THE

MAGAZINE OF NATURAL HISTORY,

AND

JOURNAL

OF

ZOOLOGY, BOTANY, MINERALOGY, GEOLOGY, AND METEOROLOGY.

CONDUCTED

By J. C. LOUDON, F.L., G., & Z.S.

MEMBER OF VARIOUS NATURAL HISTORY SOCIETIES ON THE CONTINENT.

LONDON:

PRINTED FOR LONGMAN, REES, ORME, BROWN, AND GREEN,
PATERNOSTER-ROW.

1831.

LONDON:
Printed by A. & R. Spottiswoode,
New-Street-Square.

PREFACE.

If this Fourth Volume of the *Magazine of Natural History* shall be found, as we believe it will, to contain a greater variety of articles than either of the three which have preceded it, our Subscribers are indebted to our Contributors, and we think will join with us in offering them sincere and hearty thanks. We have only to refer to the List of Contributors (p. vii.), to show their number, and the rank in science of some of their names.

Among the improvements introduced in the present Volume, we are desirous of directing the attention of our readers to some made in the General Index. Under the head of "Queries and Answers" will be found, alphabetically arranged, all the subjects queried or answered in the present Volume, with references connected with these queries to former Volumes. Under the word "Hints," in this Index, will be found the various suggestions for improvements in the management of the Magazine, or for articles to be written for it, which have been given in this Volume, without having been complied with. Under "Retrospective Criticism" will be found all the subjects criticised in this Volume, with references, as in the case of "Queries and Answers," to former Volumes. Lastly, under "Corrections," the errors in this Volume, and in preceding ones not before noticed, are given.

Among other advantages which will result from this plan being adopted in future, will be that of pointing out to the more profound Naturalist a ready mode of ascertaining the wants of his less instructed brethren; there being many of the former, we are convinced, who would willingly answer a query, or settle a point of difficulty or criticism, who have neither leisure nor inclination to write longer articles.

It is not without regret that we allude to the large proportion of controversial papers contained in the present Volume; but

our regret is less on account of the unsuitableness of these papers to this Magazine (because we are convinced that in the end they will do good), than because of the space which they occupy among the "Original Communications." This circumstance has determined us to arrange all future controversy (and we trust we shall henceforth have very little) under a distinct head, and immediately before "Retrospective Criticism;" where, being in a small type, it will occupy much less room, and may be passed over by those who do not take an interest in the subjects discussed.

J. C. L.

Bayswater, Oct. 13. 1831.

CORRECTIONS.

Vol. II., as noticed in Vol. IV.

In p. 97. make the corrections indicated in vol. iv. p. 469. line 8. from the bottom.

Vol. III., as noticed in Vol. IV.

In p. 154. line 22. for "the swift," read "four swifts;" and, in the next line, for "October 27." read "September 27.," as pointed out vol. iv. p. 185.

In p. 189. line 13. for "Coulemb's balance of Tarsim," read "Coulomb's balance of torsion," as directed vol. iv. p. 469.

In Notes on the Pyrenees, p. 496-507., insert the corrections given vol. iv. p. 82.

In p. 507. line 14. from the bottom, for "Peeblesshire," read "Mid-Lothian," as shown vol. iv. p. 556.

In p. 524. for description of fig. 128. see vol. iv. p. 85.

In p. 545. for "*Phil. Trans.*," p. 1793, read "year 1703," as shown vol. iv. p. 80.

In p. 570. to "holocéntricus" substitute the derivation given vol. iv. p. 77.

Vol. IV.

In p. 25. line 35. for "elevation" read "thickness," as shown, p. 468. line 37.

In p. 27. line 19. for "entwine" read "intermingle."

In p. 105. line 15. for "Collièri" read "Collièi," as shown p. 331.

In p. 123. line 42. for "triviàlis" read "locustèlla," as shown p. 412. in the note.

In p. 144. line 13. for "Vol. II. p. 123." read "Vol. III. p. 193.," as shown p. 278.

In p. 155. line 50. for "on" read "no."

In p. 168. in the headings to the columns of the table, make the corrections as directed p. 469.

In p. 178. line 25. for "Sowerby's *Genera of Fossil Shells*," read "Sowerby's *Mineral Conchology*."

In p. 185. line 31. for "diction" read "dictum."

In p. 208. line 11. from the bottom, for "fig. 33. *a*," read "fig. 33. A."

In p. 287. line 17. for "mare" read "man," as shown p. 383.

In p. 449. line 19. for "Lanius excubitor" read "L. *Collùrio*."

CONTENTS.

PART I. ORIGINAL COMMUNICATIONS.

GENERAL SUBJECT.

Remarks on the Natural Productions indigenous to Britain. By T. E. L. - - Page 1

On the Study of Nature and Science. By Joseph Hayward, Esq. - - - - 5

On the Auditory Apertures in the Skulls of Quadrupeds and Birds, as Auxiliaries in Classification. By W. Farrar, Esq. M.D. - 9

A familiar Treatise on the Anatomy and Physiology of the Organs of Vision in Man and other Animals. By B. S. - - 14. 207

A Defence of "certain French Naturalists." By Wm. Swainson, Esq. F.R.S. F.L.S. &c. &c. 97

Original Letters, descriptive of a Natural History Tour in North America. By T. W. 108 289. 523

Account of an Ornithological Visit to the Islands of Shetland and Orkney, in the Summer of 1828. By Richard Drosier, Esq. - - 193

Evidences in Proof of certain Statements contained in the "Gardens and Menagerie of the Zoological Society delineated." In a Letter to the Conductor. By E. T. Bennett, Esq. F.L.S. Vice-Sec. Z.S. - - - - 199

A Letter to the Editor respecting Art. I. of No. XVIII. of this Journal. By N. A. Vigors, Esq. M.A. F.R.S. &c. - - 206

Rough Notes made during a Pedestrian Tour to the Lakes of Cumberland and Westmoreland, in the Spring of 1830. By G. - 297

Remarks on the recent Mode of publishing the Numbers of Stephens's "Illustrations of British Entomology." By A. H. Davis, F.L.S. 303

An Attempt to explain the principal Phenomena of Geology and Physical Geography, by the Precession of the Equinoxes and the Earth's Figure as an oblate Spheroid. Presented to the Geological Society of London by the Author, Sir John Byerley, Member of several learned Societies - - - - 308

A farther Defence of certain French Naturalists. By Wm. Swainson, Esq. F.R.S. F.L.S. &c. - - - - 316

A Reply to Art. I. No. XVIII. of this Journal. By N. A. Vigors, Esq. A.M. F.R.S. &c., in a Letter to the Editor - - - 319

An Essay on the Analogy between the Structure and Functions of Vegetables and Animals. By William Gordon, Esq., Surgeon, Welton, near Hull. Read before the Hull Literary and Philosophical Society, Nov. 19. 1830. Communicated by Mr. Gordon - 385

Some Account of a Russian Natural History Expedition in Brazil, during the Seven Years preceding April, 1831. By M. F. Faldermann, Curator of the Botanic Gardens, St. Petersburgh - - - - - 394

Instances of Monstrous Productions. Communicated by C. B. Rose, Esq. - - 403

The final Statement of Mr. Swainson, in reply to Mr. Vigors. By William Swainson, Esq. F.R.S. L.S. &c. - - - 481

Letter to the Editor, in defence of certain French Naturalists. By M. Lesson - 487

Reply to Mr. Davis's Animadversions upon the recent Method of publishing his "Illustrations of British Entomology." By J. F. Stephens, Esq. F.L. and Z.S. &c. - - 488

On the Intellectual Faculties of Brute Animals. By J. J. - - - - - 498

Further Remarks on the Luminosity of the Sea. By Wm. Baird, Esq. M.D., Member of the Plinian Society, Edinburgh - Page 500

Additional Remarks on the Luminosity of the Sea. By J. Westwood, Esq. F.L.S. &c. - 505

ZOOLOGY.

Notice of an Attempt to naturalise the Virginian Partridge in England. By J. C., Staffordshire 16

Anecdotes of a tame Hawk. By the Rev. W. B. Clarke, F.G.S. F.L.S. M.R.S.L. &c. - - 19

Notice of the Breathing-Tube of the Boa. By Bartholomew Dillon, Esq. - - - 20

Entomological Notes. By J. C. Dale, Esq. - 21

Notice of the recent Capture of Chrysomèla cerealis in North Wales. By John Blackwall, Esq. F.L.S. - - - - 23

Additions to the Catalogue of British Birds, with Notice of the Occurrence of several rare Species. Communicated by William Yarrell, Esq. F.L. & Z.S., in a Letter to the Conductor 116

Some Account of the British Song Birds. By J. M., A.L.S. &c. - - - - 118. 412

An Account of the Discoveries of Müller and others in the Organs of Vision of Insects and the Crustàcea. By George Parsons, Esq. 124. 220. 363

Observations on the Hyacinthine Maccaw. By E. T. Bennett, Esq. F.L.S. - - 211

On the Solitary Thrush (*Túrdus solitàrius*). By J. Couch, Esq. - - - - 213

Observations tending to establish the Identity of the Deal Fish of Orkney with the Vaagmaer of Iceland. By the Rev. Dr. Fleming - 215

On the Natural History of the Bee. By W. L., of Selkirkshire - - - - - 234

On a beautiful Nidus of a Spider, and a Hymenopterous Parasite found within it. By A. H. Davis, Esq. F.L.S. - - - 236

On the Habits of the Weasel. By *Scólopax Rustícola* - - - - - 337

Some Account of a Grampus (*Delphìnus O'rca*) recently captured in Lynn Harbour. By G. M. 338

Observations on the British Species of Shrikes, their Habits, Nidification, &c. By J. D. Hoy, Esq. - - - - - - 341

On the Black Marten (*Hirúndo Apus Lin.*). By W. L. - - - - - - 344

Remarks on the Locomotion and Habits of the Limpet. By Frederick C. Lukis, Esq. - 346

An Introduction to the Natural History of Molluscous Animals. In a Series of Letters. By G. J. - - - - - 351. 523

The Robin. By Von Osdat - - - - 410

On the Domestic Education of Cats. By Cattus 511

Unusual Structure of the first two Cervical Vertebræ of a large Quadruped found in a Boneyard. By C. B. - - - - - 513

Remarks on Professor Rennie's Edition of Montagu's Ornithological Dictionary. By Charles Waterton, Esq. - - - - - 516

Notes on the Chimney Swallow (*Hirúndo rústica*), and on the Window Swallow or Marten (*Hirúndo úrbica*). By Jonathan Couch, Esq. 520

On a peculiar Species of Mite parasitical on Slugs. By the Rev. L. Jenyns, F.L.S. - 538

BOTANY.

A Sketch of the Flora of Richmond, Yorkshire, as compared with that of Thirsk, in the same County. By T. E. L. - - Page 24
On the claims of *Iris tuberosa* as a Native of Ireland, and on some Peculiarities in its Growth and Flowering. By the Rev. W. T. Bree, A.M. - - - 28
Account of a very large Tree in Mexico. Communicated by James Mease, Esq. M.D. - 30
On the Sensibility of Vegetables. By T. E. L. 134
Description of a beautiful Tree. By John F. M. Dovaston, Esq. A.M., of Westfelton, near Shrewsbury - - - 238. 538
New Theory of the Ascent of the Sap. By H. 541

GEOLOGY.

Notice of a Fossil *Nautilus* found in the Sandstone of the Isle of Sheppey. By Mrs. Lee, late Mrs. Bowdich - - - 137
Description of the Jaw and Teeth of a Mammoth, and of some other Fossils, found in a Flint Quarry in the Neighbourhood of Chatham; being the Substance of a Lecture delivered to the Philosophical and Literary Society of that Town by Robert Dadd, Esq. Communicated by Mr. Dadd - - 240
Observations on the Diluvial Gravel in the Neighbourhood of Birmingham. By Frederick Jukes, Esq. - - - 372
On the recent and rapid Formation of some Peat Bogs in Ireland. By Geo. Ensor, Esq. 543
Notice of the Volcanic Island lately thrown up between Pantellaria and Sciacca. By William Ainsworth, Esq. M.R.S.L., Member of the Royal Geographical Society, &c. - Page 545

METEOROLOGY.

On raining Trees. By John Murray, Esq. F.S.A. F.L.S. F.G.S. &c. - - - - 32
Some Remarks on the Spring of 1830, as compared with that of 1829, with a Calendar showing the Difference of the Two Seasons. By the Rev. W. T. Bree, M.A. - - 35
A short Account of the Fall of a Meteoric Stone at Launton, in Oxfordshire. By Mr. Stowe, Surgeon, Buckingham - - 139
On the Temperature of the Atmosphere on different Parts of the Earth's Surface. By Mr. W. White, H.M.C.S. - - - 245
Data and Observations towards establishing Rules for the Guidance of Agriculturists and Botanists, as to the Quantity of Rain which falls in different Months of the Year in different Places. By James G. Tatem, Esq., Member of the Meteorological Society - 248
Hail in the South of France, and Insurance against Loss by it. By James Mitchell, Esq. LL.D. - - - - 549

PART II. REVIEWS.

Insect Architecture: forming Vol. III. of the "Library of Entertaining Knowledge" - 39
Botanical Commentaries. By Jonathan Stokes, M.D. Vol. I. - - - - 55
Algæ Britannicæ; or, Descriptions of the Marine and other inarticulated Plants of the British Islands belonging to the Order *Algæ*; with Plates illustrative of the Genera. By Robert Kaye Greville, LL.D. &c. - - 57
Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists - - - - - 62. 421
Bulletin de la Société Impériale des Naturalistes de Moscou. Vol. I. for 1829, and No. I. for 1830 - - - - - 251
Zoological Researches and Illustrations in Natural History. By John V. R. Thompson, Esq. F.L.S. Nos. I. and II. - - - 256
Notice sur le Tettigópsis, nouveau genre d'Orthoptères de la Russie. Par G. Fischer de Waldheim - - - - - 261
Illustrations of Zoology. By James Wilson, F.R.S.E. Nos. VIII. and IX. 261
Literary Notices - - 67. 262

PART III. COLLECTANEA.

Zoology - - - - - 142. 430
Botany - - - - - - 157. 437
Geology - - - - - 443
Meteorology - - - - 444

PART IV. MISCELLANEOUS INTELLIGENCE.

Natural History in Foreign Countries:
Italy - - - - 263
Natural History in London - - 68. 158
Natural History in the English Counties:
Bedford - - - - 160
Buckinghamshire - - - 267
Cheshire - - - - - 73
Cornwall - - 161. 267
Devonshire - - - 445
Dorsetshire - - - - 73
Essex - - - - 268. 446
Lancashire - - - 72. 448
Leicestershire - - - 162
Norfolk - - - - 269
Nottinghamshire - - - 70
Suffolk - - - - 163. 449
Sussex - - - - 163
Warwickshire - - - 164
Worcestershire - - - 450
Yorkshire - - - 71. 165
Natural History in Scotland - - 166. 269
Natural History in Ireland - - 167. 269. 452
Calendar of Nature in England for 1830, 167
Monthly Calendar of Nature for Scotland, 74. 175. 270. 378. 453. 553
Wood-cuts in the "Library of Entertaining Knowledge." - - - 380
Hints for Improvements - - - 177
Retrospective Criticism 76. 183. 272. 381. 455. 554
Queries and Answers 86. 187. 278. 383. 470. 557
Obituary - - - 192. 558

Appendix: Controversy between N. A. Vigors, Esq. A.M. F.R.S. &c. and W. Swainson, Esq. F.R.S. L.S. &c. - - - 559
Glossarial Index - - - - - - 561
Index to Books reviewed and noticed - - - 563
General Index - - - - - - 564

LIST OF ENGRAVINGS.

BIRDS.

No. Page
8. Virginian partridges - - 16

FISHES.

34. Deal fish of Orkney - - - 216
56. Grampus - - - 339

REPTILES.

15. Intestines of a frog - - 95

CRUSTACEA.

100 *b*. A species of Cynthia? *Thompson* - 503
100 *a*. Cancer fulgens? *Banks* - - 503
18, 19. Eyes of Scorpio tunensis - 129, 130
22, 23. Eyes of a large Cymothoa - 132
47, 48. Eye of Gammarus Pulex - 232
46. Eye of Monoculus apus - - 232
43. Eye of Penæus sulcatus - - 226
20, 21. Eyes of Scolopendra morsitans - 130

INSECTS.

1. Ægeria tipuliformis - - 6
14. Ball containing an insect - - 93
35, 36, 37, 38. Compound eye of Libellula vulgaris - - 221, 223, 224
66. Diagram exhibiting the mode of the action of light on compound eyes - 365
31. Erosions of insect in the bark of ash - 156
42. Eye of Æschna grandis - - 226
44. Eyes of a Sphinx - - - 228
39. Eye of Dytiscus marginalis - 226
40. Eye of Lucanus Cervus - - 226
45. Eyes of Mantis religiosa - - 230
41. Eye of Meloe majalis - - 226
26. Hermaphrodite Bombyx castrensis - 150
89. Hermaphrodite Bombyx (Clisiocampa *Curt.*) castrensis - - 434
88. Hermaphrodite Bombyx (Eutricha *Steph.*) pini - - - 434
90. Hermaphrodite Bombyx (Hypogymna *Hubn.*) - - - 434
91. Hermaphrodite Lucanus Cervus *L.* - 435
27. Hydrophilus piceus, nest of - 151
52. Luminous sea insects - - 285
13. Metamorphosis of a species of Cassida 85
68. Mode of vision by insects with compound eyes - - - 371
97. Polyommatus Argiolus, male and female - - - - 477
28. Remarkable web of a spider - 151
50. Tettigopsis, a new genus of locusts - 261
30. Tracks of the Scolytus destructor - 156
67. Visual field of the hemispherical eye 368
31. Tracks of an insect in ash bark - 156
2. Wasp's nest, two sections of - 7

MOLLUSCA.

65. Animal of Buccinum undatum - 362
105. Bulimus obscurus - - - 525
61. Cells of Lithodomi - - 354
106. Haliotis - - - 529
64 *c*. Hiatella arctica - - 358
60. Mytilus edulis - - - 353
107. Octopus vulgaris, eye of - - 531
109. Philodromus Limacum *Jennings* - 539
62, 63. Pholas candida - - 355, 356
96. Physalis pelagica, Portuguese man of war - - - - 475
64 *b*. Saxicava præcisa - - 358
64 *a*. Saxicava rugosa - - - 358
104. Solen siliqua - - - - 524

No. Page
57, 58. Tracks of the common limpet (Patella vulgata) - - 348, 349
108. Tritonia arborescens - - - 537
59. Young of the common limpet - 350

ANIMALCULES.

51. Fluke, found in the liver of sheep - 284
181 *a b c*. Luminous animalcules - 504
99 *b*. Luminous echinate animalcule - 502
99 *c*. Luminous cirrhose animalcule - 502
98. Luminous species of Cyclops - 501
99 *a*. Radiated luminous animalcule - 502

LANDSCAPES.

16. Fort Lee, in America - - 109
17. Grave of Major André - - 114
54. The Hudson river, in America, near Vredideka Hook - - - 290
55. West Point, on the Hudson - 291

TREES AND SHRUBS.

83. Dracæna surculosa - - - 384
29. Elm tree - - - - 155

HERBACEOUS PLANTS.

32. Aspidium dilatatum var. recurvum - 162
82. Eriophyllum cæspitosum - - 384
9. Iris tuberosa - - - 29

FOSSILS.

24. A Nautilus in sandstone in the Isle of Sheppey - - - - 137
11. A petrified tree - - - 73
72. A seed-vessel - - - 374
79. A shell of the Pecten genus - - 376
77. Bed of shells - - - 376
73. Calamites Pseudo-*Bambusia* - 375
80. Caryophyllia - - - 377
78. Entrochi in chert - - 376
69. Fern leaf in ironstone - - 374
74. Ficoïdites verrucosus - - 375
75. Fossil unnamed - - - 375
49. Jaw and teeth of a mammoth - 241
10. Oak from the bed of the Trent - 70
71. Reticulated trunk, with leaves - 374
81. Shells in sandstone - - 377
70. Single leaf in ironstone - - 374
76. Thin stem with fine leaves - - 376
53. Trilobite, a species of - - 288
93, 94. Trilobites resembling butterflies 443, 444

METEOROLOGY.

12. Meteorological diagram - - 74

GEOLOGY.

111, 112. Volcanic Island - - 548, 549

OSTEOLOGY.

102. Cervical vertebræ - - - 514
86, 87. Head of a monstrous lamb - 405, 406
5. Skull of the fox - - - 11
3. Skull of the hare - - - 9
6. Skull of the owl - - - 12
4. Skull of the polecat - - 10
103. Vertebral mechanism - - 515

MISCELLANEOUS.

7. Human eye, and a section of it - 15
33. Human eye, humours of - - 208
92. Instruments for catching insects - 436
84, 85. Monstrous head of a lamb - 404
25. Pipe for blowing eggs - - 145
110. Stool found in an Irish peat bog - 544

LIST OF CONTRIBUTORS.

A. B. - - - - - - - 145
A. B. B. - - - - - - 268
A Constant Reader - - - - 382
Acton, Edward - - - 163. 187
A. D., 284.; A. E. - - - 93
A. G. G., Newark upon Trent - - 70, 71
A. G., Annat Gardens, 75. 177. 272. 380. 455. 554
Agronome - - - 476. 557
Ainsworth, William, M.R.S.L. - 82. 545
A. J., 182.; A. L. A. - - - 186
Allis, Thomas - - - - 71. 91
A Lover of the Science (Entomology) - 476

A Mineralogist - - - - 96
An Entomological Amateur - - 149
An Observer - - - - 456
An Observer of Nature - 82. 92. 93. 145. 456
Anon. - - - - 192. 268
A Purchaser of "Stephens's Illustrations" 460
A. R. Y. - - - - 55. 458
A Sportsman - - - - 181
A Subscriber - - - 147. 383
A. Z. - - - - 384. 473. 479
B., Coventry - 81. 190. 383. 457. 476. 471
B., Hampstead - - - - 288
B., Laytonstone - - - - 444
Baird, W., M.D. - - - 476. 500
Bakewell, Robert - - - - 474
Bennett, E. T., F.L.S. - - 199. 211
Blackwall, John - - 23. 74. 142
Blair, T. - - - - 187. 280
Bland, Michael - - - - 465
Blomer, Charles - - - - 446
Bloxam, Andrew - - 146. 162, 163
Bluett, T. - - - - 434
Bowman, J. E. - - - - 180
Bouchier, Barton - - - - 433
Bree, Rev. W. T., A.M. 28. 35. 145. 148. 162. 165. 187. 275. 381. 443. 464. 469. 472. 479. 480
Brown, P. J. - - - - 89
B. S. - - - - - 14. 207
Burney, H. - - - - 471
Byerley, Sir John - - - 308
C. - - - - 283. 479
C. B. - - - - - 513
Cattus - - - - - 511
Causidicus - - - - 463
Chapman, Thomas - - - 188
Clarke, W. B. - 19. 82. 91. 92. 96. 144. 191
Couch, J. - - - - 213. 530
C. S. E. - - - - 382
Davis, A. H., F.L.S. - 283, 284. 303. 557, 558
Dale, J. C. - - - - 21. 267
Deck, J., Cambridge - - - - 153
Denson, John, sen. - - 152. 155. 156
D. N. - - - - 384. 472
Dovaston, J. Freeman Milwood, A.M. 238. 455
Dadd, Robert - - - - 240
Drosier, Richard - - - 193
D. S. - - - - 423
Duval, Auguste Prévost - - - 150
Edgeworth, Thomas - - - 464
Ensor, George, Esq. - - - 543
E. S., F.L.S. - - - 436. 464
Faldermann, F. - - - 394
Farrar, W., M.D. - - - 9
F. C. L. - - - - 284
F. I. - - - - 288
Fleming, Rev. Dr. - - - 215
Flewker, James - - - 73
Frank Plain - - - - 278
G. - - - - 297
Garry, William - - - - 448
Gilbertson, Wm. - - - 73
Giles, J. B. - - - - 279
G. J. - - - - 351. 523
G. M. (Lynn Regis) - 146. 152. 157. 191. 338
Gordon, William, Surgeon - - 385
Gorrie, A. - - - - 192
H. - - - - 93. 541
Hayward, Joseph - - - 5
H. C. W. - - - - 166
Headlam, E. - - - - 433
Henslow, J. S., Prof. Bot. Cambridge 279. 281, 282. 284. 383. 459. 466
Hewitson, William C. - - - 265
H. N. - - - 270. 453
H. T. - - - - 473
H. T. C. - - - 287. 383
Hoy, J. D. - - - 147. 341
Inquisitor - - - - 279
J. B. A. - - - - 86. 183
J. C. (Staffordshire) - - - 16. 433
J. E. L. - - 1. 24. 72. 134. 466. 467
Jenyns, Rev. Leonard, F.L.S. - - 538
J. G. - - - 448. 479
J. G. C. - - - - 445
J. J. - - - - 498
J. M. (Edinburgh) - - - - 143
J. M. (Philadelphia) - - - 151
Jones, J. - - - - - 90
J. O. W. - - - 82. 85. 94. 95
J. Reed - - - - 149
J. S. (Manchester) - - - - 81
Jukes, Frederick - - - - 372
Juvenis - - - - - 181
J. W. L. - - - - 64. 70. 276
K. O. See V. O.
L. D. - - - - 92. 96. 188
Lee (late Bowdich), Mrs., - - - 137
Lees, Edwin - - - - 441
Lequin, J. - - - - 192
Lesson, M. - - - - 487
Lukis, Frederick C. - - - 346
Mackay, J. T. - - - - 167
Main, James, A.L.S. - - 118. 412
Mantell, Mr., of Lewes - - - 164
Maund, B. - - - - 442
Mease, James, M. D. - - - 30
Mitchell, James, LL.D. - - - 551
Murray, John, F.S.A. F.L.S. F.G.S. &c., 32. 85. 147. 148. 150, 151. 157. 469
Murray, T. See Murray, J.
N. - - - - 63. 255. 260. 261. 262. 277
Newman, Edward - - - - 560
Nichols, J. - - - - 449
O. - - - - - 94. 150
Parsons, George - - 124. 220. 363
Rennie, J., Prof. Nat. Hist., King's College, London - - - - 186
Perry, John, jun. (Godalming, Surrey) - 437
Perry, W. G. - - - - 450
Reed, L. E. - - - - 444
R. H. - - - - - 427
Robertson, John - - - 469
Rose, C. B. - - - - - 403
R. S. - - - - - 96
Rusticus - - - - 280. 284
Scales, William - - - - 431
Scólopax Rustícola - 83. 147. 184. 337. 428
Simpson, John - - - - 86
Sowerby, J. D. C. - - - - 188
Spence, W. - - - - 264
Spring, C. - - - - - 187
Stephens, J. F., F.L. & A.S. &c. - - 488
Stock, Daniel - - - - 278
Stowe, Mr., Surgeon - - - 139
S. T. P. - - - - - 187
S. V. W. - - - - - 274
S. W. - - - - - 269
Sw. - - - - - - 276
Swainson, William, F.R.S. F.L.S. &c. &c., 97. 316. 456. 474. 481. 555. 558
Tatem, James G., Mem. Meteor. Soc. 248. 267. 469
T. E. L. See J. E. L.
T. G. - - - - - 431
Thompson, Thomas - - - 86. 94
Tudor, R. A. - - - - 94
Turner, Henry - 442. 449. 450. 464. 465. 474
T. W. D. - - - - - 90
Vigors, N. A., F.R.S. &c. &c. - 206. 319
V. O. - - - - - 84
Von Osdat - - - - - 410
W. —— (near Melrose) - - - 166
W. A. - - - - 95. 190
Warwick, J. - - - - - 470
Waterton, Charles, Esq. - - - 516
W. C. jun. - - - - 473
W. C. T. - - - - - 190
Westwood, John O. - - - 435. 505
White, W. H., H. M.C.S. 160. 185. 245. 466. 474
W. H. W. - - - - - 160
W. L. (Selkirkshire) - - 166. 234. 281. 344
Woodward, Samuel - - 177. 285. 469
W. P. S. - - - - - 480
Wright, A. - - - - 150. 166. 188
W. S - - - - - 273
W. S. (Buckingham) - - - 180
W. S. (Geneva) - - - - 149
W. S. (Stamford Hill) - - - 95
Yarrell, William, F. L. & Z. S. - - 116
Y. R. - - - - - - 442
X. Y. Z. - - - - - 269
☞ - - - - - - 57. 65, 66
Σ, 274.; Γ., 189.; Δ. - - - 150

THE MAGAZINE

OF

NATURAL HISTORY.

JANUARY, 1831.

ART. I. *Remarks on the Natural Productions indigenous to Britain.* By T. E. L.

Sir,

WHEN we cast our eyes around, and observe the comforts and enjoyments, principally derived from the productions of Nature, with which we are on every side surrounded, it will naturally occur to us to consider whence these severally are derived, and how they were brought into general use; whether they are indigenous to the country, or imported into it by the zeal of individuals. This becomes almost a matter of necessity at the present time; for scarcely a day passes, scarcely a single vessel arrives from foreign ports, which does not bring with it something new or strange, either to supply the demands of luxury, already too far extended, or to fulfil some useful end in the varied concerns of commerce.

How far any country is capable of relieving the wants of its inhabitants is a question of difficult solution. In an uncivilised state, where, of course, the population is much more thinly scattered, the wants of man are comparatively few, and easily satisfied; and where commerce is unknown, and intercourse with foreigners is unfrequent, the natives are compelled to subsist on the indigenous productions of the country which they inhabit. But as civilisation advances, the population gradually increases, and intercourse with strangers becomes more frequent; a commercial spirit is by degrees awakened, and the natives of the neighbouring countries mutually exchange the productions peculiar to each; new wants arise, and, consequently, new means must be taken to gratify them; luxurious refinements creep in, and no exertions are left

untried to supply the great and increasing demand. Thus man ingeniously increases his supposed necessities, and is ever seeking something new; which, when the novelty wears off, must be supplied by others, to an interminable series.

The preceding remarks will be found generally applicable to this country which we inhabit. It will be seen, on consideration, that very few of the commonest necessaries of life are the produce of our own, but imported from foreign lands: I perhaps ought to say originally; fruits, domestic animals, the different species of grain, are *originally* natives of lands far remote from their present naturalised abodes. It is the object of this paper to take a brief and rapid view of the more remarkable of these importations, and of the principal ones which claim this island as their natural habitation.

Britain, from the earliest periods of history, has been known for its mineral treasures. There is no doubt that the Phœnicians derived their supplies of tin from this island, though whether through direct or indirect channels is uncertain. The latter seems the more probable hypothesis; though, perhaps, the uncertainty respecting the position of the Cassiterides, which exists in the ancient authors, may have arisen from the care with which the Phœnicians, in the illiberal spirit of monopoly, endeavoured to conceal the source whence that mineral was derived. Tin was evidently considered much inferior in value to gold and silver, and was abundant in Egypt at a very early period; the Greeks were well acquainted with it at the time of the Trojan war, and it was in common use among the Jews in the time of Moses. But to return: the Carthaginians, under Himilco, in that celebrated voyage respecting which we cannot but regret the scantiness of the materials that remain, reached the coast of England, or Albionn, as it was then called; and Pytheas, a voyager from Marseilles previously to the time of Alexander the Great, was acquainted with its southern and eastern shores.* England was also known by name to Aristotle, the father of natural history. But it is from the expedition of Julius Cæsar into Britain, and the account which he has transmitted to us, that we derive the fullest information of what were the productions and character of the country at that distant period.† He tells us "that the coast was thickly peopled, and that cattle (pecora) were abundant. Instead of money, the inhabitants employed iron and copper rings; the copper was imported, and the supply of iron was but scanty. Plumbum album (or

* See Lardner's Cabinet Cyclopædia, Maritime and Inland Discovery, vol. i.; and Thomson's History of Chemistry, vol. i. p. 67.

† Gallic War, lib. v. § 10.

tin) was of frequent occurrence in the interior; and the trees were the same as those found in Gaul, except the 'abies' and the 'fagus.' The natives bred the hare, the hen, and the goose, yet did not consider it proper to use them for food. They seldom cultivated corn in the inland parts, but lived on milk and flesh meat; and were clothed in the skins of beasts." Thus much says Cæsar. Tacitus, in the life of Agricola, adds some curious particulars. * He says, "Fert Britannia aurum et argentum et alia metalla pretium victoriæ; gignit et oceanus margarita, sed subfusca et liventia †:" respecting which he remarks, "Quidam artem abesse legentibus arbitrantur; nam in rubro mari ‡ viva ac spirantia saxis avelli; in Britannia, prout expulsa sint, conligi: ego facilius crediderim, naturam margaritis deesse quam nobis avaritiam." § That corn was planted even in the northern parts of the island, we gather from the speech of Galgacus before battle (when he was exhorting his countrymen to resist the insupportable tyranny of the Romans), in which he says, "Bona fortunasque in tributum egerunt; in annonam frumentum." ‖

Before proceeding further, I must be allowed to make a few remarks upon the preceding passages. The assertion of Cæsar that neither the "abies" nor "fagus" was found in Britain, has been much too severely brought forward as an impeachment of that author's veracity. There can be little doubt that the tree here spoken of was not the beech; and the "abiete," as the Italians call the silver fir, is certainly not a native of this country. The question is, then, what tree is here meant under the name of "fagus." That it was used for food there can be no doubt. Pliny calls the acorn of the fagus "dulcissima omnium" [sweetest of all], alluding to the trees natives of Italy; therefore excluding the chestnut, which, he says,

* Tacitus, Agricolæ Vita, sect. 12. and 31.

† "Britain contains gold and silver to reward the conqueror; and the sea produces pearls, but brownish and livid."

‡ "Indicus maxime has (margaritas) mittit oceanus; præcipue autem laudantur circa Arabiam in Persico sinu maris rubri." — *Pliny, Nat. Hist.* ["These pearls chiefly come from the Indian Ocean; but those from the shores of Arabia, on the Persian Gulf of the Red Sea, are the most prized."] The student must be on his guard not to mistake the "mare rubrum" here mentioned, for the Red Sea of our geographers. What is meant under that name is the northern part of the Persian Gulf, whence the Romans got their finest pearls.

§ "Some attribute this to the ignorance of the collectors; for in the Red Sea the pearl shells are torn alive from the rocks, while in Britain they are gathered as they are thrown up: but I should more readily believe nature to be deficient in pearls than men in avarice."

‖ "They take our goods in tribute; they carry off our corn to supply their city and their armies."

came originally from Lydia. He also adds, "Glandem, quæ proprie intelligitur, ferunt robur, quercus, esculus, cerrus, ilex, suber." * Pausanias tells us that the acorn was for ages almost the sole food of the Arcadians; not, however, those τῶν δρυῶν πασῶν [of all trees], but only of that which was called φηγὸς [fagus] (*Pausan.* lib. viii. c. 1. p. 592.); and a traveller in Spain (Sir Thomas Gascoigne) relates that the peasants of Catalonia and Valencia live great part of the year on the acorns of the evergreen oak; and that he and his fellow-traveller found them very sweet and palatable.† The author, also, of the number of the *Library of Entertaining Knowledge* upon trees ‡ says, "The *Q*uércus *I*lex (evergreen oak), which is still common in Spain, in Italy, in Greece, in Syria, in the south of France, and on the shores of the Mediterranean, bears a fruit which, in its agreeable flavour, resembles nuts. There is another evergreen oak (*Q*uércus *B*allòta) very common in Spain and Barbary, of which the acorns are most abundant and nutritive. During the late war in Spain, the French armies were fortunate in finding subsistence upon the *B*allòta acorns in the woods of Salamanca." This, then, in all probability, is the "fagus" spoken of in the *Commentaries* of Cæsar: certainly not a native of Britain; and more likely, being a common article of food, to be mentioned than that which we now know as the *beech.* From the same passage in Cæsar we find that neither the copper mines of Cornwall nor, in fact, any in the kingdom, were then worked, or, indeed, known; and that even iron was not found in abundance. In the time of Agricola, it appears that pearls and the precious metals were to be met with. The consideration of this passage we will leave to another opportunity. Whatever progress in civilisation the natives, from the preceding passages, appear to have reached, it must be understood to refer to the inhabitants on the sea-coast exclusively. The natives of the interior were perfect savages, lurking in the recesses of the woods, clad in skins, painting or tattooing their bodies, and neither sowing nor planting; verifying the description of the poet Spenser —

> "But far in land a salvage nation dwelt
> Of hideous giaunts and halfe-beastly men,
> That never tasted grace, nor goodness felt;
> But wild like beastes lurking in loathsome den,

---

* "The acorn properly so called is produced by the Robur," &c.

† Swinburne's Travels in Spain, Letter ii. p. 85.

‡ Library of Entertaining Knowledge, vol. ii. p. 4.

◊ See a note in Mitford's History of Greece, vol. i. p. 8., for further information respecting the use of acorns as food.

And flying fast as roebucke through the fen,
All naked without shame or care of cold,
By hunting and by spoiling liveden;
Of stature huge, and eke of corage bold,
That sonnes of men amazd their sternesse to behold."

I am, Sir, yours, &c.

Richmond, Yorkshire, Nov. 7. 1830. T. E. L.

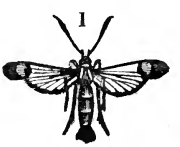
ART. II. *On the Study of Nature and Science.* By JOSEPH HAYWARD, Esq.

Sir,

ALTHOUGH I am so unfortunate as neither to have possessed leisure, nor perhaps inclination, to study the methodical arrangements of botany or entomology, nor to have found room in my memory for their technical terms and distinctions, I have always been an admirer of Nature; my admiration principally arising from the beauty and elegance of her designs in the formation of all her subjects, and the all-perfect adaptation of them to her ends. One object of your Magazine must, no doubt, be to direct and attach the mind to the study of nature, in its simple as well as in its complex garb; and therefore, though some of your more learned readers may think my abilities too limited, you, perhaps, may not think my endeavours to contribute to your miscellany unworthy of your notice. In studying nature, with whatever view, unless we confine ourselves to some definite object, we may be led, like too many authors, into the bewildering extreme of "perverting the study of nature into metaphysical subtlety and vain logomachy." My observations have been chiefly, if not wholly, directed to those objects in which the exhibitions of beauty and demonstrations of utility are combined; consequently, my attention has been given more to vegetables than animals: but as the one is so much dependent on the other, they cannot well be separated. Thus we find that the symmetrical forms designed by nature to be assumed by vegetables, are often obstructed and destroyed by their being made necessary to form the food and habitations of insects: and as it, therefore, happens that there are no means of preserving the one without destroying the other, we are necessitated to study the means of annihilating one object of beauty to preserve another. In the pursuit, however, of destruction, we are often permitted to enjoy the mental pleasure of contemplating an exhibition of the beautiful designs of Nature, and the all-perfect execution of them, conformably to her ordinances.

Having been balked in my endeavours to raise and train some young currant bushes in a particular manner, from their failing to grow so luxuriantly as I had reason to expect from the pains I had taken to prepare the soil, &c., I was led to a narrow examination of their exterior, in search of the cause; and perceiving some wounds in the branches, that had much the appearance of being made by the entrance of small shot, I cut off a branch, when I found that the medulla or pith was destroyed, and its place converted into a commodious apartment and passage for some insects. I traced it for several inches, and found it was occupied by a grub or maggot; and knowing this must be the larva of some fly or moth, I determined on securing some of them at the proper season, to see the result of their transformations. Having obtained some in a chrysalis state, I placed them under a glass; when, after some weeks, one of them produced a beautiful and most singularly formed insect, which appeared to be neither a fly nor a moth, but something between both. (*Ægèria tipulæformis*: see Samouelle's *Ent. Useful Compend.*, 397.) I enclose you the insect; but, fearing it may be destroyed in its journey, I annex a rough sketch. (*fig.* 1.) The colour of the bands of the body, and the veins of the wings, is a black purple, and these, with the sides, legs, &c., are edged with gold; the fan at the posterior, which is something like the tail of a lobster, is formed of feathers, laid one over another, the same as on the rump of a bird; the wings lie on its back, much in the same position as those of a common fly. The exhibition and description of this fly, however, can only serve as an object of admiration. The means of preventing its mischievous ravages must be, to cut off the branches, and, tracing it to its lodgment, to destroy it.

1

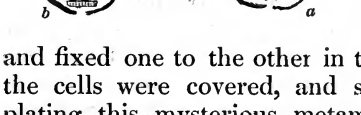


I will also describe what appeared to me to be a singular instance in the working of an insect, and which seems to prove that their powers of design and execution, in the formation of their apartments for lodging and fostering their young, are something more than instinctive. Accidentally standing and musing under a shed erected over a small rivulet in Wiltshire, I observed a common wasp enter, affix itself to the roof, and set about attaching something to one of the rafters, much in the same manner as martens do in building their nests; and as I had always understood that those wasps made their nests under ground, curiosity led me to notice its operations, and the progress it made daily, for some weeks. It proceeded to form a cell of the shape and size of an acorn, depending, with an entrance at the lower extremity. As soon as this was

completed, it began another, at a sufficient distance from the first to admit of its free passage between them; as soon as this was finished, it began and completed another and another, and so on until the inverted cone was large enough to hold half a pint or more.

I could not perceive that there was more than one artist employed, until two or three shells had been formed, and the last one was as large as a hen's egg. About this time there were evidently two or three active labourers; and these increased in number daily, until they became so numerous as to become a nuisance, when I determined on destroying them, and examining the interior of their mansions.

Having smothered, as I thought, all the tenants, I detached the fabric carefully from the rafter; when, to my astonishment, instead of finding it composed of as many shells as I had seen formed one over the other, thus (*fig.* 2. *a*), I found the exterior shell only to retain its figure; the interior consisted of three or four tiers, formed with a regular range of cells, like a honeycomb, and fixed one to the other in the centre, thus (*b*). Many of the cells were covered, and some open. Whilst contemplating this mysterious metamorphosis, I observed one of the coverings broken through by some active power within; and, presently, out marched a fine and perfectly formed wasp, which, after a few seconds devoted to pluming and adjusting itself, flew off in all the glory of its perfect formation. In a few minutes another came forth, and then another, and so on. This led me to a further examination of the contents of the cells, and I found, in all those that were covered, wasps fully formed; but in many of them their bodies were of a white jelly-like substance, some just turning colour, and some nearly arrived at perfection; but all had their limbs perfectly formed, and folded, with perfect order and regularity, close to their bodies. The cells that were not covered I perceived to contain each a larva or grub, but of different sizes, advancing from a small point to the size of the wasp; and as each of these appeared to be furnished with a pair of destructive jaws, and to be inclined to work them, I presented some pulp of fruit, which they received and devoured most ravenously. Hence it is evident that the wasps feed their young until they arrive at a certain age; and this accounts for the ravages they make among fruits.



It also appears evident that the colonies of wasps, like bees, are divided and appropriated to the performance of different

duties; and although it seemed to me that all those which were in activity about the original nest possessed stings, many of those which afterwards came out did not: possibly these, like the drones among bees, were the males, and produced only at the close of the season. As it is evident that the lives of all are limited to the close of the autumn, how and in what state are the females preserved, to continue the breed? In general, the female wasps make their appearance in April and May; and as each of these is found to be the origin and mother of a colony, I always take every means in my power to destroy all that can be met with at that time.

I once found a circle of six or eight cells, each containing a larva approaching to the perfect state, in some old thatch that had been thrown off a wall during the winter, which I supposed to be female wasps; but I could not exactly make out whether they were so, or humble bees.

Whilst writing, I will take the liberty to remark, that, as science is "demonstrative truth," all writers who profess to ground their works on science should adhere to it in their descriptions; as without this the unerring principles of science are often deprived of the confidence due, from being confounded with the fallacious suppositions of theory: and thus unjust prejudices are raised and increased against books on science: and further, when the objects of Nature are misrepresented, her designs are made to appear imperfect; and hence one of the important effects of the study of nature is unjustly depreciated. I am led to make these observations by a description of your fair correspondent, Miss Kent (Vol. I. p. 223.); wherein, upon describing the different parts of a flower, she says of the pistil: "The stigma is more or less covered with a glutinous moisture; the pollen being shed upon this part, adheres to the glutinous moisture, and, by means of the hollow style which connects it with the germen, feeds the young fruit until it has attained its full growth. Thus sits the style, like a hen bird upon her eggs; while the stamen, like a tender mate, supplies her with food." Whereas, the fact is, the style merely forms a channel for conveying the living principle contained in the pollen to the embryo seeds; which operation being effected, it withers and dies, and this long before either the fruit or seeds attain their full growth.

I am, Sir, yours, &c.

Weymouth, July, 1829. JOSEPH HAYWARD.

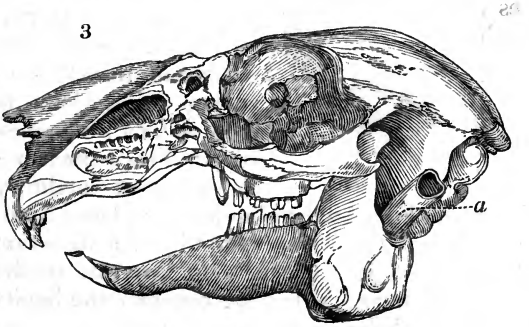
ART. III. *On the Auditory Apertures in the Skulls of Quadrupeds and Birds, as auxiliaries in Classification.* By W. FARRAR, Esq., M.D.

Sir,

I HAVE been induced, for some time back, to pay a considerable share of attention to the position of the auditory canal in various animals, from having accidentally remarked, when engaged in researches in comparative anatomy, the different situations of this tube in the pursued and pursuing animals. From what has fallen under my notice, I think this portion of the animal structure has received but little attention; at any rate, much less than I feel inclined to claim for it. I am further of opinion, that the form and situation of this organ, or its tubulated external portion, might be made a very useful *auxiliary* in classing quadrupeds (and particularly the fossil specimens of them), as well as in arriving at a more correct knowledge of their habits and modes of existence. I have selected a few well known animals, to show the most opposite extremes in which the auditory canal is placed, for the amusement, if not for the edification, of your readers.

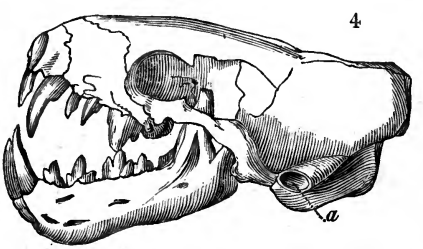
To commence with the skull of the hare. (*fig.* 3.) When the skull of the animal is placed horizontally before you, the tubulated bony portion of the external ear is seen nearly half an inch in length, and a quarter of an inch in diameter, pointing backwards and upwards, at an angle of 45° or thereabouts. To this tube (*a*) in the living animal is attached the external ear, which is moved in various directions to suit the purposes of the animal, as will be subsequently mentioned. This animal is a pursued one; and, as such, it is indebted for its safety to a quick perception of danger, by means of its external senses. The least remarkable of these is certainly not that of hearing: viewed externally, we find long open ears, for the most part inclining backwards; but also occasionally forward, as well as laterally. These are moved into various attitudes by muscles placed for that purpose, and thus serve

3



as excellent media for collecting sounds, and transmitting them, through the bony portion of the canal, to the internal ear. That these organs are valuable adjuvants to another sense (that of sight) no one will doubt, especially when he recollects that animals of this class, although possessing a very wide expanse of sight, yet do not enjoy an equally distant one; which is not to be wondered at, when we look at the diminutive stature they exhibit: yet for this loss they are compensated, by having the sense of hearing very acute from a number of points, though much more from behind than in any other direction. Many persons contend that the hare cannot distinguish sounds immediately before her, which is not unlikely when we consider the bony structure of the external ear; however, this is not absolutely necessary, as her prominent eyes scarcely allow any object to approach her without some part of its shadow being depicted upon the retina, and thus communicating the alarm to the timid animal.

As a contrast to the situation of the auditory tube in the hare, I shall now mention that of the polecat (*fig.* 4.); which animal is, as is well known, a pursuing one: consequently requiring its external senses, or rather the communications for conveying impressions, to them as forward as possible. This animal has its external auditory tube similar in length and diameter to the hare's; placed at an angle of 45° (*a*), but pointing from behind, in a direction downwards and forwards; in fact, the very opposite to the position described in the hare. When we consider the habits of this animal, and behold the structure containing one sense acting in concert with and supporting another still more valuable to the animal's existence, we cannot but wonder at the excellence of arrangements that provides for wants which mere human ingenuity can only comprehend, but could never supply.



From this tube being placed very forward, we should naturally conclude that this animal's sense of hearing is necessarily much less acute from behind than before: this supposition I am inclined strongly to support, from the following circumstance: — A farmer in the neighbourhood had his poultry disturbed on several successive nights, but could not make out the cause; till one day he discovered, near his residence,

a couple of these vermin gamboling in a very frolicsome manner. Without disturbing them, he returned hastily to his house, got his gun loaded, and then went back to look for his visitors. Approaching them cautiously from behind, he was enabled to come within a very few yards of them. He levelled his gun, but it missed fire. This occurred five or six times, without a single spark being elicited from his flint; and notwithstanding all this hammering in their rear, the animals never were in the least alarmed. Fortune, however, at last favoured him, and he was enabled to obtain one of them; but the other made its escape.

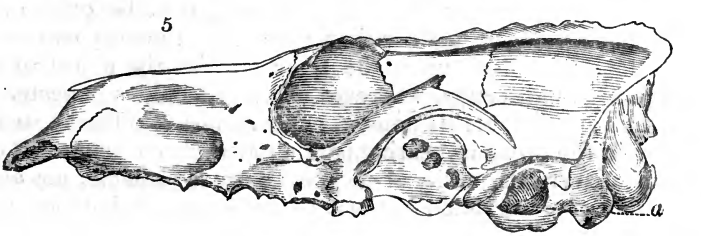
I was much puzzled with his recital of this circumstance; and could not in any manner satisfactorily account for it, till I examined its skull minutely (having obtained it for a skeleton), and then discovered its auditory canal situated in the position before mentioned.

This investigation satisfied my mind, that though this animal may hear sounds behind it, yet they are only heard imperfectly; otherwise it must have taken alarm at the many attempts to fire the gun. Applying this analogy to the hare, we may suppose that this animal, whose external tube is placed backward, would not distinguish sounds very distinctly in front of her. Many facts in the natural history of the hare might be produced to support this idea, but one will suffice: — A hare, pursued by greyhounds along a turnpike road, was seen by a woman approaching her immediately in front: she knelt down, and the hare ran fairly into her apron, which was stretched out to receive him. This circumstance clearly proves that poor puss was much more occupied from dangers behind than those which so unfortunately were placed before her.

The next animal is one which, although predatory in its habits, does not obtain its prey by pursuit, but steals upon it unawares; and, as such, is much indebted to the excellence of its outward perceptions for the ease with which it seizes its victims.

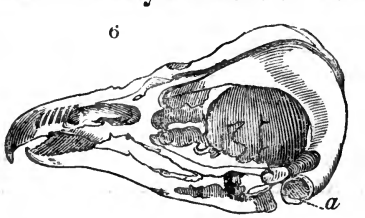
This animal is the fox. On examination, we find the external portion of his auditory structure (*fig.* 5. *a*) is not tubulated in a similar manner to the two former instances;

5



but, on the contrary, is expanded principally from behind, in a forward direction, into nearly a circular aperture. This opening is very well adapted, when the head is thrown laterally and upwards, for receiving sounds from above. His prey is usually met with in hen-roosts, or perched on trees; and his mode of taking them by surprise induces him to approach them stealthily. Hence arises the necessity of sounds indicating their immediate presence being transmitted to the sensorium as soon as possible. The moment his ear indicates his prey above him, his eye is immediately turned in that direction; and thus, if within his reach, is very speedily captured. What more beautiful provision for this animal's necessities could be met with than those with which he appears to be provided? His ears first give the indication of the presence of his prey, and his eye instantly contemplates the object of his pursuit.

Hitherto I have not been able to meet with any animal whose auditory structure is the opposite to that of the fox, viz. one where the outward ear is expanded into a nearly circular form, but arched, and overhanging from above downwards: hence I am compelled to look into the class of birds; and here an instance immediately offers itself in the owl genus, where the above-mentioned structure is very well defined. This formation, by a little observation, we find to be exceedingly valuable to this bird: indeed, wanting it, he could scarcely procure food sufficient for supporting his existence. He never hunts or goes abroad for food except in twilight; and even then, when in an old building where his prey abounds, he will be seen perched majestically and silently upon any projecting substance whatever. Thus elevated above the ground, sounds indicating his prey must ascend, and are received by the arched, overhanging, and concave external bony structure of his ear. (*fig.* 6. *a*) This function being roused, his head is naturally turned into the direction whence the sounds emanate; and he is thus enabled to discover, if not always to seize, his prey. Here it may be proper to remark, that the owl's eyes are immovable in their sockets; but that the very extensive motion of its head upon the spine enables the object to be seen in any direction, wherever its other faculties indicate.



Having thus briefly pointed out examples of different structure in the organ of hearing, and alluded also to some of their habits where the utility of such structure is valuable, not only to animal preservation but also to subsistence, I shall now beg

leave to state a singularity in the hedgehog, and solicit further elucidation from any of your readers who may be willing to communicate their knowledge upon so interesting a subject.

My kitchen being much infested with the black beetle (*Blátta orientàlis*), I introduced a hedgehog for the purpose of ridding me of such a nuisance, which they really are when abounding in numbers.

After keeping it a few days, it became quite domesticated; so much so as to feed from the hand, without being the least intimidated. I devoted a good deal of attention to the observation of its perceptions both of sight and hearing, but could never satisfactorily make out that the latter was at all of service to it, as nothing seemed to give it any alarm, unless that alarm was communicated through the medium of the organs of vision. His sight, on the contrary, was very quick; and not only so to near objects, but also to those more distant. As an example, he would discover a beetle at a distance of 12 or 14 feet, and have it in possession immediately. His sense of smell seemed tolerably acute, as he would repeatedly apply his nose to fresh substances before tasting them. After ridding my kitchen, I transferred him to a friend for the same purpose; but there he unfortunately soon died.

As his services when living had been very useful, I was anxious for him when dead, to bestow his remains for the purposes of dissection, that the structure of his auditory faculty might be developed as far as possible. External ears he certainly had, and these were placed forward in the skull; but as for any external aperture communicating with the brain for the purpose of hearing, not the slightest opening could I discover. Thinking his case might be a solitary one, I procured another for dissection; and the like result followed. Much surprised at this investigation, I have consulted many sportsmen and gamekeepers, who all assure me that his sense of hearing is very acute; but when closely pressed, whether or not his alarms are received through the organs of vision or hearing, they seem doubtful.

I shall conclude these remarks by asking a few questions, the solution of which may clear away the apparent mystery in which the question is involved.

Has any author on comparative anatomy pointed out the structure of the external or internal ear?

What are the powers of hearing he really does enjoy, independently of sight?

What purposes in his economy would the organ of hearing assist, as far as it regards his habits?

I am, Sir, yours. &c.

Barnsley, March 16. 1830. W. Farrar, M.D.

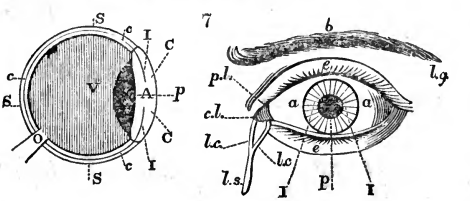
ART. IV. *A familiar Treatise on the Anatomy and Physiology of the Organs of Vision in Man and other Animals.* By B. S.

Sir,

YOUR article on the "use of the botanic microscope" (Vol. III. p. 184.) has induced me to put together the following extracts from my own private journal. Should you agree with me that they might prove useful towards promoting a taste for natural history, by turning the attention of beginners to anatomical pursuits (without some knowledge of which no one can become a naturalist), or by assisting them in the management of the microscope, I feel sure you will not grudge the space which the paper will occupy. The prevailing taste for natural history has fortunately dispelled that dread which was at one time prevalent at the bare idea of anatomical investigation as a rational amusement; but even now there are some who are of opinion that these pursuits lead to hypochondriasis, and that many individuals are thus worked up to imagine themselves attacked by every disease to "which flesh is heir," and hence become the prey of designing quacks, and allow themselves to be made the receptacles of all the elixirs, pills, lotions, and God knows what other nameless compounds (some harmless, some dangerous—all expensive), which every nostrum-monger and dealer in superior advice concocts, advertises, and dispenses, solely for the good of the public, of course. I am quite of a contrary opinion: the charlatan dreads the idea of his expected victim gaining any knowledge of the structure of that frame into which all his stuff is poured, lest his own ignorance should be discovered, and his trade fail. Natural history is one of the best means of dispelling the disease called the vapours, as it tends to withdraw the mind from brooding over fancied ills, and promotes healthy bodily exercise. Whoever, indeed, takes the most cursory view of the natural objects which surround him, cannot but observe that, however much they may differ in figure, structure, dimension, temperature, and their component parts, each has its own especial office to perform in the vast and beautiful economy of the universe; that nothing is without its use, from the greatest to the most minute substance; and, lastly, that all these tend, either directly or remotely, to the comfort, the welfare, and the happiness of mankind. I do not, therefore, apprehend that any body who peruses the outline of the construction of the eye, in a state of health, will rise from the perusal with any great sensations of approaching *Blepharophthálmia*, or any other sesquipedalian complaint.

Every part of every object which surrounds us sends off

rays of light, or pencils of light, which enter the eye; they are there refracted by the different humours; and at last, by uniting into a focus or point on the rétina, form a perfect picture of the objects from which they proceed. The impression which is thus conveyed to the mind, through the medium of the brain, constitutes the faculty which we call "vision." The beautifully contrived instrument by which these changes and impressions are effected and conveyed is called the *eye.* This consists of a *ball,* which is not a very regular sphere, though it is usually called spherical; the protuberance of the *córnea* makes it bulge out in front. The eyeball is composed of a certain number of *coats* or *tunics,* and these serve as coverings to the humours beneath. The tunics are: 1st, the *sclerótica* (*fig.* 7. s), which forms nearly the whole of the outside covering of the orb or ball of the eye. It is, as its name indicates (from *sklēroō,* to harden), hard and firm. In the anterior portion of the orb is placed the second tunic, called also, from its nature, *córnea transpàrens* (c) (transparent horn). This is fitted into the first coat like a glass into the frame of a clock. Immediately within the first tunic, or sclerótica, is the *choroid* (*c*) (*chōrion,* from *chōreō,* to escape, and *eidos,* likeness. The chorion is a membrane which is attached to the fœtus, and escapes with it at birth: from its likeness to this membrane, the third tunic of the eye derives its name.) The choroid is lined with a black liquid, called the *nìgrum pigméntum* (paint), and adheres to the internal surface of the sclerótica; but when it reaches the edge of the latter, instead of being continued within the concave (or hollow) surface of the córnea, it hangs loosely down like a circular curtain, and forms the *ìris* (I) (a rainbow): and according to the colour of the iris, in different individuals, the eye is said to be blue, brown, grey, black, &c. The posterior surface of the iris is called the *ùvea* (so called because in beasts, which the ancients chiefly dissected, it is found of a grape colour; *uva* meaning in Latin *a grape*). The large black hole in the centre of the eye, surrounded by the iris, is called the *pùpa* (a puppet) or *pupil* (P). The blackness of this hole is owing to the nìgrum pigméntum which lines the choroid. The French derive their term *poupée,* signifying a doll, from *pupa;* and the Greek anatomists termed the pupil *korē,* signifying a diminutive person; because, when we look at ourselves in a



glass, we perceive a perfect representation of our figure, occupying that black spot behind the cornea, of very small dimensions. The fourth coat is the *rétina* (from *rete*, a net), which is a very delicate network spread within the choroid, as far as where that membrane or tunic meets the cornea. The retina is an expansion of the optic nerve, which enters the eyeball at the posterior part, through a hole made for its passage, rather nearer the nose than the centre of the orb. The *optic nerve* arises from the brain; but in some experiments conducted by Dr. Wilson Philip, I believe, the thálami nervòrum opticòrum, whence this second pair of nerves (as the optic nerves are called) originates, were destroyed in some animals, and the eyes did not seem to have lost their powers!

I am, Sir, yours, &c.

May, 1830. B. S.

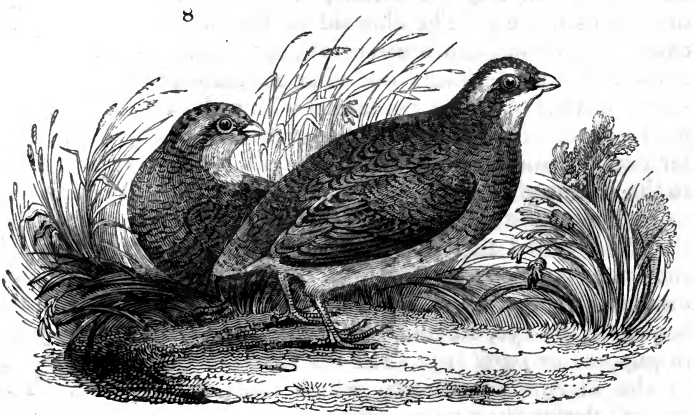
(*To be continued.*)

ART. V. *Notice of an Attempt to naturalise the Virginian Partridge in England.* By J. C., Staffordshire.

Sir,

I TAKE the liberty of sending you a few observations upon the habits and manners of a recently imported bird from America, which M. Audubon denominates the Virginian partridge, accompanied by a drawing (*fig.* 8., male and female) taken from the birds in my possession.

8



A few years ago I purchased two brace of these elegant little birds from Mr. Cross of Exeter Change, London, and

brought them home with me in the coach. I have a small garden, walled round and covered over with wire, into which I turned them, but each brace separated from the other by a wire partition. Towards the latter end of May I perceived one of the cock birds carrying straws, and twisting them about over his head; and I found they were making a nest within a bundle of pea-sticks, which were placed in the garden for them to run under and hide themselves.

This nest was the joint production of male and female; it was placed on the ground within the pea-sticks, and shaped much like a wren's, with a hole on one side, and covered over at top. After the hen had laid about twelve eggs she began to sit, and with as much assiduity as our common hen. When I thought it was her time to hatch I examined the nest, and found it deserted, and the egg-shells, which had evidently contained young birds, lying about. Much pleased with this circumstance, I went cautiously about to find the dam with her little ones, and, after searching a considerable time, the first intimation I had of her presence was from her flying in my face with great agitation, like our common hen. I retired much gratified, and observed the young ones, nine in number, collect again under the wings of their mother. The assiduity of this excellent parent was truly exemplary, and her attention unremitting, and she reared them every one with very little trouble. What is very singular, there were eight cocks and but one hen, all of whom were reared till they moulted, and got their adult plumage; when, from some cause which I could never ascertain, they began to droop one after another, and before Christmas all the young birds died. Though I examined the stomachs and gizzards of most of them, yet I never could find out the cause of their deaths; but I have little doubt of its being some deleterious substance picked up in the place where I separated them from the old ones, soon after they became full fledged, as the old birds escaped this mortality, and the cock bird is now living (October, 1830).

The other pair never bred, but it was easily accounted for, as the hen was unwell from the first time I turned them down, and she lingered on to October and then died.

Previously to and during the time the hen was sitting the cock serenaded her with his harsh and singular notes, some of them very similar to the mewing of a cat. He had also a peculiarity of constantly running round in a circle, till the ground whereon he performed his evolutions was worn as bare as a road, and the turf trodden down much in the same

way as it is by the ruff in the fens during the season of incubation.

Nothing could be more cordial and harmonious than this happy family. When the shades of evening approached they crowded together in a circle on the ground, and prepared for the slumbers of the night by placing their tails all together, with their pretty mottled chins facing to the front in a watchful round-robin.

When food was thrown in for them, which consisted chiefly of spirted barley and wheat, and occasionally bread, the male bird would peck at the grain, but not eat any himself until he had called his family around him, first to partake of the food; which he did with many soft blandishments, and with much strutting and spreading of the wings and tail.

I was much disappointed at the loss of this interesting family; and I waited with some impatience for the result of another season. The season at length arrived: they built their nest again as usual; the hen laid about sixteen eggs; when, to my great mortification, just as she had begun to sit, I found her dead one morning, and can no otherwise account for the circumstance than by supposing that something must have frightened her in the night and caused her to fly up with violence against the wires, which proved fatal to her. Thus ended my hopes of domesticating this elegant little bird, as I have never been able to procure another female, though I have applied in London for that purpose. The guard of a coach informed me that he had the care of a basket of these birds by his coach; that they all, by some accident, got out and flew away; and that in the part of the country where they made their escape (which I have now forgotten) they had bred and increased exceedingly. I have also heard of their doing well in some parts of the south of this kingdom. I know that a quantity were turned down upon the large demesne of Edward John Littleton, Esq. M.P., at Teddesley, in Staffordshire, and that they did not breed at all, but straggled away, and some of them were shot ten or fifteen miles from his estate.

I should feel much obliged by any of your correspondents informing me where I could procure some living specimens of this bird, as I should much wish to breed some more, and turn them out, if I became successful, as they lay many eggs, and are much more easily reared than either pheasants or partridges.

Staffordshire, October, 1830. J. C.

ART. VI. *Anecdotes of a tame Hawk.* By W. B. CLARKE, Esq.

Sir,

ABOUT three years since a young sparrowhawk was purchased and brought up by my brother. This was rather hazardous, as he, at the same time, had a large stock of fancy pigeons, which, in consequence of their rarity and value, he greatly prized. It seems, however, that kindness and care had softened the nature of the hawk, or the regularity with which he was fed rendered the usual habits of his family unnecessary to his happiness; for, as he increased in age and size, his familiarity increased also, leading him to form an intimate acquaintance with a set of friends who have been seldom seen in such society. Whenever the pigeons came to feed, which they did oftentimes from the hand of their almoner, the hawk used also to accompany them. At first the pigeons were shy, of course; but, by degrees, they got over their fears, and ate as confidently as if the ancient enemies of their race had sent no representative to their banquet. It was curious to observe the playfulness of the hawk, and his perfect good-nature during the entertainment; for he received his morsel of meat without any of that ferocity with which birds of prey usually take their food, and merely uttered a cry of lamentation when the carver disappeared. He would then attend the pigeons in their flight round and round the house and gardens, and perch with them on the chimney-top, or roof of the mansion; and this voyage he never failed to make early in the morning, when the pigeons always took their exercise. At night he retired with them to the dovecote: and though for some days he was the sole occupant of the place, the pigeons not having relished this intrusion at first, he was afterwards merely a guest there; for he never disturbed his hospitable friends, even when their young ones, unfledged and helpless as they were, offered a strong temptation to his appetite. He seemed unhappy at any separation from the pigeons, and invariably returned to the dove-house, after a few days purposed confinement in another abode, during which imprisonment he would utter most melancholy cries for deliverance; but these were changed to cries of joy on the arrival of any person with whom he was familiar. All the household were on terms of acquaintance with him; and there never was a bird who seemed to have won such general admiration. He was as playful as a kitten, and, literally, as loving as a dove.

But that his nature was not altogether altered, and that, notwithstanding his education, which, as Ovid says,

" Emollit mores, nec sinit esse feros," *

he was still a hawk in spirit, was proved on an occasion of almost equal interest. A neighbour had sent us a very fine specimen of the smaller horned owl (Strix brachyòtus), which he had winged when flying in the midst of a covey of partridges; and after having tended the wounded limb, and endeavoured to make a cure, we thought of soothing the prisoner's captivity by a larger degree of freedom than he had in the hen-coop which he inhabited. No sooner, however, had our former acquaintance, the hawk, got sight of him, than he fell upon the poor owl most unmercifully; and from that instant, whenever they came in contact, a series of combats commenced, which equalled in skill and courage any of those which have so much distinguished that great hero [?], who to the boldness and clearness of vision of the hawk unites the wisdom of the bird of Athens. The defence of the poor little owl was admirably conducted: he would throw himself upon his back, and await the attack of his enemy with patience and preparation; and, by dint of biting and scratching, would frequently win a positive, as he often did a negative, victory. Acquaintanceship did not seem, in this case, likely to ripen into friendship; and when his wing had gained strength, taking advantage of a favourable opportunity, the owl decamped, leaving the hawk in possession of his territory.

The fate of the successful combatant was, however, soon to be accomplished; for he was shortly after found drowned in a butt of water, from which he had once or twice been extricated before, having summoned a deliverer to his assistance by cries that told he was in distress. There was great lamentation when he died throughout the family; and it was observed by more than one person, that that portion of the dovecote in which he was wont to pass the night was for some time unoccupied by the pigeons with whom he had lived so peaceably, even during his wars with the unfortunate owl.

W. B. Clarke.

East Bergholt, Suffolk, September 21. 1830.

Art. VII. *Notice of the Breathing-Tube of the Boa.* By Bartholomew Dillon, Esq.

Sir,

Several years ago I had an opportunity (the only one in my life) of witnessing the rare sight of a boa feeding. Its

* " Softens the manners, nor permits to be cruel."

prey was a rabbit; and when the little animal was drawn into its mouth, up to the shoulders, it became matter of wonder to me how the reptile supported respiration, for its mouth and nostrils seemed to be completely stopped. Stooping down for the purpose of watching the process of deglutition more closely, my attention was arrested by the appearance of a breathing-tube, about a quarter of an inch in diameter, projecting from the lower jaw, to the extent of an inch or more out of the mouth, as if an elongation of the trachea: it lay close up to the breast of the rabbit, and was, of course, concealed by its body. The keeper of the reptile had never before noticed this singular air-tube, and it was as much a matter of astonishment to him as to myself; but having no kind of familiarity or intimacy with each other, he felt disinclined to allow me to prosecute the investigation any further: indeed, I believe, he feared lest the serpent might receive some injury from being handled. However, I discovered quite sufficient to satisfy my mind that this curious formation was of service to the serpent, by affording it free respiration when its mouth and nostrils were closed by the body of the rabbit.

I have not, ever since, had the means of perfecting this enquiry; and am now induced to mention the fact, hoping that some of your correspondents, who are more favourably circumstanced than myself, will embrace the first opportunity to verify the observation, and examine this wonderful contrivance with the degree of attention it merits.

I am, Sir, yours, &c.

Wrexham, Nov. 17. 1830. BARTHOLOMEW DILLON.

ART. VIII. *Entomological Notes.* By J. C. DALE, Esq.

Sir,

As Kirby and Spence (*Introd. to Entom.*, vol. iv. p. 201.) mention a singular monstrosity in Chrysomela hæmóptera, in the cabinet of Mr. Curtis, and which is figured in his *Br. Ent.*, (plate 111. fig. 5.), where part of an extra-leg is attached to the extremity of the femur of one of the hinder legs, I beg to inform you that I have added to my cabinet a specimen of an Emphytus (?) with *seven complete legs*, the supernumerary one being placed between the fore and middle ones on the left side, lately taken and presented to me by my friend Mr. Morris of Charmouth.

I have also added a specimen of Chrysomela cerealis, captured and presented by W. Hey, Esq., who found it near the

summit of Snowdon, in Wales, in the beginning of July, 1828; and it has been again found there this season, by —— Fox, Esq.: thereby confirming it as a British insect, as mentioned by Donovan (*Br. Ins.*, pl. 115.), where it is said to have been "taken on a mountain in Wales, by the Rev. H. Davies of Beaumaris, and also by Mr. Hudson," whose authority has been lately more than *suspected*; because the species (or one very similar) has been imported in cork, one of which I received from the late Mr. Miller of Bristol, it is of a duller colour, and more round in its form. Geómetra trepidària (of *Haw.*) has lately been said to be the same insect as *B*ómbyx Sabìn*i*, which was found in Melville Island by Capt. Parry; but Mr. Kirby, in the appendix to *Parry's Voyage*, says, "Anténnæ of the male setaceous, *bipectinate at the base, with short rays*;" from which I suspected the specimen of trepidària I took on Schichalion must be a female, although the form of the abdomen seemed to point it out as a male. I have since been favoured with a sight of Mr. Haworth's specimen, taken by Professor Hooker at the same place, and, it is *decidedly* a female; and mine is *decidedly* a male, and the antennæ *not bipectinate* at all. *B.* Sabìn*i* (which Mr. Kirby once showed me) must, therefore, be *distinct.*

When at the Edinburgh museum I was shown a *P*apílio Melitæ`*a*, somewhat allied to Selèn*e* (qu. Túllia?) but duller; an Anárta, larger than myrtílli, with under wings white; a *B*ómbyx, allied to díspar, and another to fascelìna, with the exuviæ of their larvæ and pupæ; also *T*ípulæ, *M*úscæ, &c., all from Melville Island, taken and presented by Mr. Fisher. I mention this, as Mr. Kirby states that only six species, viz. *B*ómbyx Sabìn*i*, a caterpillar of the genus Lària (probably allied to fascelìna), *B*ómbus árcticus, Ctenóphora P*á*rr*ii*, Chirónomus polàris, and *A*ràne*a* melvillénsis, were found in Winter Harbour. I have since received a specimen of the Lària from that place, and also a Melitæ`*a*, which I think the same species, from the late Mr. Miller of Bristol, who writes "from Whale Island, Captain Parry." I saw at the Edinburgh museum also a pair of Penthóphera detrìta (?) and a pair of Mòrio (?) (or some near allies) set in "English fashion," but I could not learn their localities or history. In Parry's voyage to the North Pole, two of A`phis boreàlis *Curtis* were taken on the ice, lat. 82° 26′ 44″, and long. 20° 32′ 13″ E., July 16. 1827, 100 miles from the nearest known land, one of which I saw in the collection of Mr. Curtis.

On my way home from Scotland, I visited the museums at Keswick (two), Kendal, Liverpool, and Manchester (two), where I saw three specimens of Hespèri*a* Oíleus of *Ent. Trans.*, in fine condition, and set in the "English fashion," bought by

the late L. Phillips, Esq., "from Leman's ancient English cabinet," and the same as one I had from the cabinet of the late Dr. Abbot, said to be taken "by him in Bedfordshire:" but, in looking over Mr. Haworth's collection, the insect in question is ticketed Syrichtus, and is lighter than his Oileus, though very similar in markings. I was glad to find that natural history is so much encouraged in the north, and hope to see it so in the south.

I am, Sir, yours, &c.

Glanville's Wootton, Sept. 19. 1830. J. C. DALE.

ART. IX. *Notice of the recent Capture of Chrysomèla cereàlis in North Wales.* By JOHN BLACKWALL, Esq. F.L.S.

Sir,

CONSIDERING the extensive commercial intercourse carried on between this country and other regions of the globe, much vigilance and circumspection are requisite, on the part of our entomologists, in order to avoid the introduction of foreign insects as British into their collections and catalogues; since it is well known that many exotic species are conveyed with facility to great distances in various articles of traffic. How far it may be deemed objectionable to enumerate as indigenous those insects which have been long introduced to our shores, and are become thoroughly naturalised among us, I shall not now discuss; but that considerable caution should be employed in the admission of new British species cannot, I am persuaded, be insisted upon too strongly. Under the influence of this impression, some of the ablest entomologists of the present day entertain doubts as to the propriety of giving that exceedingly rare and brilliant beetle, Chrysomèla cereàlis, a place in the British Fauna; notwithstanding Mr. Donovan, in his *Natural History of British Insects* (vol. iv. p. 20.), includes it among the British Chrysomèlæ, on the authority of the late Mr. Hudson, author of the *Flòra Anglica*, &c., "who," he remarks, "appears to be the only naturalist that has taken it in Great Britain, except the Rev. Hugh Davies of Beaumaris, who also met with a specimen of it on a mountain in Wales some years since." If the instances of its recent capture among the mountains of Caernarvonshire, in North Wales, which I am about to relate, should contribute to remove these scruples, I shall feel gratified in having directed public attention to them.

On the 2d of June, 1830, Thomas Glover, Esq., of Smed-

ley Hill, near Manchester, in descending from Garn, a mountain situated between Nant Francon and the Pass of Llanberis, to Cwm Idwal, discovered under a detached piece of rock, many hundred feet below its summit, a fine living specimen of Chrysomèla cereàlis; and the abdomen of a smaller individual, which, unluckily, had been destroyed. From the disparity in point of size, it is very probable that the sex of these specimens is different; but it would be hasty to pronounce them male and female, unless they were proved to be so by dissection, which would render them unsuitable for the cabinet. I saw both specimens, which still remain in Mr. Glover's possession, soon after they were procured: the perfect one was then alive, and was certainly a very splendid insect. Stimulated by his success, Mr. Glover continued his search with redoubled ardour, but was not so fortunate as to meet with another individual.

I may observe, that, among the mountains constituting the district termed Snodonia, vast numbers of beetles are destroyed by foxes, which prey upon them freely, as is evident from the elytra and other indigestible parts contained in their fæces.

A good living specimen of Chrysomèla cereàlis was obtained in the same locality, in the summer of 1829. It is now in the cabinet of that excellent practical naturalist the late Mr. Edward Hobson of Manchester.

I am, Sir, yours, &c.

Crumpsall Hall, Sept. 30. 1830. JOHN BLACKWALL.

ART. X. *A Sketch of the Flora of Richmond, Yorkshire, as compared with that of Thirsk, in the same County.* By T. E. L.

Sir,

THE town of Richmond is situated at the lower extremity of a deep valley, through which the rapid river Swale meanders, here about thirty miles from its source. The general aspect of the neighbouring country is much varied, and justly famed for the bold and romantic scenery it presents. Along the banks of the river the country is well wooded, though the trees seldom arrive at any great size. Those which most commonly prevail are, the ash, the elm, the mountain ash, and the oak; while the underwood is generally the hazel, mixed with several species of *Rìbes*, *V*ibúrnum *O*pulus, *D*áphne Laurèola, &c. The hornbeam is not found in this neighbourhood. As we advance from the river, and ascend to the high grounds, the land is of a poorer quality, and the woods, if any, are principally fir.

The bed of the river is rocky, and contains frequently masses of granite, porous sandstone, and sometimes fragments of trap-rocks. The valley at Richmond is but narrow, and the opposite sides are formed of rocks of the carboniferous or mountain limestone, which here generally prevails. After passing Richmond the valley widens, and the aspect as well as the geological structure of the country alters until we enter the red marl or new red sandstone district, which runs through the whole of the celebrated vale of Mowbray, as far as the city of York; forming a level plain, rich and extremely fertile at the base of the lias range of the Hambletons. The valley at its greatest breadth is nearly thirty miles across, bounded on the east by the Hambletons, and on the west by Pen Hill and the Wensley Dale range.

Leaving Richmond, and advancing up the valley, the scene is of the most romantic description. On the right bank the mountain limestone rises to the height of 150 or 200 ft., and in many instances presents the appearance of the embattled walls and turrets of a castellated building. From the summit of these cliffs the mayor of Richmond, at a remote period, was precipitated by his horse, while out hunting, when he most miraculously escaped, at the cost of a leg, though his horse was killed upon the spot. These rocks, as is generally the case, are full of fissures, some of which reach to a considerable depth below the surface. It is no uncommon occurrence in the crevices to find small pieces of galena.

Further up the valley veins of lead are not uncommon; and proceeding to Arkindale, sixteen miles up the dale, the mines are rich and numerous. The ore not unfrequently contains an admixture of silver; there occurs, besides, carburet of lead, sulphuret and carbonate of copper, oxide of zinc, iron pyrites, sulphate and carbonate of barytes, and crystallised quartz, with many other mineral substances. The thickness of the mountain limestone varies; perhaps we may not exceed the mark in assigning it an elevation of 300 or 400 ft.; it is not unfrequently surmounted by the millstone grit. In height, above the level of the sea, it cannot fall short of 800 ft. The springs are numerous, and hold a good deal of calcareous matter in solution. The agricultural character of the land on the high grounds is poor, and not of much value; but the bases of the hills furnish good pasturage. It appears more than probable that the narrow defile through which the river runs has been formed by some convulsion of nature, as the force of water, or the action of some violent earthquake, though at a very remote period. There are evident proofs of the valleys having been narrower in former times. At the foot

of the cliff the ground is covered with masses of limestone, which have fallen down from the rocks above. Indeed, the pastures shelving down to the river, at a few inches below the surface, are composed of the debris which have by degrees fallen, and are now become clothed with grass. Near Richmond a vein of copper passes underneath the bed of the river; it was once worked, but, having been found a losing concern, it was given up.

As we ascend the river a circular hill, named the Round How, is seen on the left bank, of much interest to the geologist. On the side facing the river it slopes with a gentle descent, but on the opposite side it is precipitous, covered with loose masses of stone, and overgrown with underwood. It is completely detached by a narrow defile from the hills, which form a semicircle behind it, and evidently appears to have been cut off by some great acting force from them. The same appearance, though to a much greater extent, is presented by Hood Hill, a circular mountain, in like manner detached from the Hambleton Hills, and standing quite alone. It is backed by Roulston Scarr, which is composed of the old red sandstone, and rises to the height of about 800 ft. above the level of the sea.

The woods in the neighbourhood of Richmond vary much in their appearance, and no less so in their vegetable productions. Indeed, even on the opposite wooded banks of the river, the plants frequently differ in a surprising degree. Most of the vegetables peculiar to the limestone districts are found here in abundance. The bogs are seldom or never of a peat character, and are formed by the rain which falls in the spring, and by the mosses, especially *Sphágna*, is long retained. On the higher grounds fir woods almost exclusively prevail; and a striking difference may be observed between the vegetable productions of the upland and lowland woods. In the neighbourhood of Thirsk peat bogs are not unfrequent; and it may not be uninteresting to observe the difference of vegetation between them and those in a limestone district. I have generally remarked that peat produces the rarest plants; but to compare the two: —

In a large bog near Richmond we find Callùna vulgàris, *Erìca* cinèrea and *Tétralix*, all flourishing extremely well; in peat *E. Tétralix* alone. *Vaccínium* Myrtíllus and *Empetrum* nìgrum we have in vast quantities; in Leckby Car, a peat bog near Thirsk, Oxycóccus palústris takes the place of *V.* Myrtíllus: the Erióphora flourish equally in both. With us, *Ophrys* cordàta, *Sphágnum*, *Polýtrichum*, *Vìola* palústris, several species of ferns, carexes, &c., principally abound,

none of which occur at Leckby; while, on the other hand, Scheuchzèr*ia* palústris (the only British habitat), *C*ómarum palústre, Drósera ánglica and rotundifòlia, Rhynchóspora álba, *L*ysimàchia thyrsiflòra, Hydrocótyle vulgàris, unknown to us, occur there. Mosses and ferns abound on limestone, but you might in vain look for them in the neighbourhood of Thirsk on the red marl; nor would you meet with the common *S*axífragæ, *Tróllius*, Aquilègia, *O*rchídeæ (except *O.* maculàta), Pýrolæ, Solidàgo, *Rìbes*, or Aspérula, which, in the neighbourhood of Richmond, appear in profusion. The foxglove grows plentifully upon the high grounds, particularly in the light vegetable mould in the fir woods. It never thrives well when transplanted into a garden. It clothes the summit of Hood Hill, of which we have made previous mention, along with Rhinánthus màjor and *S*enècio viscòsus, two plants unknown to the flora of Richmond. The *A*nemòne nemoròsa grows with us plentifully, and adds much to the vernal beauty of the woods with its snowy blossoms; it is fond of dry strong ground, and its long roots entwine among those of the trees and shrubs near which it grows. *D*áphne Laurèola also occurs plentifully, and sometimes, though rarely, the *Mezèreum*. *A*lísma *P*lantàgo is not found here, though common at Thirsk; while, on the other hand, the cowslip and oxlip are comparatively of rare occurrence there. I have generally remarked that in the limestone districts the woods and mountain pastures produce the rarest plants; while on the level plains of red marl which skirt the Hambletons, in the corn fields and borders of cultivated fields, the most uncommon are met with.

The geography of plants is of such interest to the botanist, that he ought to let slip no opportunity of promoting our knowledge of this branch of science. There can hardly, in my opinion, a doubt exist that the geological structure of the district exercises great influence over the vegetable productions: or, if it be not so, why do we find the plants so remarkably dissimilar in the different formations? My experience has ever tended to confirm me in my belief. For instance, the same plants in great measure occur with us and upon the range of the Hambletons, though thirty miles distant, and though the intervening country is quite of a different character, and as dissimilar in its geology as in the plants which it produces. It may be said that moisture, dryness, and height above the level of the sea, might produce this difference; but how is it, then, that we find at the same altitude, on different habitats, that the botany is different? Much, no doubt, remains to be discovered on the subject; and many facts, in all probability, require correction; yet, by accurate observation,

we may attain to the desired correctness. This cannot be effected, unless the observers in different counties will make known their discoveries; and this, I trust, will soon be carried into effect through the medium of your Magazine.

Yours, &c.

Richmond, Yorkshire, September 20. 1830. T. E. L.

ART. XI. *On the Claims of Iris tuberòsa as a Native of Ireland, and on some Peculiarities in its Growth and Flowering.* By the Rev. W. T. BREE, A.M.

Sir,

I DO not know whether botanists in general are aware that the beautiful *Iris* tuberòsa has any pretensions to be considered as native to Great Britain; yet its claims to a place in our indigenous flora are at least as strong as those of many other plants that have been admitted into it. Being at Cork some years ago, I was informed by Mr. Drummond, the intelligent curator of the botanic garden there, that the above iris grew wild in that neighbourhood. On my expressing some surprise at this intelligence, — surprise almost amounting to disbelief, — Mr. Drummond said, if I would only be at the pains of taking about a quarter of an hour's walk, he would convince me of the accuracy of his statement. Accordingly I accompanied him to an old hedge-bank at no great distance from the town, which he assured me abounded with it. This occurred in the month of October, when, of course, the plant was entirely under ground, and no vestige even of the decayed leaves to be seen above. Mr. Drummond began to dig (as it were at random) with his knife in the bank, and in a very short time presented me with a good handful of the roots, which I took home, and have cultivated in the garden ever since. The bank, I should observe, was composed of very dry soil, owing to the roots of the strong old quicksets which grew upon and shaded it, and formed the fence. In this apparently unfavourable situation, however, Mr. Drummond assured me the iris produced flowers; he also mentioned another spot in the vicinity of Cork where it occurred wild: I think, if my memory serves me, it was near some old ruin in the neighbourhood. It will, perhaps, be thought by some that the iris was not really a native in the above situations, but merely the accidental outcast of a garden. This, however, does not appear probable, as the plant is by no means common — I may say it is rare — in gardens; nor does it seem likely that it should have been planted in this spot by some one who wished to naturalise it.

One circumstance relating to the culture of this plant I think not unworthy of being mentioned. The roots from Cork were procured in 1814, and I had for some years previously cultivated the plant, having received it from the Oxford garden *; but from that time to this, though I tried it in various soils and situations, both in the borders and in pots, and adopted the method recommended by Miller and Curtis in the *Botanical Magazine*, of putting rubbish under the roots to prevent them from going too deep in the ground, the iris never produced a flower in my garden, with the solitary exception of one year, and then only one single flower. I gave roots of it to a friend, in whose garden, situated about eight miles distant, they remained for seven or eight years, producing, as in my case, no blossoms. All this is, perhaps, nothing extraordinary; though it certainly might have been expected that the plant would have enjoyed itself at least as well in our Warwickshire gardens as it did on the old dry bank near Cork. What I think remarkable in the case is, that the roots of the iris, after remaining in my friend's garden for seven or eight years unproductive, as above stated, all at once took to flowering abundantly, though no alteration of treatment was adopted, nor any particular care or attention bestowed on their culture. The garden alluded to consists of a light dry soil; the iris grows in the open border, and in this situation has, from the first commencement of its flowering, continued to produce flowers profusely every year since. I have seen between thirty and forty blossoms out at a time on one patch. I may observe that the figure of Iris tuberòsa in the *Botanical Magazine*, pl. 531., is but a very indifferent representation. Such of your readers as have the opportunity of consulting that costly and splendid work, I would refer to *Flòra Græ̀ca*, tab. 41., for an excellent figure (*fig.* 9.) of this singular and beautiful plant.


9

Yours, &c.

Allesley Rectory, Nov. 13. 1830. W. T. Bree.

* I watched the plant for several years in the botanic garden during my residence at Oxford, but never could see that it flowered, though it increased abundantly by the roots. The old gardener, however, told me that it did occasionally produce flowers.

ART. XII. *Account of a very large Tree in Mexico.* Communicated by JAMES MEASE, Esq. M.D.

Sir,

IN the year 1827, the American minister to Mexico, J. R. Poinsett, sent to the American Philosophical Society of Philadelphia a cord, which he said "was brought to him from Oaxaca, as the exact measure of the circumference of a cypress tree growing in the vicinity of that city. The person who measured the tree is one whose word may be relied on; and he assured Mr. Poinsett that he stretched the cord as tight as it could be drawn round the body of the tree." The great length of the cord naturally excited suspicions as to the accuracy of the measurement; and Mr. Vaughan, our librarian, by order of the Society, requested Mr. Poinsett to enquire further into the subject. In another letter to Mr. Vaughan, of Sept. 6. 1827, Mr. Poinsett writes: "As you seem somewhat sceptical about the size of the cypress tree, I addressed a note to an English gentleman lately returned from Oaxaca, and now enclose you his reply. The reply is as follows: —

"*Mexico, Sept.* 5. 1827.

"My dear Sir, — In compliance with your request, I proceed to give you the result of my visit to, and examination of, the enormous cypress tree in Oaxaca, which has so much excited the surprise and astonishment of travellers.

"The tree is situated in the churchyard of Santa Maria de Tesla, $2\frac{1}{2}$ leagues west of Oaxaca, on the road to Guatemala per Tehnantepec; and there are five or six other enormous trees of the same class surrounding the church, equal in size to the largest trees of the like class now growing in Chapultepec or Xmiquilpan, in the state of Mexico; but the tree above referred to, standing within the walls surrounding the church of Santa Maria, is the tree that, from its enormous bulk, excites the wonder of all who have seen it: it is called by the natives *Sabino*. During the month of May last I breakfasted under it, and measured the circumference by the cord or lasso of my horse I had then with me. It required five lengths of the lasso and about one half vara more to complete its span. Upon my return to Oaxaca, I measured the length of my lasso, which was exactly 9 varas; so that I estimate the circumference to be 46 varas of fair measurement, as I made allowance (with my servant, who assisted me in spanning the tree) for the protuberances in many parts thereof. The largest tree in Chapultepec is about 17 varas in girth; and the remainder of the trees of the same class in Santa

Maria are about the same size, or somewhat smaller. [A Mexican vara, Mr. Poinsett says, is 33½ English inches; so that the large tree is 127 ft. in circumference.] The large tree, I think, may be about 120 ft. high; and, comparatively to its bulk, has but little foliage, less than the smaller trees surrounding it. It moreover appears in the prime of its growth, and has not a single dead branch on it. The enormous branches that spring out of the trunk, some 30 ft. high, make it appear (as all these trees do) as if there were three or four trees united. I have, however, no doubt that it is one entire tree, as one entire bark encircles the grand trunk.

"This tree is an object of considerable veneration with the natives of the village, and the neighbouring Indians; who in former times, it is said, offered sacrifices to it. It is mentioned by Cortez, in his history of the conquest of Oaxaca, as at that time the greatest wonder he had seen, and the shade of which served for the whole of his little army of Europeans.

"Enormous as the size of this tree may appear, I am credibly informed that there yet exist, in the road to Guatemala, by the ancient city of Palenque, now in ruins, trees of the same class, equal to this in size, if not somewhat larger.

"With great respect, I am, my dear Sir,

"Your faithful servant,

"RICHARD EXTER.

"*His Excellency J. R. Poinsett, Mexico.*"

The following notice of the trees at Chapultepec, mentioned above, is from Mr. Ward's *Travels in Mexico*, vol. ii. p. 230.:—

"In the gardens of Chapultepec, Mexico, the first object that strikes the eye is the magnificent cypress (Sabino Ahuahuete, or *Cupréssus dísticha*), called the cypress of Montezuma. It had attained its full growth when that monarch was on the throne (1520), so that it must now be, at least, 400 years old; yet it still retains all the vigour of youthful vegetation. The trunk is 41 ft. in circumference; yet the height is so majestic as to make even this enormous mass appear slender. On a close inspection, it appears to be composed of three trees, the trunks of which unite towards the root so closely as to blend into one. This circumstance, however, led us to give the preference to a second cypress, not quite equal to the first in circumference (it is 38 ft. in girth), but as old, as lofty, and distinguished by a slight curve towards the middle of the stem, which gives it a particularly graceful appearance."

I am, Sir, yours, &c.

Philadelphia, Oct. 10. 1829. J. M.

ART. XIII. *On raining Trees.* By JOHN MURRAY, Esq. F.S.A. F.L.S. F.G.S. &c.

Sir,

THE secretions of trees form a curious part of their physiology, but the influence of vegetation on the atmosphere seems to have been entirely overlooked, at least as far as it regards its meteorology.

In the case of that curious genus of plants the Sarracènia, in which the S. adúnca is most conspicuous, the foliaceous pouch is a mere reservoir, or cistern, to catch and retain the falling dew or rain. In the *N*epénthes distillatòria, or pitcher plant, the case is different; and analysis proves it to be an evident secretion from the plant itself, independent altogether of the fact that it is found in the pitcher before the lid has yet opened. I may here state, *en passant*, that the results I obtained from a chemical examination of this liquid differ materially from those of Dr. Edward Turner. The *C*órnus máscula is very remarkable for the amount of fluid matter which evolves from its leaves, and the willow and poplar, when grouped more especially, exhibit the phenomenon in the form of a gentle shower. Prince Maximilian, in his *Travels in the Brazils*, informs us that the natives in these districts are well acquainted with the peculiar property of those hollow leaves that act as recipients of the condensed vapours of the atmosphere; and, doubtless, these are sources where many tropical animals, as well as the wandering savage, sate their thirst "in a weary land." The Tillándsia exhibits a watery feature of a different complexion: here the entire interior is charged with such a supply of liquid, that, when cut, it affords a copious and refreshing beverage to man. That these extraordinary sources of "living springs of water" are not unknown to inferior creation, is a fact interestingly confirmed to us in the happy incidents detailed by Mr. Campbell, in his *Travels in South Africa*, where a species of mouse is described to us, as storing up supplies of water contained in the berries of particular plants: and, in Ceylon, animals of the *S*imia tribe are said to be well acquainted with the *N*epénthes distillatòria, and to have frequent recourse to its pitcher. The mechanism of the "rose of Jericho" (Anastática hierochuntìna) shows the susceptibility of plants to moisture in a very remarkable manner; and I have submitted some experiments made with this extraordinary exotic, the inhabitant of an arid sandy soil, to the Horticultural Society of London. That succulents should be found clothing in patches

the surface of the burning desert is a phenomenon not the least wonderful in the geographical history of vegetation.

In Cockburn's *Voyages* we find an interesting account of a tree in South America, which yielded a plentiful supply of water by a kind of distillatory process: this tree was met with near the mountainous district of Vera Paz. The party were attracted to it from a distance, the ground appearing wet around it; and the peculiarity was the more striking, as no rain had fallen for six months previous. "At last," says he, "to our great astonishment, as well as joy, we saw water dropping, or, as it were, distilling fast from the end of every leaf of this wonderful tree; at least it was so with us, who had been labouring four days through extreme heat without receiving the least moisture, and were now almost expiring for want of it." The testimony of travellers is too often enshrined among the fabulous; and their credentials either altogether rejected by some, or at least received "cum grano salis." Bruce of Kinnaird forms the most remarkable example of this kind, and the caricature of Baron Munchausen consigned the whole to sarcasm and ridicule; and yet the time is come when the more remarkable circumstances and phenomena mentioned by this traveller, verified by Lord Valentia, Mr. Salt, &c., are received as well accredited facts. The curious phenomenon mentioned by Cockburn finds an interesting and beautiful counterpart in two plants; namely, the *C*álla æthiópica and Agapánthus umbellàtus, in both of which, after a copious watering, the water will be seen to drop from the tips of the leaves; a phenomenon, as far as I know, not hitherto recorded.

The great rivers of the continent of Europe have their source of supply in the glaciers; but many of the rivers in the New World owe their origin to the extensive forests of America, and their destruction might dry up many a rivulet, and thus again convert the luxuriant valley into an arid and sterile waste; carried farther, the principle extends to the great features of the globe. What the glaciers effect among the higher regions of the Alps, the *P*inus *Cémbra* and *L*àrix commùnis accomplish at lower elevations; and many a mountain rivulet owes its existence to their influence. It rains often in the woodlands when it rains nowhere else; and it is thus that trees and woods modify the hygrometric character of a country: and I doubt not but, by a judicious disposal of trees of particular kinds, many lands now parched up with drought, as, for example, in some of the Leeward Islands, might be reclaimed from that sterility to which they are unhappily doomed.

In Glass's *History of the Canary Islands* we have the description of a peculiar tree in the Island of Hierro, which is the means of supplying the inhabitants, man as well as inferior animals, with water; an island which, but for this marvellous adjunct, would be uninhabitable and abandoned. The tree is called *Til* by the people of the island, and has attached to it the epithet *garse*, or *sacred*. It is situated on the top of a rock terminating the district called *Tigulatre*, which leads from the shore. A cloud of vapour, which seems to rise from the sea, is impelled towards it; and being condensed by the foliage of the tree, the rain falls into a large tank, from which it is measured out by individuals set apart for that purpose by the authorities of the island.

In confirmation of a circumstance *primâ facie* so incredible, I have here to record a phenomenon, witnessed by myself, equally extraordinary. I had frequently observed, in avenues of trees, that the entire ground engrossed by their shady foliage was completely saturated with moisture; and that during the prevalence of a fog, when the ground without their pale was completely parched, the wet which fell from their branches more resembled a gentle shower than any thing else; and in investigating the phenomenon which I am disposed to consider entirely *electrical*, I think the *elm* exhibits this feature more remarkably than any other tree of the forest. I never, however, was more astonished than I was in the month of September last, on witnessing a very striking example of this description. I had taken an early walk, on the road leading from Stafford to Lichfield: a dense fog prevailed, but the *road was dry and dusty*, while it was quite otherwise with the line of a few *Lombardy poplars;* for from them it rained so plentifully, and so fast, that any one of them might have been used as an admirable shower bath, and the constant stream of water supplied by the aggregate would (had it been directed into a proper channel) have been found quite sufficient to turn an ordinary mill.

Yours, &c. J. Murray.

February 4. 1829.

P. S. — I have met with the *Rana arbòrea* in the Canton of the Vallais, and I have described it in my *Beauties of Switzerland* [noticed Vol. II. p. 360.], as employed in the way you have mentioned in Vol. II. p. 79.

ART. XIV. *Some Remarks on the Spring of* 1830, *as compared with that of* 1829, *with a Calendar showing the Difference of the Two Seasons.* By the Rev. W. T. BREE, M.A.

THE extraordinarily fine and warm weather which occurred last spring was accompanied, as might be expected, with some corresponding unusually early appearances in the calendar of nature: and as the previous spring (viz. that of 1829) was as remarkable for being a cold and late one, it strikes me that it may not be uninteresting, in a few instances, to contrast the two, by presenting in parallel columns the dates of certain natural occurrences in each, with a view to show the difference of the two seasons, and the influence it had on various subjects of the animal and vegetable world. The remarkably fine weather alluded to in 1830 occurred at the end of March; I have not therefore thought it necessary, for the purpose I have in view, to commence the contrasting calendar earlier than towards the middle of that month, nor to extend it beyond the end of May. I have to regret that my calendar for 1829 is rather scanty; where no corresponding date, therefore, is found in the column for that year, the particular occurrence was not noted. The warm weather changed on the last day of March, with cold rain in the afternoon. April 1st was cold, with storms of rain and snow towards the middle of the day. During April 2d and 3d there was an exceedingly heavy fall of snow, which was succeeded by frosts so severe as entirely to destroy, in many situations, the buds of the walnut, though they had scarcely begun to open, and were still almost within their close winter covering. It is obvious that this sudden alteration of the weather must have given a great check to vegetation, and to the appearance of insects and summer birds: the redstart, heard March 31st, did not appear again nor resume its twittering note till April 7th; and the blackcap, heard March 30th, not till April 8th; Póntia ràpæ (small garden white butterfly) and Polyómmatus Argìolus (azure blue butterfly), seen on the wing March 28th and 29th, were not observed again, the former till April 9th, and the latter not till the 18th of the month. The effects of the severe frosty nights on trees seemed to differ according to circumstances, and to be most destructive in the lower situations: for example, a sycamore tree below the bottom of my garden, which was in leaf, was entirely cut off, so that it never recovered its beauty and verdure through the summer; while another of the same species on the premises, not more than a hundred yards distant, a much loftier tree, and in a higher and more exposed situation, was scarcely injured at all.

If there ever was a season in which, perhaps, more than in any other we might have expected the early arrival of the swallow tribe, it was the spring of 1830: but according to my own observations, exhibited in the following calendar, none made their appearance much before the usual period. The house swallow, indeed, was rather early (April 9th); but the swift by no means so (May 5th); and the marten, at least in this immediate neighbourhood, remarkably late (May 10th). * I confess I was somewhat disappointed at not seeing *Hirúndines* earlier, as I had expected; for it occurred to me that, had any individuals remained with us in a torpid state during the winter, the extraordinarily fine weather at the end of March would undoubtedly have called them into life and activity. I am informed, however, on authority which I have no reason to question, that a large flight of *Hirúndines* (of which species I could not ascertain, probably sand-martens) was observed by many persons in the neighbourhood of Tamworth, sporting over the river on the 29th of March; several were also seen by different persons near Coventry as early as April 4th; swifts †, too, at the latter place on April 30th. In the following calendar I have recorded only what fell under my own personal observation; without, however, in the least doubting the accuracy of the statements made by others.

To those articles which are the earliest instances of their kind I ever happened to have noticed a double asterisk is affixed (thus **): —

	1830.	1829.
Apricot tree flowered - - -	March 11	
Anemône nemorôsa flowered - -	17	April 3
Blackbird sung - - - -	19	
Apis terréstris appeared Willow wren (*Sylvia Trochilus*) sung	24	
Apis retùsa appeared - - -	25‡	17
Gonépteryx rhámni appeared - -	26	13
Vanéssa Io appeared Pump-borer (least woodpecker) heard	27	
**Polyómmatus Argiolus appeared		May 10
Póntia rápæ appeared	28§	April 17
Cherry tree flowered		18

* I have no doubt martens were to be seen long before the above date; but I did not see one previously myself, though I was on the look out for them.

† My informant, an accurate observer, remarks that swifts generally make their first appearance towards the evening.

‡ If credit may be given to newspaper intelligence, a swarm of bees was hived on the 25th of March at Long Itchington, in this county. See *Coventry Mercury* for March 28. 1830.

§ The thermometer this day stood at 64° exposed on a north wall.

	1830.	1829.
**Bombýlius major appeared - -	March 29	April 17
Blackcap sung		11
Vanéssa urtìcæ appeared		May 11
***A*pis muscòrum appeared - -	30	
Pear tree flowered		April 21
*V*ìola canìna flowered		8
**Redstart sung - - -	31	7
Fieldfares and redwings last seen - -	April 1*	
Plum tree flowered (full flower) - -	4	8
Lesser pettychaps (Sylvia hippolàis) sung	8	15
Póntia nàpi appeared		May 10
Swallows † (*H.* rústica) appeared		April 17
*M*elítta fúlva appeared - -	9	
Blackthorn flowered (full flower)		19
Nightingale sung - - -	12	30
*C*áltha palústris flowered - -	13	21
Stellària *H*olóstea flowered - -	14	May 4
*C*ardámine praténsis flowered - -	15	
Wild cowslip flowered - - -	16	April 18
*V*éspa commùnis appeared - -	17	
Póntia cardámines appeared - -	18	May 11
Apple tree flowered - - -	23	10
Hippárchia Ægèria appeared		
Cuckoo sung ‡	25	April 26
Polyómmatus Argìolus appeared in a faded state §		
*S*cílla nùtans flowered - - -	26	21
*Verónica C*hamæ'drys flowered - -	27	
**Libéllula vírgo (least dragon-fly) appeared	28	May 12
*S*pártium *s*copàrium flowered		
Hawthorn flowered		
Póntia brássicæ appeared - -	May 3	9
Geómetra cratægàta appeared		30

* I failed to notice the last appearance of these birds in the spring of 1829; but it may be stated, that they usually stay with us till towards the end of April, and occasionally some are seen the beginning of May, and even later.

† Four appeared at the same time.

‡ I did not myself hear the cuckoo till this day, but an intelligent countryman assured me that he was positive he heard it on the 29th of March, and again, most distinctly, on the 12th of April. The cuckoo, it should seem, when it first commences its song in the spring, usually sings very early in the morning; and accordingly is likely to be first heard by labouring people who are stirring betimes about their occupations. I should have doubted the accuracy of the information of the cuckoo having been heard so early as the 29th of March, were it not that my informant is in the habit of attending to the notes and appearances of our summer birds; and I generally find that the cuckoo has been first heard by him, when he has been up early shepherding, a considerable time before I have heard it myself.

§ The faded condition in which I observed this little butterfly on the 25th of April, with its wings battered and torn, shows that even at this early period the insect must have been out on the wing a considerable time.

	1830.	1829.
**Libéllula deprássa appeared		May 29
** quadrimaculàta appeared		June 2
** æ'nea appeared	May 4	2
**Melitæ'*a* Euphrósyne appeared		
**Panórpa commùnis appeared		
Swifts appeared	5	May 3
*S*carabæ'us auràtus appeared	7	
**Cockchafer appeared	8	29
Martens appeared	10	April 23
Chrỳsis ignìta appeared	14	
Geómetra implicària	17	
Libéllula puélla appeared	21	May 29
Large May-fly appeared		
*S*carabæ'us hortícola appeared	29	29

It will immediately appear, on looking at the above calendar, that in every instance of comparison the occurrences were considerably earlier in 1830 than in 1829, with the exception of three (viz. flowering of *S*cílla nùtans, and the appearance of the swifts and martens) which were later, and one (viz. the appearance of *S*carabæ'us hortícola) which took place on the same day in both seasons.

I avail myself of this opportunity to record the last appearance of our British *H*irúndines in the autumn of the present year:—Swallow, Oct. 12.; Marten, Oct. 5.; Swifts, Aug. 26.

The swallows and martens had for the most part disappeared in this neighbourhood by the end of September: I observed many of both species at Kenilworth on October 5th; several swallows at Allesley on the 7th and 10th; and, lastly, one on October 12th. I could not observe a swift in this parish after August 3d. Many were still left at Warwick on August 11th; and some continued there till the 16th. On the 26th of the same month I observed two flying high in the air between Corley and Fillongley (adjoining parishes to this), and, as I conclude, on their travel for other climes, as they were soon beyond the range of my vision.

The late cold, wet, and sunless summer was, of course, exceedingly unfavourable to the appearance of diurnal lepidopterous insects. On the 23d of July I could see but a single example of Argỳnnis *P*àphia (silver-washed fritillary) in the neighbourhood of the woods in this parish, where I have been in the habit of observing the insect in some abundance. A solitary specimen of Vanéssa *I*'o appeared on September 20th. During the whole autumn I could observe no specimen of Cỳnthia cárdui, nor of Vanéssa C. álbum; and but one only of Vanéssa Atalánta on the 13th of October, evidently just emerged from the chrysalis on that day. Scarcely a specimen, indeed, was to be seen even of the very common Vanéssa urtìcæ.

PART II.

REVIEWS.

ART. I. *Insect Architecture:* forming Vol. III. of the *Library of Entertaining Knowledge.* 12mo. London, 1829.

THE high price of books is a subject on which, whatever might have been the case formerly, there is no reasonable ground for complaint in the present day. We do not mean that there is not as great a number of costly and splendid works published now as ever, but that there is also a proportionate number of cheap ones. This is readily to be accounted for by the more general diffusion of education; an increasing taste for reading and thirst for acquiring knowledge having called forth the exertions of a corresponding class of editors and authors to meet the public demand. Accordingly there have of late been so many new editions of sterling books, as well as entirely new works published at a low or very moderate price, that any one may now, for a comparatively small sum of money, procure a tolerable library, sufficient for most practical purposes; provided only he be willing to forego the enjoyment of such luxuries as portly quartos, coloured plates, hot-pressed paper, and meadows of margin. We have lately purchased a neat little pocket edition of White's *Natural History of Selborne*, enriched too with additional notes by Sir William Jardine, for 3*s.* 6*d.*; and the book now before us, *Insect Architecture*, consisting of more than 400 closely printed duodecimo pages, and adorned with 160 illustrative woodcuts, is offered to the public at the very low cost of 4*s.*

In a former Number of our Magazine (Vol. III. p. 80.), when speaking of the *Library of Entertaining Knowledge* (of which *Insect Architecture* forms one volume), we briefly alluded to this "singularly interesting and entertaining" work, and then promised, when the second part appeared, to review the whole more at length. This pledge we would now redeem. It is not, however, our intention to enter upon a complete and regular analysis of the work; a plan which would involve us in the necessity either of doing little more than transcribing the table of contents, or of transferring to our own pages too considerable a portion of the volume before us. We shall

content ourselves, therefore, after having made a few general remarks bearing upon the popular mode of studying natural history, with giving, by way of specimen, such extracts as, we trust, may induce our readers to have recourse to the book itself, if indeed there be any of our readers, our insect-loving readers, who are not already acquainted with it.

It is with great satisfaction that we learn, on the authority of Mr. Vigors *, the enormous extent to which this work has been circulated. "Another striking feature in modern zoology," says Mr. Vigors, "is one to which I have already had occasion to allude: the publication of popular treatises on the subject. The extent to which some of the more valuable of these productions have been lately circulated, — I shall instance more particularly the *Menageries* and the volumes on *Insect Architecture*, published under the superintendence of the Society for the Diffusion of Useful Knowledge, — not only proves the popularity of the science, but points out one of the powerful causes that contribute to the cultivation of it. When I mention to you that copies of these publications have been disseminated by tens of thousands, you may calculate not merely how many readers participate in the delights of the study, but how many of them may be induced, from the perusal, to become observers of nature, if not active cooperators in the science."

The time, we trust, is now gone by, or nearly so, when it was necessary to enter upon a regular defence of any branch of natural history. "Cui bono?" however, is a question still sometimes put to us; and the answer often given in reply, though perfectly true and just, as far as it goes, — and the one, moreover, of all others, perhaps, most likely to have weight with many who make the enquiry, — is yet, we think, neither the *only* nor the *best* answer of which the question admits. When taunted with the frivolity of the study, and demanded, "What is the use of natural history?" the student is sometimes tempted to defend his pursuit by referring to its *utility* as connected with commerce, the arts, medicine, and domestic economy! Now this view of the *utility* of natural history is undoubtedly just; but, we think, the pursuit has other and better claims on our attention. Nor indeed, in point of fact, does bare *utility* supply the motive by which the generality are actuated in taking up the study. If it were asked, "What is the use of hunting, shooting, or fishing?" no sportsman, we apprehend, would think of answering, that it is in the one

* See his Address at the Anniversary Meeting of the Zoological Club, Vol. III. p. 223.

case the destruction of a noxious animal; or in the others, the supply of the table with game or fish. The noxious animal, as every one knows, might be destroyed far more readily and effectually, and the game and fish procured at much less expense of time and labour, by other means. Any one possessed of right sentiments on the subject, would rather be inclined to refer us to the exhilarating pleasures of the chase (man being by nature a *sporting** animal), the manly and wholesome exercise, the display of skill and ingenuity requisite to insure success, the beautiful and varied scenes of nature to which the followers of field sports are necessarily introduced, &c. In like manner may natural history, over and above the consideration of its direct and palpable utility, be recommended purely on the ground of its being a continual source of rational amusement, a delightful exercise of the mind, an innocent—we had almost said a *pious*—recreation: for nothing can be more true than the maxim so often quoted, that "the contemplation of Nature raises the mind up to Nature's God." All the works of the Creator are worthy of being "sought out" by his rational creatures: we make no doubt they were *designed* to be so, and *designed* moreover to afford us both useful and agreeable instruction. Solomon sends us to the ant to learn wisdom †; an inspired prophet refers to "the stork and the swallow," as knowing their "appointed times," and "the time of their coming." ‡ Our Saviour himself directs our attention to the fowls of the air and the lilies of the field, in order to inculcate an important moral lesson §; and St. Paul refutes the philosophical gainsayers, and illustrates the possibility of a resurrection from the dead, by an argument drawn from the ordinary process of vegetation. ‖ And again (though we have no scriptural authority for so applying the subject), who that watches the caterpillar passing into the death-like condition of a chrysalis, and thence issuing forth a brilliant butterfly, can fail to be struck with the obvious and beautiful analogy between the different states of insect life and the present and future condition of our own existence! To a thoughtful mind, indeed, all nature abounds with objects which may be turned to advantage ¶; and he who will but be at the pains to reflect a little on what he sees around him, may

> "find tongues in trees, books in the living brooks,
> Sermons in stones, and good in every thing."

---

* Θηρευτικος. Aristotle. † Prov. vi. 6.

‡ Jer. viii. 7. § Matt. vi. 26. 28. ‖ 1 Cor. xv. 36. &c.

¶ "In a *moral view* I shall not, I believe, be contradicted when I say, that, if one train of thinking be more desirable than another, it is that which

With regard to the study of insects in particular, it may, perhaps, at first sight appear somewhat extraordinary, that while botany has long had its troops of ardent admirers, entomology has, till comparatively of late years, lain under peculiar reproach and neglect. This, no doubt, is in part owing to the too prevailing error of uniformly associating with the very name of "insect" the idea of something noxious, destructive, and disgusting. Not only the vulgar, but many even of the better-informed, are in the habit of regarding these wonderful little creatures in the light of blights, pests, scourges of the human race, and *in no other*. They overlook entirely the important purposes which the inferior animals are ordained to accomplish in the economy of nature; and forget that

> ——— "Each crawling insect holds a rank
> Important in the plan of Him who framed
> This scale of beings; holds a rank which lost
> Would break the chain, and leave behind a gap
> Which Nature's self would rue." *Stillingfleet.*

"We ought not," says Aristotle, "childishly to disdain the

---

regards the phenomena of nature with a constant reference to a supreme intelligent Author. To have made this the ruling, the habitual sentiment of our minds, is to have laid the foundation of every thing which is religious. The world thenceforth becomes a temple, and life itself one continued act of adoration. The change is no less than this: that, whereas formerly God was seldom in our thoughts, we can now scarcely look upon any thing without perceiving its relation to him. Every organised natural body, in the provisions it contains for its sustentation and propagation, testifies a care, on the part of the Creator, expressly directed to these purposes. We are on all sides surrounded by such bodies; examined in their parts, wonderfully curious; compared with one another, no less wonderfully diversified. So that the mind, as well as the eye, may either expatiate in variety and multitude, or fix itself down to the investigation of particular divisions of the science. And in either case it will rise up from its occupation possessed by the subject in a very different manner, and with a very different degree of influence, from what a mere assent to any verbal proposition which can be formed concerning the existence of the Deity, at least that merely complying assent with which those about us are satisfied, and with which we are too apt to satisfy ourselves, will or can produce upon the thoughts. More especially may this difference be perceived in the degree of admiration and of awe with which the Divinity is regarded, when represented to the understanding by its own remarks, its own reflections, and its own reasonings, compared with what is excited by any language that can be used by others. The works of nature want only to be contemplated." &c. See Paley's *Natural Theology*, p. 585., a work which we cannot too strongly recommend to the perusal of our readers generally, not merely as affording a very high degree of amusement and instruction, but also more particularly as directing them to the proper *application* of their studies in the field of nature. It will appear that, in what we have offered in the present article, we have very much underrated the advantages, the *utility* of natural history.

study of the less noble animals; for there is in all natural objects something to excite our admiration."* "I think," says Paley, speaking of insects, "it is in this class of animals above all others, especially when we take in the multitude of species which the microscope discovers, that we are struck with what Cicero has called 'the *insatiable* variety of nature.'"† "The meanest creature is a collection of wonders."‡ And again; "The hinges in the wings of an *earwig*, and the joints of its antennæ, are as highly wrought as if the Creator had nothing else to finish."§ Surely the instincts, habits, and manners of insects, their "architectural" contrivances and singular transformations, the infinite variety of their forms, the exact mechanism and structure of their parts, and, in many cases, their extraordinary brilliancy and beauty, are not less deserving some portion of our attention than the charms and wonders of Flora.‖

But, besides the false views above alluded to, as having operated in no slight degree to the discouragement of entomology as a general pursuit, the neglect we speak of might also formerly, in part at least, be attributed to the want of suitable books, to *set people a going*, as it were, on the subject. And it is in this respect, more especially, that the little volume before us is peculiarly valuable, being calculated above most that we have met with to render the study of insects both accessible and attractive. With the assistance here afforded, the student may at once set to work for himself. He is sent, for example, to a bee's nest, an ant-hill, a spider's web, or the like, to behold with his own eyes, and admire the manners and contrivances of their inmates. He needs not to undergo a long course of previous reading—*hard* reading,

* Δει μη δυσχεραινειν παιδικως την περι των ατιμοτερων ζωων επιστημην. Εν πασι γαρ τοις φυσικοις ενεστι τι θαυμαστον.—*Aristotle.*

† Nat. Theology, p. 373. ‡ Ibid., p. 316. § Ibid., p. 588.

‖ "Quæri fortasse a nonnullis potest, Quis papilionum usus sit? Respondeo, ad ornatum Universi, et ut hominibus spectaculo sint: ad rura illustranda velut tot bracteæ inservientes. Quis enim eximiam earum pulchritudinem et varietatem contemplans mira voluptate non afficiatur? Quis tot colorum et schematum elegantias naturæ ipsius ingenio excogitatas et artifici penicillo depictas curiosis oculis intuens, divinæ artis vestigia eis impressa non agnoscat et miretur?"—*Raii Historia Insectorum*, p. 109. "It may, perhaps, be asked by some, What is the use of butterflies? I answer, to adorn the world, and afford mankind an agreeable sight, serving like so many spangles to decorate the fields. For who can contemplate their exquisite beauty and variety without being touched with wonderful delight? Who can look with an attentive eye on the elegance of so many colours and forms, devised by the fancy and painted by the skilful pencil of Nature herself, and not acknowledge and admire the traces of divine art impressed upon them?"

nor encumber himself with much of the jargon and technicalities of science, before he can be brought, with such a book in his hands, to take an interest and a pleasure in the observance of insects. When we speak of "*the jargon of science,*" we beg not to be misunderstood, nor to have it supposed for a moment that we underrate the value and importance of purely scientific works; quite the contrary; we readily admit their utility, and the pleasure they afford to such as have already acquired a taste for natural history. Nevertheless we consider them as means, not as ends. For ourselves, we could with much satisfaction pore over the scientific pages of a system of entomology or botany, by the hour together. But we much doubt whether the perusal of such systems in the *first instance*, be the best way to instil into the mind of a beginner a love for the study of nature. We may be erroneous in our opinion; but it does appear to us, that this would be beginning at the wrong end, and adopting a method which, so far from being the most likely to insure success, would, in the majority of cases, have the directly opposite effect of disgusting the student, and deterring him from the pursuit altogether. We feel confident, at least, that very many persons, when put in the right track, are capable of deriving much rational amusement from the study of nature, who yet could never be trained by book-learning to become thorough scientific naturalists. Let but a taste for the subject be once imbibed, and the student will afterwards naturally be led to aim at higher attainments, and seek for further information; by degrees he will wish to become acquainted in some measure with the nomenclature, arrangement, and classification of the objects he studies, and with the systems to which they have been reduced. It should be remembered, too, that the acquisition of a perfect knowledge of scientific entomology or botany would require more time and attention than most men can afford to devote to such pursuits. Eminence in either department demands almost "a whole man." Accordingly the great luminaries in natural history, as in other sciences, are necessarily few in number: "apparent rari — in gurgito vasto."* We do not regret this circumstance; our object in recommending these pursuits not being so much the formation of one or two first-rate naturalists, as of a very large number of observers of nature. In short, we have ourselves found such an inexhaustible fund of rational pleasure in natural history,— we feel so indebted to the pursuit for the recreation it has afforded us, that we cannot but wish to see it become popular

* "Few, scatter'd, floating on the vast abyss." *Trapp's Trans.*

with the generality, in order that the greatest possible number of our fellow-creatures may partake of the same benefits with ourselves, deriving amusement and instruction from the rich stores which their Creator has every where bountifully strewed around them.

But it is time to turn from these general remarks to the book which has called them forth, and whose title stands at the head of our present article. *Insect Architecture*, as its name implies, treats of that portion of the economy of insects which is more particularly displayed in the construction of their nests and habitations. We believe we are correct in stating that the work is from the pen of Mr. Rennie. To him, at all events, we are indebted for many interesting facts and valuable remarks, the result of his own personal experience and observation. The author, whoever he may be, has executed his plan with much taste and ability, and, what is more, with a right feeling throughout; nor will it detract from the merits of the work to state, that no inconsiderable portion of its contents consists of little more than a compilation — indeed it could not well be otherwise — from the writings of previous authors of established reputation: for in a popular treatise, like the present, the author, we think, would be much to blame had he failed to avail himself of the labours of his predecessors as often as it might suit his purpose. The introductory chapter is an able and interesting essay in defence and recommendation of the study of insects. We gladly extract the following passage, the sentiments of which are so much in unison with our own: —

"The exercise of that habit of observation which can alone make a naturalist, 'an out-of-door naturalist,' as Daines Barrington called himself, is well calculated to strengthen even the most practical and merely useful powers of the mind. One of the most valuable mental acquirements is the power of discriminating among things which differ in many minute points, but whose general similarity of appearance usually deceives the common observer into a belief of their identity. Entomology, in this point of view, is a study peculiarly adapted for youth. According to our experience, it is exceedingly difficult for persons arrived at manhood to acquire this power of discrimination; but, in early life, a little care on the part of the parent or teacher will render it comparatively easy. In this study the knowledge of things should go along with that of words. 'If names perish,' says Linnæus, 'the knowledge of things perishes also;' and without names how can any one communicate to another the knowledge he has acquired relative to any particular fact, either of physiology, habit, utility, or locality? On the other hand, mere catalogue learning is as much to be rejected as the loose generalisations of the despisers of classification and nomenclature. To name a plant, or an insect, or a bird, or a quadruped rightly, is one step towards an accurate knowledge of it; but it is not the knowledge itself. It is the means, and not the end, in natural history, as in every other science." (p. 12.)

Our author's remarks, too, on *collections* of insects are, we think, sound and judicious. He does not allow "the collecting of specimens only, or, as the French expressly call them, chips (*échantillons*), to be called a study. The mere collector," he says, "is not, and cannot be, justly considered as a naturalist." On the other hand, he does not condemn or despise the practice as a useless or frivolous employment, only he is anxious to place it on its true and proper footing. But our author shall speak for himself: —

"A collection of insects is to the true naturalist what a collection of medals is to the accurate student of history. The mere collector who looks only to the shining wings of the one or the green rust of the other, derives little knowledge from his pursuit. But the cabinet of the entomologist becomes rich in the most interesting subjects of contemplation, when he regards it in the genuine spirit of scientific enquiry. What, for instance, can be so delightful as to examine the wonderful variety of structure in this portion of the creation, and, above all, to trace the beautiful gradations by which one species runs into another. Their differences are so minute, that an unpractised eye would proclaim their identity; and yet when the species are separated, and not very distantly, they become visible even to the common observer. It is in examinations such as these that the naturalist finds a delight of the highest order. While it is thus one of the legitimate objects of his study to attend to minute differences of structure, form, and colouring, he is not less interested in the investigation of habits and economy; and in this respect the insect world is inexhaustibly rich. We find herein examples of instinct to parallel those of all the larger animals, whether they are solitary or social; and innumerable others besides, altogether unlike those manifested in the superior departments of animated nature." (p. 16.)

They who have paid but little or no attention to the subject, are not only ignorant of the immense number of species to be found in the insect world, but are also quite unconscious of the differences and distinctions observable among such as they have been accustomed to combine under one common denomination. They will be equally surprised, perhaps, to learn that the operations of these little creatures in many cases bear considerable resemblance or analogy to those of our own mechanics. Thus, for example, besides the common hive bee, which is more or less known to every body, there are others, also, of the same family, which, from the above circumstance, have been denominated mason bees, mining bees, carpenters, upholsterers, carders, &c. The carpenter bee, which is by no means an uncommon insect, constructs its nest in decaying wood, which it industriously scoops out for the purpose, and lines its cells with circular pieces of leaves, cutting them from the living plant with great expedition and the exactest nicety.

"Let us compare," says our author, "the progress of this little joiner with a human artisan — one who has been long practised in his trade,

and has the most perfect and complicated tools for his assistance. The bee has learned nothing by practice; she makes her nest but once in her life, but it is then as complete and finished as if she had made a thousand. She has no pattern before her; but the Architect of all things has impressed a plan upon her mind, which she can realise without scale or compasses. Her two sharp teeth are the only tools with which she is provided for her laborious work; and yet she bores a tunnel, twelve times the length of her own body, with greater ease than the workman who bores into the earth for water, with his apparatus of augers adapted to every soil. Her tunnel is clean and regular; she leaves no chips at the bottom, for she is provident of her materials. Further, she has an exquisite piece of joinery to perform, when her ruder labour is accomplished. The patient bee works her rings from the circumference to the centre, and she produces a shelf, united with such care with her natural glue, that a number of fragments are as solid as one piece." (p. 50.)

Another species has been called the poppy-bee, from its selecting the scarlet petals of the poppy as tapestry for its cells. From this material the bee

"Successively cuts off small pieces of an oval shape, seizes them between her legs, and conveys them to the nest. She begins her work at the bottom, which she overlays with three or four leaves in thickness, and the sides have never less than two. When she finds that the piece she has brought is too large to fit the place intended, she cuts off what is superfluous, and carries away the shreds. By cutting the fresh petals of a poppy with a pair of scissors, we may perceive the difficulty of keeping the piece free from wrinkles and shrivelling; but the bee knows how to spread the pieces which she uses as smooth as glass.

"When she has in this manner hung the little chamber all round with this splendid scarlet tapestry, of which she is not sparing, but extends it even beyond the entrance, she then fills it with the pollen of flowers mixed with honey, to the height of about half an inch. In this magazine of provisions for her future progeny she lays an egg, and over it folds down the tapestry of poppy petals from above. The upper part is then filled in with earth; but Latreille says, he has observed more than one cell constructed in a single excavation. This may account for Réaumur's describing them as sometimes 7 in. deep; a circumstance which Latreille, however, thinks very surprising. It will, perhaps, be impossible ever to ascertain beyond a doubt, whether the tapestry-bee is led to select the brilliant petals of the poppy from their colour, or from any other quality they may possess, of softness or of warmth, for instance. Réaumur thinks that the largeness, united with the flexibility of the poppy leaves, determines her choice. Yet it is not improbable that her eye may be gratified by the appearance of her nest; that she may possess a feeling of the beautiful in colour, and may look with complacency upon the delicate hangings of the apartment which she destines for her offspring. Why should not an insect be supposed to have a glimmering of the value of ornament? How can we pronounce, from our limited notion of the mode in which the inferior animals think and act, that their gratifications are wholly bounded by the positive utility of the objects which surround them? Why does a dog howl at the sound of a bugle, but because it offends his organs of hearing? And why, therefore, may not a bee feel gladness in the brilliant hues of her scarlet drapery, because they are grateful to her organs of sight? All these little creatures work, probably, with more neatness and finish than is absolutely essential for comfort; and this circumstance alone would imply that they have something of taste to exhibit, which produces to them a pleasurable emotion.

"The tapestry-bee is, however, content with ornamenting the interior only

of the nest which she forms for her progeny. She does not misplace her embellishments with the error of some human artists. She desires security as well as elegance; and therefore she leaves no external traces of her operations. Hers is not a mansion rich with columns and friezes without, but cold and unfurnished within, like the desolate palaces of Venice. She covers her tapestry quite round with the common earth, and leaves her eggs enclosed in their poppy-case with a certainty that the outward show of her labours will attract no plunderer." (p. 55.)

The industry of the bee has become proverbial: the marauder wasp also, though her labours are unattended with the same profitable results to mankind, works equally hard in her vocation, and displays no less ingenuity in the formation of her habitation and the manufacture of her cells. On the material with which the wasp family construct their nest, we have the following interesting remarks: —

"The wasp is a paper-maker, and a most perfect and intelligent one. While mankind were arriving, by slow degrees, at the art of fabricating this valuable substance, the wasp was making it before their eyes, by very much the same process as that by which human hands now manufacture it with the best aid of chemistry and machinery. While some nations carved their records on wood, and stone, and brass, and leaden tablets, — others, more advanced, wrote with a style on wax, — others employed the inner bark of trees, and others the skins of animals rudely prepared,—the wasp was manufacturing a firm and durable paper. Even when the papyrus was rendered more fit, by a process of art, for the transmission of ideas in writing, the wasp was a better artisan than the Egyptians; for the early attempts at paper-making were so rude, that the substance produced was almost useless, from being extremely friable. The paper of the papyrus was formed of the leaves of the plant, dried, pressed, and polished; the wasp alone knew how to reduce vegetable fibres to a pulp, and then unite them by a size or glue, spreading the substance out into a smooth and delicate leaf. This is exactly the process of paper-making. It would seem that the wasp knows, as the modern paper-makers now know, that the fibres of rags, whether linen or cotton, are not the only materials that can be used in the formation of paper: she employs other vegetable matters, converting them into a proper consistency by her assiduous exertions. In some respects she is more skilful even than our paper-makers; for she takes care to retain her fibres of sufficient length, by which she renders her paper as strong as she requires. Many manufacturers of the present day cut their materials into small bits, and thus produce a rotten article. One great distinction between good and bad paper is its toughness; and this difference is invariably produced by the fibre of which it is composed being long, and therefore tough; or short, and therefore friable.

"The wasp has been labouring at her manufacture of paper, from her first creation, with precisely the same instruments and the same materials; and her success has been unvarying. Her machinery is very simple, and therefore it is never out of order. She learns nothing, and she forgets nothing. Men, from time to time, lose their excellence in particular arts, and they are slow in finding out real improvements. Such improvements are often the effect of accident. Paper is now manufactured very extensively by machinery in all its stages; and thus, instead of a single sheet being made by hand, a stream of paper is poured out, which would form a roll large enough to extend round the globe, if such a length were desirable. The inventors of this machinery, Messrs. Fourdrinier, it is said, spent the enormous sum of 40,000*l.* in vain attempts to render the machine capable of determining with

precision the width of the roll; and, at last, accomplished their object at the suggestion of a bystander, by a strap revolving upon an axis, at a cost of three shillings and sixpence. Such is the difference between the workings of human knowledge and experience and those of animal instinct! We proceed slowly, and in the dark; but our course is not bounded by a narrow line, for it seems difficult to say what is the perfection of any art: animals go clearly to a given point, but they can go no further. We may, however, learn something from their perfect knowledge of what is within their range. It is not improbable that if man had attended in an earlier state of society to the labours of wasps, he would have sooner known how to make paper. We are still behind in our arts and sciences, because we have not always been observers. If we had watched the operations of insects, and the structure of animals in general, with more care, we might have been far advanced in the knowledge of many arts which are yet in their infancy; for nature has given us abundance of patterns. We have learned to perfect some instruments of sound, by examining the structure of the human ear; and the mechanism of an eye has suggested some valuable improvements in achromatic glasses." (p. 85.)

Largely as we have already quoted the work, we need make no apology for presenting our readers with another long extract, relating to the different texture and durability observable in the cocoons formed by caterpillars, according to the length of time the enclosed insect is to remain in its chrysalis or quiescent state; though, at the same time, strictly speaking, we are hardly prepared to go with our author the length of attributing to the little architects thought, foresight, and positive intelligence; or to admit the propriety of the expression, that "one caterpillar is *aware*, while it is building the cocoon," &c., and "the other *pursuing a similar course of thought*," &c. In our avowed and unavoidable ignorance on these subjects, we think it preferable to speak of such operations in the usual manner, as being the result of instinct.

"It is worthy of remark, as one of the most striking instances of instinctive foresight, that the caterpillars which build structures of this substantial description, are destined to be much longer in their chrysalis trance than those which spin merely a flimsy web of silk. For the most part, indeed, the latter undergo their final transformation in a few weeks; while the former continue entranced the larger portion of a year, appearing in the perfect state the summer after their architectural labours have been completed. This is a remarkable example of the instinct which leads these little creatures to act with a foresight in many cases much clearer than the dictates of human prudence. In the examples before us, the instinct is more delicate and complex than that which directs other animals to provide a burrow for their winter sleep. It is not unreasonable to suppose that the one caterpillar is aware, while it is building the cocoon, that the moth into which it is about to be changed will not be in a fit state to appear before the succeeding summer. The other, pursuing a similar course of thought may feel that the moth will see the light in a few weeks. The comparative distances of time certainly appear most difficult to be understood by an insect; for, as far as we know, quadrupeds do not carry their intelligence to such an extent. And yet, in the solitary case of provision for a future progeny, the instinct is invariably subtle and extraordinary. What, for instance, is more remarkable than that the insect should always place her

eggs where her progeny will find the food which is best suited to their nature? In almost no case does the perfect insect eat that food, so that the parent cannot judge from her own habits. The Contriver of the mechanism by which insects work also directs the instinct by which they use their tools. It is exceedingly difficult, with our very limited knowledge of the springs of action in the inferior animals, to determine the motives of their industry; that is, whether they see clearly the end and object of their arrangements. A human architect, in all his plans, has regard, according to the extent of his skill, to the combination of beauty and convenience; and in most cases he has adaptations peculiar to the circumstances connected with the purpose of the structure. In the erection of a common dwelling-house, for instance, one family requires many sleeping-rooms, another few; one wants its drawing-rooms in a suite, another detached. The architect knows all these wants, and provides for them. But all insects build their habitations upon the same general model, although they can slightly vary them according to circumstances. Thus, according as the uniformity, or the occasional adaptation of their work to particular situations, has been most regarded by those who speculate upon their actions, they have been held to be wholly governed by instinct or by intelligence, have been called machines or free agents. There are difficulties in either conclusion; and the truth, perhaps, lies between the two opinions. Their actions may entirely result from their organisation; they are certainly in conformity with it. Those who would deny the animal all intelligence, by which we mean a power, resulting from selection, of deviating in small matters from a precise rule of action, are often materialists, who shut their eyes to the creating and preserving economy of Providence. But even this belief in the infallible results of organisation does not necessarily imply the disbelief of a presiding Power. 'The same wisdom,' says Bonnet, 'which has constructed and arranged with so much art the various organs of animals, and has made them concur towards one determined end, has also provided that the different operations which are the natural results of the economy of the animal should concur towards the same end. The creature is directed towards his object by an invisible hand; he executes with precision, and by one effort, those works which we so much admire; he appears to act as if he reasoned, to return to his labour at the proper time, to change his scheme in case of need. But in all this he only obeys the secret influence which drives him on. He is but an instrument which cannot judge of each action, but is wound up by that adorable Intelligence, which has traced out for every insect its proper labours, as he has traced the orbit of each planet. When, therefore, I see an insect working at the construction of a nest or a cocoon, I am impressed with respect, because it seems to me that I am at a spectacle where the Supreme Artist is hid behind the curtain.'" (p. 180.)

If there is one portion of the little work before us which we feel less disposed to be satisfied with than another, it is that contained in the fifth and sixth chapters, which treat of the avowedly difficult subject of the architecture and economy of the hive-bee. There is here, indeed, much curious and interesting information, but mixed up, at the same time (as it appears to us), with some error and confusion, more especially as it regards the collecting and manufacture of wax, propolis, and honey. And we confess that, after having submitted these chapters to a second perusal, though there is much to reward the task, we still feel some difficulty, from

the statement before us, in forming a clear and correct notion of the operations of this wonderful petticoat government (*respública gynæcocrática* Linnæus) of the hive. Unwilling as we are to venture an opinion in opposition to that of so acute an observer as Mr. Rennie, we cannot help thinking that he has been misled by the great authority of Huber, in too hastily concluding that wax is manufactured by the bees from honey. Huber was an able and industrious naturalist; but all his experiments, we think, are not conclusive. Without entering further into this obscure and much controverted subject, we shall merely record our opinion, that wax is not prepared from honey, as the Huberians maintain, but is fabricated from pollen, by undergoing an elaborate process in the second stomach of the bee; but by what exact process, the researches of naturalists have hitherto failed to discover. So, at least, we have been taught to believe by experienced apiarians. If this opinion be correct, it is to be regretted that Mr. Rennie, too implicitly adhering to the dictum of an able though fallible experimenter, should have been the means of widely propagating an error on a practical point of natural history; and that, too, under the sanction of a Society for the Diffusion of Useful Knowledge.

We have scored our copy in innumerable places with notes of admiration, for the purpose of marking passages for extraction; but our limits absolutely forbid us from transcribing any thing like all of those which we had singled out with that view, or giving a place to more than a very small number of the interesting observations with which the work abounds. Indeed we have experienced no slight difficulty in making a selection. We cannot find space, therefore, to say any thing (as we could have wished to have done) on the somewhat obscure subject of gall-flies, treated on in the nineteenth chapter, or to enter upon the much controverted question as to the manner in which spiders shoot out their lines, and transport themselves through the air from one place to another. Amid the variety of theories which have been formed on this subject, we shall content ourselves with observing, that to us the opinion adopted by our author appears to be the correct one, being that which is best borne out by actual experiment; namely, that spiders require the aid of a current of air in transporting themselves through the atmosphere, and that "in perfectly motionless air they have not the power of darting their threads even through the space of half an inch."

We should be guilty of injustice towards the editors, were we entirely to pass over in silence the numerous wood-cuts with which, as already stated, the work is illustrated. It is

said, " there is nothing new under the sun;" accordingly we here find the good old practice revived, usual in the days of Gerarde, Parkinson, and their predecessors, of employing wood-engravings instead of copper, and incorporating them with the type in the body of the page. Wood-engravings possess many advantages; neat and beautiful in themselves, they are produced at a comparatively cheap rate; and the blocks, moreover, not being subject to the continual wear and tear produced by the polishing and whiting-besmeared hand of the printer, endure long, and afford, without suffering impair, a very large number of impressions — larger than copper-plates, or even, we believe, than steel. We infinitely prefer xylographic to metallic prints, unless the latter be executed in the very first style of excellence. And here we would, in a kindly spirit, entreat all printers to do justice to the artists whose works are placed in their hand, by paying a little attention,—*extra* attention, if need be,—to the manner in which they pass the blocks through the press, and previously prepare them for the operation. It is grievous to see, what frequently it is our fate to see, the effect of a beautiful wood-engraving entirely marred for want of care in striking off the copies. Hence we are sometimes presented either with faint and indistinct impressions on the one hand (as is the case with some of those in the volume before us), or on the other, with black and blotted ones; the one arising from a deficiency, the other from a superabundance, of ink with which the blocks are charged, or from some other mismanagement in passing them through the press. But to return: the low price at which the present volume is offered to the public would absolutely disarm us of all severity of criticism towards its embellishments, even were it otherwise deserved. The wood-cuts before us, though not of the first order of merit, — how, indeed could that be expected? — are yet, in most instances, respectable at least, and often good. We particularly admire the figure of the caterpillar and cocoon of the Ziczac moth at p. 172., the caterpillar of the Goat moth at p. 189., and the Capricorn beetle at p. 240. In some few instances we must withhold even our qualified approbation: for example, the figure of Hesperia málvæ, at p. 169., is positively bad; we do not know from what old author it has been copied — we say *copied*, because we are confident it resembles nothing in nature, and appears to us better suited to have found a place in the rude pages of Thomas Mouffet, the learned author of *Insectorum Theatrum*, printed in 1634, than in those of a modern work of the nineteenth century. For the credit of the book we heartily wish the cut had been omitted. We

have to regret also, in the present volume, the absence of that most useful, but homely and unpretending commodity, an index, without which no work, — certainly no work of this description, — ought to issue from the press. The deficiency complained of is, however, in part, and only in part, supplied by a copious table of contents.

In conclusion, we beg to assure our readers, that we have derived great pleasure and satisfaction from the perusal of this interesting little volume, having found therein much to praise, and but little, almost nothing, to find fault with. Holding, as we do, with the aphorism of antiquity, that "a great book is a great evil," we do not like the present work at all the less for being small; and we like it a great deal more for being cheap. The extracts we have given will, we trust, be more than sufficient to recommend it to the notice of all those, whose minds are so constituted as to be susceptible of any gratification from the study of insects.

It was with much pleasure that we learned from the concluding paragraph of the book, that the present volume, though complete in itself, was to be followed up by a second, to be entitled *Insect Transformations.* While we were engaged in writing the above remarks, this second work made its appearance. Exactly of a piece with its predecessor, in plan, execution, and interest, it will, we doubt not, meet with the same favourable reception: all that has been said in commendation of the one applies equally to the other. Here we might close our remarks, confidently trusting that such of our readers as have perused *Insect Architecture* will lose no time in making themselves acquainted with its twin-brother *Insect Transformations.* We cannot, however, dismiss this latter performance without briefly noticing a subject presented to us in the opening chapter. In a work of this popular cast, a work likely to meet with so extensive a circulation among the middling and even (as we hope) among the lower classes, and to become the companion, during leisure hours, of the youth of both sexes, it is, we think, of incalculable importance, that the utmost care should be taken to exclude or discountenance all such false and pernicious doctrines as have a tendency to infuse poison into the minds of those who are entering upon the innocent study of entomology. It is with especial satisfaction, therefore, that we see Mr. Rennie, in the first chapter of *Insect Transformations*, exposing and holding up to merited reprobation the monstrous theories of the modern Epicurean school. We allude to the absurdities maintained by Darwin, Lamarck, and others; as, for instance, that "animals arose from a single filament or threadlet of matter, which, by its

efforts to procure nourishment, lengthened out parts of its body into arms and other members; that after this filament had improved itself into an oyster, and had been by chance left dry by the ebbing of the tide, its efforts to reach the water again expanded the parts nearest to the sea into arms and legs; that if it tried to rise from its native rocks, the efforts produced wings, and it became an insect, which in due course of time improved itself by fresh efforts, till it became a bird, the more perfect members being always hereditarily transmitted to the progeny; that the different forms of the bills of birds, whether hooked, broad, or long, were gradually acquired by the perpetual endeavours of the creatures to supply their wants; that the long-legged water-fowl (Grallatores *Vigors*) in this way acquired length of legs sufficient to elevate their bodies above the water in which they waded; that a proboscis of admirable structure has thus been acquired by the bee, the moth, and the humming-bird, for the purpose of plundering the nectaries of flowers; and that the giraffe acquired its long neck by its efforts to browse on the high branches of trees, which, after the lapse of a few thousand years, it successfully accomplished!!!? (See *Insect Transformations*, p. 9.) We wonder how many centuries, or tens of centuries, it took to elevate this race of theorists from the condition of brute beasts without understanding, into the form and stature of human beings! To enter upon a regular refutation of such absurd nonsense, would be an insult to the understandings of our readers, and an undertaking about as profitable as to write a treatise to disprove the truth of Ovid's *Metamorphoses*. When we read old Kircher's recipe for the manufacture of snakes, by roasting the old ones, chopping them up, and sowing the pieces, in order to raise a fresh crop of snakelets (see *Insect Transformations*, p. 2.), we smile at the credulous simplicity of the experimenter, and pity the ignorance of a dark and superstitious age. But we cannot help expressing our *unfeigned astonishment*, that in later and more enlightened times, we will not say, any *philosopher* or *naturalist*, but any one bearing only the *face of a man*, should be found to advocate doctrines so utterly unphilosophical, so exquisitely ridiculous, as those we have above recorded. We do not think there is the remotest probability of such opinions ever becoming popular, at least on this side of the channel; however, as there is nothing, it seems, too absurd to gain credence in the minds of some, we thank Mr. Rennie for having on this occasion entered his protest against them, and held them up to the ridicule they deserve. We have styled these doctrines unphilosophical and absurd; but this is not all: we think

them, moreover, not a little impious; tending as they do to rob God of the honour due unto his name, and manifesting on the part of their advocates a weak and futile attempt to deny the Almighty that portion at least of the attributes of wisdom and beneficence every where so conspicuously displayed in the works of the creation. Never let the delightful study of natural history be so prostituted and perverted as to be made a vehicle for the dissemination of atheism and impiety! Its genuine and legitimate fruits we affirm to be the direct reverse of such conclusions. "For the invisible things of God from the creation of the world are clearly seen, being understood by the things that are made, even his eternal power and Godhead."* "O Lord, how manifold are thy works! in wisdom hast Thou made them all: the earth is full of thy riches."†

A. R. Y.

ART. II. *Botanical Commentaries.* By Jonathan Stokes, M.D. Vol. I. 8vo. 14*s.* London, 1830.

THE author of the present work has been a labourer in the vineyard of science for more than half a century. He was the colleague of Withering in the second edition of the *Arrangement of British Plants*, and contributed various interesting matter, which, being omitted in subsequent editions of the work, has rendered that impress an object of curiosity. He now presents himself before the public with his *Botanical Commentaries*, the result of fifty years of observation, containing much that is valuable, with some that is obsolete; but if his recluse life, in a remote part of the kingdom, has prevented him from keeping pace with the galloping progress of science, he has the rare merit of having observed for himself, with a perseverance and industry very uncommon among those who figure at head-quarters as the oracles of the table. Nothing can be more delightful than to witness his ardour and energy, the abundance of his speculations, the fluency with which he treats of all botanical and horticultural experiments; and, though long past the epoch assigned to man's life, he is as ready as ever to enter the field, and journalise the history of

* Rom. i. 20. This passage would have been as accurately translated and far more intelligibly to the English reader, had it been rendered thus: "For the invisible things of God, even his eternal power and Godhead, since the creation of the world, are clearly seen, being understood by the things that are made."

† Psalm civ. 24.

the lichens upon an old post, or to entertain himself with the phenomena of vegetable monsters. " When will a botanic farmer," exclaims this amiable patriarch of science, " begin with his next wooden fence to mark, month after month, the progress of vegetation, till it decays, recording the growth of its inhabitants in another *Journal of a Naturalist!*"

" Many objects of enquiry present themselves to the minds of individuals which they do not pursue, from the shortness and uncertainty of life, or a doubt of continued residence. Who would not wish to know how lichens, *Fùci*, Sertulàriæ, and corals grow; but the lichen which excites the wish grows perhaps on a distant mountain, or adheres to a mass of rock too large to be portable, and, if marked, some geologist breaks it off with his hammer. When will some observer, resident on the sea-shore, relate the growth of the *Fùci* which vegetate between high and low water-mark? When will some zoologist take lodgings for a summer at Red Wharf Bay near Beaumaris, in Anglesea, to observe in Ellis's aquatic microscope the growth of Sertulàriæ? If a society possessed of a garden would invite the travelling botanist to send specimens of lichens growing on rock, they might be deposited in their garden, and their dimensions given in their catalogue, and their growth become the subject of future histories. I have often observed posts and rails in a state of decay covered with *Lichen fraxíneus* and *Prunástri*, and have wished to know their age. When will a botanic farmer begin with his next wooden fence, and mark, month after month, the progress of vegetation till it decays, recording the growth of its inhabitants in another *Journal of a Naturalist!*" (Pref., p. vi.)

After a dedication to the memory of a deceased friend, he enters upon a preface, replete with the product of an active mind, original, minute, instructive, full of anecdote, and amusing. He is the connecting link between the fossil and recent botanists, and speaks familiarly of persons who are regarded by the present generation as belonging to another age of the world. Among the rest of his information, he gives an account of all the botanic gardens within his knowledge, from Paradise downwards.

" Soho garden, north of Birmingham, on siliceous sand and gravel, cultivated by Boulton, partner of Watt in the manufacture of Watt's improved steam-engine. Hither resorted, on the Sunday nearest the full moon, James Watt, engineer, and fellow-labourer with Black on latent heat, and who, as well as Mrs. Watts, collected plants in Cornwall; James Kier, translator of Macquer's *Chemical Dictionary*; Erasmus Darwin, author of *Zoonomia* (a work which would be oftener consulted if it had an index to volumes and pages) and *Phytologia*, and who, in conjunction with Boothby, author of fables, and Jackson, printer of the work, planned and published a translation of Linnæus's *Gen. Plant.* and *Syst. Veg.*, in 3 vols. 8vo; and W. Withering, who, in conjunction with Sneyd of Belmont, and Turton of Stafford, planned, and which he afterwards executed, the first version, revised by me, of Linnæus's generic descriptions and specific characters of British plants, under the title of a *Botanical Arrangement*. On Priestley's accepting the office of pastor of the Presbyterian congregation in New Meeting Street in Birmingham, the Lunar Society changed its day of meeting to Monday, the members dining in rotation at each other's

houses, and continuing to do so till the Birmingham riots drove Priestley to Northumberland in the United States." (p. cxxvi.)

If our limits permitted, we could give many extracts which would instruct and delight our readers; and which would show that the study of the minutest objects in nature can fill the mind with pleasure, and animate it with an ardour and benevolent feeling which the philosophy of the world laughs at and scorns. Our venerable author is not one of those described by Wordsworth, —

> ——— " A prying slave,
> Who peeps and botanises upon his mother's grave."

☞

ART. III. *Algæ Britannicæ; or, Descriptions of the Marine and other inarticulated Plants of the British Islands belonging to the Order Algæ; with Plates illustrative of the Genera.* By Robert Kaye Greville, LL.D. &c. Edinburgh, 1830.

WITH the exception of Dr. Hooker's *Monograph of the Jungermanniæ*, there has appeared, during the present century, no work in any department of British botany which can be compared with the one before us in point of scientific knowledge and originality. It is, unlike the Floras which have of late issued from the press, no hasty composition, but the result of the personal investigation, continued for several successive years, of its gifted and zealous author, who has patiently watched the habits of most of our species on their native rocks, and marked diligently their progress, from their first appearance to their present state; and it treats of a class of plants hitherto imperfectly known, and yet than which there is none more interesting, whether we consider the variety of their forms and colouring, or the peculiarities of their station and structure, or the important part which they play in the economy of nature.

Dr. Greville introduces his readers to the systematic part of his work by an essay of considerable length and heterogeneous character. It contains an outline of the scientific history of algology, too brief to be either interesting or instructive; a general view of the geographical distribution of the inarticulated *Algæ*; a plea for those who devote themselves to the study of marine botany, or rather of plants in general, which seems to us somewhat irrelevant; and concludes with a full and interesting account of the economical uses of the tribe. To all this there can be no possible objection; but we think something better, or rather something additional, might have

been done. Instead of repeating, *ad nauseam*, common-place arguments in favour of the students of nature, Dr. Greville would have profitably occupied the space with a condensed and continuous view of the anatomy and physiology of the *Algæ*: points little or not at all elucidated by our elementary authors, and points which the present author is certainly best qualified to state clearly and satisfactorily. The manner in which *Algæ* absorb their food, by what vessels it circulates and is elaborated to a proper nutriment, in what state and by what means the excess is expelled, and the action of sea-weed on the circumfluent medium; these are questions relative to which we would have been glad to have received some information; and they are questions, the discussion of which would tend to rescue the study from the sneers of the scoffer more effectually than a page or two of vague and silly declamation. We could have wished also that something more particular had been said of the distribution of our native species. The subject has not been altogether neglected, but the information brought together is very trivial and unsatisfactory. From the work itself, perhaps, one might with care, and not without difficulty, gather materials for an essay on this subject; but the task would have been comparatively easy to Dr. Greville. Let him not say that he has done enough in indicating under every species its peculiar range, by the citation of many habitats. This will not do; for particulars thus doled out by piecemeal have little interest except to the collector, and dwell not on the memory. We shall immediately revert to this subject; but we wish first to furnish our readers with the contents of the work. After the introduction follows a synopsis of the genera arranged into orders, or, as they ought properly to have been denominated, into families, according to the author's views, which are in many respects original; and an enumeration of all the species which are known, whether British or foreign. The labour which this catalogue has cost the author must have been great; but it affords no room for criticism. To it is appended a copious list of authors who have written on *Algæ*; and this again is succeeded by the proper object of the book, the account of our native species, which are described with a care and minuteness which leaves little to be desired. The characters of the genera and species have been all revised and corrected; the synonymes are more select than numerous, and with this we find no fault, but we do regret the want of reference to some of the older botanists: their works are beginning, unfortunately, to be neglected. The species mentioned by Ray, in his admirable *Synopsis*, ought certainly to have been ascer-

tained, were it for no other reason than from a becoming respect to the memory of a naturalist whose equal has not since arisen in this country.

The following table, which we have been at pains to draw out, will exhibit a view of Dr. Greville's arrangement, with an indication of the number of species ascertained to belong to each genus, and of the number which are British. From the latter we exclude two species of *Sargássum*, described as such by Dr. Greville; for, certainly, they never grew on a British coast, and, when found, are to be considered as wrecks merely.

INARTICULATED ALGÆ.

	Number of Species.	British Species.	Number of Species.	British Species.
Fam. I. Fucoideæ	137	14		
1. *Sargássum*			68	
2. Turbinària	-	-	2	
3. Carpophyllum, *nov. gen.*	-	-	2	
4. Cystoseira	-	-	40	5
5. Hálidrys	-	-	1	1
6. Carpodésma, *nov. gen.*	-	-	1	
7. Seirococcus, *nov. gen.*	-	-	1	
8. Scytothàlia, *nov. gen.*	-	-	1	
9. Coccóphora, *nov. gen.*	-	-	1	
10. *Fucus*	-	-	13	7
11. Himanthàlia	-	-	2	1
12. Moniliformia	-	-	2	
13. Splachnidium, *nov. gen.*	-	-	1	
14. Polyphacum	-	-	1	
15. Scaberia	-	-	1	
Fam. II. Licheneæ	2	2		
16. Lichina	-	-	2	2
Fam. III. Laminarieæ	34	7		
17. Durvillæa	-	-	1	
18. Lessonia	-	-	3	
19. Macrocystis	-	-	7	
20. Laminaria	-	-	17	6
21. Agarum	-	-	2	
22. Alaria, *nov. gen.*	-	-	3	1
23. Costaria, *nov. gen.*	-	-	1	
Fam. IV. Sporochnoideæ	16	6		
24. Desmarestia	-	-	6	2
25. Dichloria, *nov. gen.*	-	-	1	1
26. Sporochnus	-	-	9	3
Fam. V. Chordarieæ	7	1		
27. Chordaria	-	-	7	1
Fam. VI. Dictyoteæ	46	15		
28. Chorda	-	-	2	2
29. Asperococcus	-	-	4	2
30. Stilophora	-	-	3	
31. Punctaria, *nov. gen.*	-	-	3	3
32. Striaria, *nov. gen.*	-	-	1	1

	Number of Species.	British Species.	Number of Species.	British Species.
33. Dictyosìphon, *nov. gen.*	-	-	11	1
34. Dictyòta	-	-	12	2
35. Cutlèria, *nov. gen.*	-	-	1	1
36. Padìna	-	-	14	2
37. Halýseris	-	-	5	1
Fam. VII. Furcellarie'æ	1	1		
38. Furcellària	-	-	1	1
Fam. VIII. Spongioca'rpeæ	2	1		
39. Polyìdes	-	-	2	1
Fam. IX. Flori'deæ	205	58		
40. Claúdea	-	-	1	
41. Amánsia	-	-	8	
42. Delessèria	-	-	13	5
43. Nitophýllum, *nov. gen.*	-	-	7	6
44. Hymenèna, *nov. gen.*	-	-	1	
45. Rhodomènia, *nov. gen.*	-	-	16	10
46. Botryocárpa, *nov. gen.*	-	-	1	
47. Thamnóphora	-	-	3	
48. Plocàmium	-	-	2	1
49. Microclàdia, *nov. gen.*	-	-	1	1
50. Odonthàlia	-	-	2	1
51. Dictyomènia, *nov. gen.*	-	-	5	
52. Rhodómela	-	-	12	4
53. Alsídium	-	-	1	
54. Bonnemaisònia	-	-	3	1
55. Laurénc*ia*	-	-	13	4
56. Gastrídium	-	-	8	5
57. Corallópsis, *nov. gen.*	-	-	2	
58. Acanthóphora	-	-	4	
59. Grecìllària, *nov. gen.*	-	-	16	4
60. Chóndrus	-	-	26	5
61. Phyllóphora, *nov. gen.*	-	-	7	1
62. Sphærococcus	-	-	2	1
63. Bowièsia, *nov. gen.*	-	-	1	
64. Gelídium	-	-	14	2
65. Gigartina	-	-	16	4
66. Grateloúpia	-	-	4	1
67. Hýpnea	-	-	6	
68. Chætóspora	-	-	1	1
69. Ptilòta	-	-	4	1
70. Dàsia	-	-	3	
71. Chámpia	-	-	1	
72. Digènia	-	-	1	
Fam. X. Thausma'siæ	2			
73. Thausmàsia	-	-	2	
Fam. XI. Gastroca'rpeæ	27	6		
74. Iridæ'a	-	-	10	2
75. Halymènia	-	-	10	2
76. Dumónt*ia*	-	-	6	1
77. Catenélla, *nov. gen.*	-	-	1	1
Fam. XII. Caule'rpeæ	23			
78. Caulérpa	-	-	23	
Fam. XIII. *U*lva'ceæ	36	15		
79. Anadyómene	-	-	3	

	Number of Species.	British Species.	Number of Species.	British Species.
80. Pórphyra	-	-	4	3
81. *Ulva*	-	-	12	7
82. Bángia	-	-	3	1
83. Tetráspora	-	-	3	
84. Enteromórpha	-	-	7	4
85. Valònia	-	-	3	
86. Alýsium	-	-	1	
Fam. XIV. Sipho'neæ	-	37	13	
87. Còdium	-	-	8	2
88. Bryópsis	-	-	6	2
89. Vauchèria	-	-	22	8
90. Botrýdium	-	-	1	1
Total		575	139	575	139

It would thus appear that the British inarticulated *Algæ* form rather more than one fourth of the whole; but the estimate is too high, for our shores have been explored so minutely, that very few can remain for future discovery; while, on other coasts, hundreds, probably, have as yet blushed unseen. In the family Florídeæ are included not much less than half of our native species: they are excellent in beauty and variety, and occur abundantly on all our coasts, though there are among them many which are rare and local. In the Irish Sea they are amazingly luxuriant. They grow in deep waters, or in the crystal pools of a rocky shore; or they clothe the stems of the Laminàriæ with a rich tapestry. We know nothing among plants more charming, more exhilarating to the eye, than the Ptilòta, the Bonnemaisòn*ia*, or the admirable Plocàmium, as they float, spread out in all their fulness; and look ye where at the bottom of that silver well the Delessèr*ia* spreads her leaves. Saw ye ever such a roseate circle, such a gracefulness of leaf, perfect in its outline and undulation; saw ye ever such purity and such splendour of colour? Nay, my friend, unless thou hast

> "Loved to walk where none had walk'd before,
> About the rocks that run along the shore,"

and with a tutored eye, thou never before sawest such perfect beauty in Flora's domain! And yet, notwithstanding their number, the Florídeæ exert comparatively little influence on the character of our marine vegetation. The *Fucoídeæ*, the Laminarièæ, and the *Ulvàceæ* are the families which more particularly give this character. The former, numerous in individuals, and very valuable, as from them kelp is principally made, occupy with their blackness all the space between

low and high water-marks, living an amphibious sort of life, alternately exposed to the atmosphere, and covered by the tide. The *Ulvæ* and *Porphyræ* intermix with them, and give some variety to the shore by their green and purple fronds. The Laminarieæ occupy a lower zone, for they are strictly aquatic, and choose, therefore, a station not liable to be left dry at the reflux of the tide. With the exception of L. débilis and latifòlia, the others are widely and generally distributed along our coasts, affording shade and shelter to myriads of creeping things, and becoming ultimately a source of profit to the agriculturist, to whom the "alga projecta vilior" is an unintelligible comparison. The other families may be considered as subordinate; for, although many genera and species amongst them, as, for example, Chordària, Furcellària, Desmarést*ia* aculeàta, &c., are met with abundantly every where; and many others, though local, are plentiful enough, yet, from their smaller size, or their concealed stations, they make no material change on the appearance of the coast. "It is easy to perceive," says Dr. Greville, "that some species, Gelídium córneum, Phyllóphora rùbens, and Sphærocóccus *cor*onopifòlius, for example, become more plentiful and more luxuriant as we travel from north to south; and, on the other hand, that Ptilòta plumòsa, Rhodómela lycopodioìdes, Rhodomènia sobolífera, and several others, occur more frequently, and in a finer state, as we approach the north. Odonthàlia dentàta and Rhodèmia cristàta are confined to the northern parts of Great Britain; while the Cystoseìræ, *Fucus* tuberculàtus, Halíseris polypodioìdes, Rhodomènia jubàta, R. Teed*ii*, Microcladia glandulòsa, Rhodómela pinastroìdes, Laurénc*ia* tenuissima, Iridæa reniformis, and many others, are confined to the southern parts. Others, again, such as the *Fuci* in general, the Laminarieæ, many Delesser*iæ*, some Nitophyllæ, Laurént*iæ*, Gastridia, and Chóndri, possess too extended a range to be influenced by any change of temperature between the northern boundary of Scotland and the south-western point of England." (Introd., p. x.) The causes which influence the distribution of the *Algæ* on a particular coast are not well known. Temperature is one; but there are many facts which the admission of this cause will not explain. "A few yards is, in some instances, sufficient to create a change; and the space of three or four miles a very striking one;" not merely in regard to species, but in their luxuriance and rapidity of developement. The nature of the soil, according to Dr. Greville, has here much influence. "Thus," says he, "calcareous rocks favour the production of some species, sandstone and basalt that of

others; and it would appear that the soil has an effect even upon those *Algæ* which grow parasitically upon the stems of the larger species." (p. viii.) But how far will this coincide with a generally entertained opinion that *Algæ* derive no nourishment from the soil, but support merely? and sometimes certainly, to all appearance independently of this cause, as the doctor immediately adds, "peculiar forms predominate in certain localities, both in regard to genera and species, which, as we approach their boundaries, gradually disappear, and often give place to others equally characteristic."

It will tell ill for the progress of botanical science in this country if the *Algæ Britannicæ* does not meet with such unequivocal encouragement as shall induce its author to go on and illustrate the jointed tribes in a similar manner. I strongly recommend it to you, my young readers, who, smitten with the love of nature, are about to enter this fine field; and more especially I commend it to the fair botanist, if any such may perchance honour this notice with a perusal. "It is not," says the author, "without a feeling of extreme pleasure that, by means of the present work, I shall place in the hands of my fair and intelligent countrywomen a guide to some of the wonders of the great deep; nor need I be ashamed to confess, that I have kept them in view throughout the whole undertaking. To them we are indebted for much of what we know upon the subject." The names of Hutchins, Griffiths, Hill, Cutler, and Hare, the ladies here alluded to, are proudly numbered amongst the best algologists; and let their example stimulate you on to excellence in the same pursuit. There is a pleasure on the pathless shore at all times and seasons; and to all, but to them chiefly who have taught the eye to see what the vulgar see not, who in a worthless sea-weed find strange thoughts and visitings. And cast not backwards a desponding eye at that fearful list of families and genera exhibited in the table. They are, perhaps, more numerous than they might have been; for superabundant discrimination is the fashion, and, as Sir J. E. Smith very justly remarked, also "the bane of natural science at the present day:" yet any difficulties in ascertaining their characters, in the present case, Dr. Greville has removed by a series of admirable figures, strikingly characteristic, and beautifully coloured.

N.

ART. IV. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

The Gardens and Menagerie of the Zoological Society delineated; being Descriptions and Figures in illustration of the Natural History of the Living Animals in the Society's Collection. The Drawings by William Harvey; engraved by Branston and Wright, assisted by other artists. Published with the Sanction of the Council, under the Superintendence of the Secretary and Vice-Secretary of the Society. 8vo. London, 1830. Vol. I. Quadrupeds.

The quarter whence this work emanates is quite a sufficient sanction for the excellence of the scientific portion of its contents; and when we add that the plates are designed by Harvey, that most of them were engraved by Branston and Wright, and that the work is printed at the Chiswick press, nothing need be said of the superior style in which it is got up. The editor (Mr. E. T. Bennett) offers his acknowledgments in his preface to Mr. Vigors, "for his general revision of the work, and for numerous valuable suggestions. To Mr. Broderip he is also indebted for the communication of much interesting information; as well as to Dr. Wallich, Mr. Yarrell, and other valued friends who have kindly assisted him in his task." Mr. Bennett also thanks Mr. Harvey, "for the patient attention with which he watched the manners of the animals" he has delineated; and Messrs. Branston and Wright, "for the pains they also have taken to make themselves masters of the subject previously to the execution of the cuts." We wish to point out these circumstances particularly to the attention of our readers; as we think that nothing can more decidedly mark the great progress which is now making in every branch of education, than to find artists taking a scientific interest in the subjects which they are employed to illustrate. The days of mere mechanical labour are, indeed, rapidly passing away, and the higher qualities of the mind are now constantly called into action.

Some of the anecdotes of animals in the volume before us (particularly those of the beaver called "Binny") are very entertaining; and the descriptions of the Chincella and Ratel are very interesting on account of the rarity of these animals. Altogether, the work forms an extremely beautiful and instructive volume, and we have no doubt of its becoming a popular favourite. — J. W. L.

Supplement to English Botany. Nos. VI.—XIV. London. 8vo. 3*s.* each Number.

The *English Botany* of the late Sir J. E. Smith and Mr. Sowerby is a work which not only does honour to its authors in their respective departments, but to the nation which gave them encouragement to prosecute to the completion so extensive an undertaking. The decline of science in Great Britain has become all at once a theme of lamentation; and we now, for the first time, have begun to discover that presidents and secretaries of scientific institutions ought to be provided for by the people. We are not among those who shall give any opposition to so salutary and convenient a doctrine. Nevertheless we cannot shut our eyes to some advantages which belong to the system of leaving even science to find its own level, without adventitious assistance. No other country can boast of a national Flora, in which every indigenous plant, known to the botanists of the time, has been figured and described. Many splendid fragments have been published by the fostering care of princes and patrons, but nowhere else has a work of this nature, combining ornament with utility, and a sufficient

degree of pictorial beauty with scientific exactness, been brought to a successful termination by the patronage of the public alone. Besides, where is there a larger number of persons living by authorship, and when do we witness more frequently the union of science with trade? Under any other system the difficulty would be to preserve this advantageous union in an active state, so important to the prosperity of the country, and the instruction of the public. Books for the people, and those of the best kind, are sold to a greater extent in England than in any other country on the face of the globe; and it is certain no such result could have followed from a system of royal or government patronage. We probably should have had a few more profound scholars, stars of the first magnitude, who would have illuminated the firmament; but the mass of the people would have groped in darkness, not vastly benefited by the splendour of the ascendant light.

In England we have brought into play the interests and the gratifications of the public to support science; and it may well be doubted whether any other mode of patronage is so well suited to our condition. Men of science take a station in society both honourable and, in many cases, profitable; and the Messrs. Sowerby, father and sons, the authors of the work now under our notice, by adopting natural history, the least profitable of any pursuit, have acquired a rank which greater men might envy, and an independence which the greatest frequently do not attain. Long may they and their class continue to flourish, and thus negative the assertion that science is placed on a discreditable footing in Great Britain!

The numbers of the *Supplement to English Botany* which lie before us contain several very interesting additions to the Flora of the country; and in every case the plates are executed by Mr. James D. C. Sowerby, while the descriptions are furnished by some of the most acute botanists of the day. Among the contributions we may notice *Erìca* ciliàris, found by the Rev. Mr. Tozer near Truro; *Cypèrus* fúscus, which we have endeavoured to persuade ourselves may be wild; *Resèda* fruticulòsa, which is probably not so, but is spreading itself apace; *Chærophýllum* aromáticum; *Orobánche* caryophyllàcea; Hieróchloe boreàlis; *Júncus* capitàtus; *Doróni-cum Pardaliánches*, being the true plant, that figured in *English Botany* proving to be the *plantagineum*. *Crocus* præ'cox and aúreus are probably escapes from the garden; but we quarrel not with them. What we do quarrel with is, that the contributors to the work have palmed upon us so many obscure and undefinable species, which are only known empirically, and are not capable of being held within any definite characters. It is desirable, without doubt, that even these should be recognised by the accomplished botanist; yet to all but the initiated they are utterly worthless; and the raising of them to the rank of species, and assigning to them names of equal degree, is involving the whole subject in obscurity, and leading the novice into darkness, confusion, and despair. This eternal splitting of hairs is become the bane of natural history, is unworthy of science, and its advocates will one day have to lament that they have stood sponsors to such a spurious and equivocal offspring. Why do not these lynx-eyed contributors turn their attention to some other parts of their subject, record facts, extend observation, connect the knowledge we have with some we have not; show the length, breadth, heighth, and depth of their science; the range, conditions, uses, place, and ends of the plants they study; notice their geographical and geological relations, and be no longer content with the meagre indication of *habitat in pratis, pascuis, cultis, &c.?* One tithe of the sagacity they discover in the infinitesimal division of species, directed to these points, would pile up a mountain of knowledge for future use, and immortalise their own names, which, under their present puerile system, will perish with the ephemeral names they are imposing upon undistinguishable things. — ☞

The Edinburgh Journal of Natural and Geographical Science. New Series. No. I. December, 1830. Conducted by Henry H. Cheek, F.L.S. F.S. S.A. &c.

We notice this work chiefly for the sake of putting on record our defence against an assertion of the Editor respecting Ainsworth's "Notes on the Pyrenees," which appeared in the preceding volume of our Magazine. It seems it has also appeared in the first series of the *Edinburgh Journal of Natural and Geographical Science;* but we can assure the editor and the public that this circumstance was totally unknown to us, and that we printed the article from the manuscript of the author sent us in April, 1829, and recalled to our mind by Mr. Ainsworth about the same period of the year in 1830. (See Mr. Ainsworth's letter under Retrospective Criticism, p. 81.) — *Cond.*

Maycock, James Dottin, M.D. F.L.S.: Flora Barbadensis; a Catalogue of Plants, indigenous, naturalised, and cultivated in Barbadoes. To which is prefixed a Geological Description of the Island. 1830. pp. 446.

Since the visit of Sir Hans Sloane, physician to the Duke of Albemarle, the governor of Jamaica, in 1687, but little has been added to our knowledge of the natural history of the West India Islands. Dr. Maycock has done, therefore, an acceptable service to science, by giving us a modern Flora of Barbadoes, which will serve pretty accurately as an index to the plants of the other islands: and if he has not added much to our stock of knowledge, he seems to have verified with care that which was but indistinctly made out by his predecessors. Of the geology of the island we believe nothing was known, and therefore the geological description with the accompanying map is a valuable accession. — ☞

Woodward, Samuel, Esq., Honorary Member of the Yorkshire Philosophical Society: A Synoptical Table of British Organic Remains; in which all the edited British Fossils are systematically and stratigraphically arranged, in accordance with the Views of the Geologists of the present Day; and a Reference is given to their Localities, Strata, and engraved Figures. Accompanied by a Lithograph of the Fossil Turtle in the Norfolk and Norwich Museum. London, 1830. 8vo, pp. 50.

A work, as the author informs us, "undertaken solely with the intent of promoting science;" and, we may assert, well calculated to do so in the department to which it belongs. The tabular arrangement of *Organic Remains* we consider as particularly interesting, by showing, in one general view, all the divisions, including orders and tribes, to which the organic remains hitherto found may be referred.

Hutton, William, Esq., F.G.S. &c.: Notes on the New Red Sandstone of the County of Durham, below the Magnesian Limestone. Read before the Natural History Society of Northumberland, Durham, and Newcastle upon Tyne, April 20th, 1830, and published in their Transactions. Newcastle, 1830.

These *Notes* will be adverted to when we look over the *Transactions,* of which they form a part. In the mean time we may observe, that in common with the other papers in the *Transactions,* a copy of which is before us, Mr. Hutton's paper affords evidence of great industry and research.

Youatt, W., V.S. and F.Z.S., Lecturer on the Anatomy and Diseases of Domestic Animals, Joint Editor of *The Veterinarian,* and Author of "The Horse," "Cattle," &c., in "The Farmer's Series," in the *Library of Useful Knowledge:* On Canine Madness; comprising the Symptoms, Post-mortem Appearances, Nature, Origin, and Preventive and Curative

Treatment of Rabies in the Dog, and other Domestic Animals; being a Series of Papers published in *The Veterinarian*, in 1828, 1829, and 1830. London, 1830. Pamph. 8vo. 3*s*.

This little work is very highly spoken of; but its object being rather foreign from the nature of our work, we can only spare room to notice it, accompanied by our best wishes for its success.

Art. V. *Literary Notices.*

Letters to a Young Naturalist, by Dr. Drummond of Belfast, are nearly ready for publication. The great object of these letters is the recommendation of the study of natural history.

A Scientific Annual, in which natural history will form a prominent feature, is in preparation by W. M. Higgins, F.G.S., of Witham. There is no annual, or rather perennial, that we know of, that has done so much for natural history as the *Young Lady's Book*, by Branston and Co. We could wish it in the hands of every female under thirty; indeed, we cannot sufficiently recommend it. We shall also be happy to recommend Mr. Higgins's work if we think it deserve it; but though we have had the titles of a part of the proposed contents sent, we must wait till we see the book complete. — *Cond.*

A Gardening and Naturalist's Annual, edited by Mrs. Loudon, Authoress of *The Mummy, Conversations on Chronology*, &c., will appear about November, 1831, and will be continued annually.

This work will consist of select practical and theoretical articles on all the departments of gardening, and on vegetable physiology, botany, and all those branches of natural history connected with agriculture, gardening, or the rural life of female society in climates corresponding with those of England and North America. It will also contain a garden and field calendar of operations to be performed; and of fruits, flowers, and garden and field products in perfection; and also a calendar of nature. The object will be to combine science with practical knowledge, and to add to the interest and enjoyments of country life; more especially to those of women, and of young persons of both sexes. Communications to this work are earnestly requested, addressed to the care of the Conductor of the Magazine of Natural History; and the contributors of such as are used will be complimented with one or more copies of the Annual, elegantly bound.

No article will appear in this work which has been published in the Magazine of Natural History or the Gardener's Magazine; nor will any article which may appear in the Gardening Annual be repeated in either of these periodicals.

Montagu's Ornithological Dictionary, with numerous illustrative woodcuts and additions, edited by J. Rennie, Esq. A.M. F.L.S. Prof. of Nat. Hist. in King's College, London, is announced. To Colonel Montagu the British Fauna is indebted for most important discoveries; and a new edition of his excellent work has long been much wanted.

Wilson's American Ornithology. — Sir William Jardine, Bart. F.R.S.E. F. L. S., &c., Author of *Illustrations of Ornithology*, has in the press an edition of *Wilson's American Ornithology*, with the continuation by Charles Lucien Bonaparte; the former published in Philadelphia in 1802, the latter in 1825 and 1826. The whole will be contained in three volumes, demy octavo, with upwards of 100 engravings, and copious notes by the editor; together with an enumeration and description of the newly discovered species not included in the original work.

PART III.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in London.*

The Zoological Society held a Meeting on Dec. 2, J. E. Bicheno, Esq., in the chair. Mr. Vigors read a brief but satisfactory report, which showed that during the gloomy month of November 8676 persons had visited the gardens; that the Society's receipts during the same period (including a balance brought forward) were 2035*l.* 10*s.* 6*d.*, and the expenditure 953*l.* From another report, also read by Mr. Vigors, we learned that the whole of His Majesty's collection had been removed from the menagerie at Sandpit Gate, Windsor, and was now in the Society's possession; that a committee of science and correspondence, comprising eleven individuals, had been formed, by which means a friendly intercourse with the learned bodies of the Continent and foreign parts might be cultivated, thereby facilitating the spread of the knowledge of comparative anatomy and animal physiology. A warm tribute of thanks was paid to Captain King and Major Franklin: to the latter, for his collection of birds from the Himalaya Mountains, the Society and science in general should feel much indebted. Of these birds Mr. Vigors observed, that they were alive on the Himalaya Mountains eight months ago; they arrived in England five weeks since; and were now placed on the Society's table, accompanied by accurately coloured figures, life-size. These birds have heretofore, we believe, been strangers in England; their form and plumage are exceedingly beautiful. The report further noticed a collection of American quails (genus *Ortyx*), a group analogous to the partridge of the old world. Of this bird only four species were lately known; now there are eleven, four of which were introduced to science by the Zoological Society. A number of individuals, distinguished for rank and science, were balloted for, and elected.

Linnean Society. — Nov. 2. At the first Meeting for the present session, A. B. Lambert, Esq., in the chair, a variety of donations, made to the Society during the recess, were laid on the table: amongst them were Dr. Wallich's *Plantæ Asiaticæ Rariores;* Audubon's *Birds of America*, &c. A paper by John Hogg, Esq. M.A., on the classical plants of Sicily, was partly read: we do not give an analysis of it until the reading shall have been finished. Several fellows were elected. The Meeting was numerously attended. Amongst the company was Captain King of the Adventure. It is the intention of government to extend his survey from Rio de la Plata to Cape Horn. Mr. Burchell, author of *Travels in Southern Africa*, was also present. This traveller has recently arrived from the Brazils, where he has been, for a considerable period, making collections in natural history. It was his intention to proceed into Peru, but the unsettled state of politics in that country prevented him.

Nov. 16. There was read a paper by Lieutenant Bowler, communicated by the Asiatic Society, on a particular species of palm found in the government of Madras. The communication was accompanied by beautiful illustrative drawings, a hundred years old. This palm was considered

by the fellows and botanists present to be the same as the *doum* palm of Thibet (Hyphæne coriàcea of Gærtner), and is remarkable as being almost the only species of palm with a branched stem. It was probably introduced by the Arabs into Madras. The stems are slender; and the fruit is a hard solid substance, which, after being steeped in water for a few days, is well beaten, and used by the natives as brushes to white-wash their houses. The leaves are very small and narrow, and the stalk is denticulated with many sharp curved thorns; from which circumstance the natives say it resembles the backbone of a shark, and on this account the people of the adjacent villages carry it in their hands when travelling through the jungles as a weapon of defence, and also during some of their festivals.

The inhabitants look upon this tree as the guardian of their jungle, and hold it in some degree of veneration, conceiving it has, as its Sanscrit name (*Kulpa vroocham*) implies, the power of fulfilling the desires and wishes of mankind, at least such as, from pureness of heart and morals, have faith in its supposed virtues. (*Lit. Gaz.*, Nov. 20. 1830.)

The Geographical Society held their first ordinary Meeting at the Horticultural Society's house in Regent Street, December 6th, when the president, Lord Goderich, delivered an appropriate extempore address. He observed, "that the pursuits which the Society was instituted to promote were at once useful, interesting, and ennobling. They were useful; for all classes of society would necessarily benefit by that enlarged acquaintance with the resources of our own and other countries, which the improvement and diffusion of geographical knowledge in fact constituted. They were interesting; for scarcely any but had friends or relations, who, as seamen, merchants, or travellers, would still more directly profit from the information thus acquired. And they were ennobling; because they roused and exercised the noblest faculties of the human mind: the love of enterprise; the promptitude which meets and overcomes its attendant difficulties; the powers of observation, which make the opportunities thus afforded valuable; and though last, not least, the attachment to strict veracity in narration, without which all other advantages are worse than useless; but for which, he was proud and happy to think and say, that English travellers were, for the most part, pre-eminently distinguished. The Society met, then, with a conscious feeling of the worthiness of its objects; but these objects had, moreover, already received, and were still receiving, the sanction of all that was most eminent for rank and talent in the country." (*Lit. Gaz*, Nov. 13. 1830.)

William IV. approves of this Society, and has promised fifty guineas annually for its encouragement. The minutes of previous meetings of council were read, by which it appears that the canons of Hereford Cathedral have promised to send to London for the Society's inspection a very old map of the world, which was said by Mr. Britton, the historian of cathedral antiquities, to be the earliest specimen of British map-making. Among the list of presents of books and maps made to the Society, was the notice of an offer made by Mr. Murray of Albemarle Street, characteristic of that gentleman's well known liberality, viz., to present the Society with whatever it might choose to select from his catalogue of publications. This generous offer was received with the greatest applause.

The Geological Society have met and held their Meetings as usual, and when abstracts of the papers read are printed (according to the custom of this Society), we shall give the essence of them.

King's College.—*Nov.* This building is advancing rapidly; and we have great pleasure in announcing that our excellent friend and coadjutor, Mr. Rennie, the author of *Insect Architecture*, so ably reviewed in our present Number, has been appointed to the chair of Natural Philosophy.

Rectory Grove Academy, Clapham.—We are happy to find that Mr. Cornfield, who conducts this establishment, gives popular lectures on every

branch of Natural History to his pupils; and that he walks out with them on the common and elsewhere, collecting plants and insects, sketching from nature, and discoursing upon the various objects connected with these useful and interesting pursuits, in the hope of inspiring their young minds with a taste for the beauties of nature and natural history. We approve exceedingly of this plan, and should be glad to see it generally adopted in schools, as nothing can conduce more both to the happiness and well doing of young men than having a taste early inculcated for innocent pleasures. The pursuit of natural history gives an interest to country walks, which they would not otherwise possess; and this contributes to improve the health as well as to enlarge the mind. In a pamphlet published by the Conductor at Paris, in 1829, on establishments for public education in some parts of the Continent, a school for girls (*Tochter schule*) is mentioned at Carlsruhe, conducted upon nearly the same plan. Besides the usual branches of female education, these pupils are taught all the details of natural history; and in botany, especially, they "are made to study the plants from living specimens, in the fields and gardens during summer, and from dried specimens in the winter; and are not only taught the names and distinctive marks of each plant, both exotic and indigenous, but also its use in medicine, and in the arts and manufactures of Europe. In the study of zoology, the same plan is pursued with regard to the uses of the different animals." (See *Des Etablissemens pour l'Education publique en Bavière, dans le Wurtemberg, et dans le Pays de Bade*. Paris, 1829, chez Mesnier.) — *J. W. L. Dec.* 2. 1830.

Art. II. *Natural History in the English Counties.*

Nottinghamshire.

Two large Oak Trees were raised from the bed of the river Trent a few weeks ago, a sketch of one of which (*fig.* 10.) I have subjoined. These trees are perfectly sound, except the sap, which is decayed in some parts. The gravel is fixed to the trunk where it was embedded as firmly as if it had been cemented on. There are large patches of a light fawn-coloured fungus attached. These trees are only met with in the beds of gravel, which, I believe, extend, with a few intervening beds of clay, from Nottingham to Sutton upon Trent meadows. The trees are thinly scattered throughout the whole distance, and the greatest number are found between Sutton and Muskham. The gravel rests on a bed of very stiff dark-coloured clay, occasionally rising above the gravel. The trees appear similar to those occasionally found on bogs, and seem to have been torn up with great violence. I have sent two specimens for your inspection, as I cannot enlarge on the subject, being only a tyro in study.

10

The smaller tree is straight and handsome, 33 ft. long, without any branch of importance, and girths 9 ft. The larger tree (*fig.* 10.) girths at *a* 15 ft.; from the root to *b* is 23 ft.; from the root to *c* is 49 ft.; and from the insertion of the lance, by which it was pulled up at *d*, to the line *e*, was covered with gravel, and 20 ft. were under water. — *A. G. G. Newark upon Trent, Oct.* 17. 1829.

Appearance of Birds of Passage, extracted from my Journal. — 1830. April 1. Swallows observed near Chilwell, flying about the river Trent. 6. Saw the *Régulus non-cristàtus*, or willow wren. 10. Swallows again appeared, not having seen them since the heavy snow which fell here on the

3d and 4th of this month. *M*otacílla Sylvia (whitethroat) seen at Beeston: called here, Peggy Whitethroat. 15. Heard the nightingale (*M*otacílla, *L*uscínia) in a clump of bird-cherries, in a shrubbery. 16. Observed a cock and hen redstart (*M*otacílla *P*hœnicùrus); provincial name, Firetail. Same day, a cock and hen blackcap (*M*otacílla Atricapílla); provincial name, Black-headed Peggy. 21. The cuckoo (*C*ùculus canórus) heard for the first time. 23. The whinchat arrived: called hereabouts the "U-tick," from its note. 30. Heard the meadow or corn crake (*R*állus *C*réx). — *A. G. G. Newark upon Trent.*

YORKSHIRE.

Early Appearance of Swallows. — Observing in the last Number of the Mag. Nat. Hist. (Vol. III. p. 434) a notice of the early appearance of swallows this year, and having myself seen some earlier than is mentioned in any of those accounts, or than I recollect to have seen them in any former year, the notice of them may not perhaps be uninteresting to some of its readers.

On the 30th of third month (March), the last of the very warm days we then experienced, I saw three swallows flying in a stone quarry, about half a mile from Ferrybridge, on the lower road from thence to Pontefract; on that day week, being the 6th of the following month, though the weather was then become quite cold, I observed a single swallow within about one quarter of a mile of the same place, on the road from Ferrybridge to London; and on my return from London, on the 11th, a little on this side Newark, I saw more than twenty flying in a company over the river, a very unusual number for so early in the season. I am, &c. — *Thos. Allis. York, Oct.* 16. 1830.

Rare Plants. — Sir, It is well observed by your correspondent Mr. E. Lees, that lists of variations of colour in plants, without any mention of habitat or soil on which they grow, are of no utility whatsoever. Now, since I am entirely of Mr. Lee's opinion, and since nothing will so clearly show my concurrence with him as following his example, I have sent you below a list of the varieties in this part of the country; which, possessing a great choice of hill and dale, upland and marsh, is thus more likely to attract interest.

Ranunculàceæ. Anemòne nemorósa. On dry heathy ground; flowers variegated with deep pink, often drooping. — *Aquilègia vulgàris.* With white flowers. Growing near Richmond, on limestone, promiscuously with the blue.

Crucíferæ. Cardámine praténsis. In marshy ground, with double flowers, and of light purple.

Violàceæ. Víola lùtea. On high barren ground, frequently purple or ple and yellow.

Polygàleæ. Polýgala vulgàris. On high barren and heathy ground, of a much lower growth, and of a white and rose colour; whereas in lower and richer soil it is invariably blue.

Malvàceæ. Málva moschàta. White, on road-sides, along with the rose-coloured.

Caryophýlleæ. Lýchnis dioíca. In corn fields, generally white; in woods always rose-coloured.

Geranàceæ. Eròdium cicutàrium. On the sandy sea-coast at Redcar, almost constantly white.

Oxalídeæ. Oxalis Acetosélla. In a wood, quite free from underwood, of a fine rose colour.

Leguminòsæ. Lòtus corniculàtus. On the banks of the Swale, on a sandy soil, streaked with deep red.

Caprifoliàceæ. Caprifòlium Periclýmenum. With flowers smaller and light green, in a hedge near Knaresborough.

Campanulàceæ. Campánula rotundifòlia. In shady places; white. — C. glomeràta. Limestone, in high meadows; white with the blue.

Compósitæ. *Achillèa Millefòlium.* On high heathy ground; of a bright rose colour. — Bìdens cérnua. I never found the plant in this neighbourhood with any but radiate flowers. — *Serrátula tinctòria.* On high ground, with white flowers. — *Centaurèa nigra.* On high ground, with white flowers.

Borragíneæ. *Echium vulgàre.* Road-sides; much smaller, and of a fine rose colour. — Myosòtis sylvática. In marshy ground, with white flowers.

Ericèæ. Calluna vulgàris. With white flowers; on heaths. — *Erìca Tétralix.* With white flowers; on heaths.

Primulàceæ. Prímula vulgàris. In a shady place, near Richmond, with white, lilac, and crimson flowers.

Scrophulàrineæ. *Pediculàris sylvática.* White; in dry heathy ground. — Bártsia Odontites. White; in corn fields. — Digitàlis purpùrea. In a fir wood with white flowers, on a soil composed of decayed vegetables. This kind of soil appears to agree much the best with the foxglove, since, when transplanted into a garden, it never bears such large flowers, and is apt to branch out.

Labiàtæ. *Ballòta nigra.* With white flowers, along with the common one. — *Betónica* officinàlis. White; woods. — *Prunélla* vulgàris. In a meadow near Thirsk, with white flowers exclusively. — Clinopòdium vulgàre. Hedges; white. — *Origanum* vulgàre. Mountain limestone, with white flowers.

Orchídeæ. *Orchis* máscula. This plant varies very much: on high limestone soil it is dwarfish, and sometimes white-flowered; in low marshy situations, where there happen to be trees, it grows to nearly three quarters of a yard high; and the corolla presents every variety of shade, of white, pink, and scarlet. Indeed, the odours which it disperses around are almost as various as its colours, in one plant rather pleasant, but in another, distant perhaps only a few yards, absolutely nauseous. I have never been able to find an explanation of this phenomenon (for so I may venture to call it), and would feel much obliged to any person who might give a probable reason for it. It cannot depend upon any variety of soil, as they grow close to each other. The soil is of a black peaty kind.

Asphodèleæ. *Scilla* non-scripta. In woods; white. — *T. E. L. Richmond, March 5. 1830.*

Lancashire.

Preston Depot for the Sale and Exchange of Objects of Natural History. — A few admirers of the productions of nature here have long been anxious for the establishment of a mart for the sale or exchange of their spare specimens, and have constantly, but in vain, expected that some of your town readers would have answered the repeated calls that have been made by your correspondents on the subject. Disappointed in the expectation of seeing one established in London, they have come to the determination of establishing one in this town, which, in addition to the advantages of a general thoroughfare and a central situation, has constant intercourse with the principal sea-ports of Ireland, so that there would be no difficulty in forwarding a parcel from any part of the kingdom. The necessity of such an institution is particularly felt by those who wish to collect the productions of our own country, which seem to be so much beneath the notice of dealers, that specimens, of which any quantity might be got, are not to be met with on sale; whilst others, the most rare and valuable, are doomed to remain in the hands of the finder, instead of enriching his cabinet as they ought to do with the productions of other parts of the country. As an instance of this, I may mention the crinoidal remains, and other fossils, from the mountain limestone, so rarely to be met with in collections, many un-

figured species of which I possess in sufficient number to furnish all the empty cabinets in the kingdom. The persons with whom the design originates are all ardent collectors, and are able to contribute most of the natural productions of the neighbourhood as a nucleus. They have also the advantage of two excellent libraries: one left for public use by the late Dr. Shepherd, which is particularly rich in old authors on the subject; the other, a collection of the best modern works, in the possession of the Preston Natural History Society. These, with their private libraries, would be of essential service, by enabling them to correct occasional errors in nomenclature. In addition, it may be stated that a wish to furnish their cabinets, and a sincere desire to promote the study of natural history, are the motives that induce them to come forward, and not pecuniary advantage.

It only remains for me to add, that cabinets are preparing for the reception of specimens; that I hope to be able to state in your next Number the terms on which exchanges will be made, &c.; and that, in the mean time, I shall be glad of your advice, or that of any of your correspondents who is friendly to such an undertaking. I remain, Sir, &c. — *Wm. Gilbertson.*
Preston, Oct. 16. 1830.

Dorsetshire.

A petrified Tree. — Sir, I send you a sketch of a petrified tree (*fig.* 11.) discovered in one of the quarries of the Island of Portland, during the latter part of the last year. It was found lying in a horizontal position, and broken into several pieces, about 10 ft. below the surface of a bed of stone, which is called by the quarrymen part of the "willow tree," and in which roots and fragments of trees (probably of the willow kind) have been frequently met with. Its height and diameter are given in the sketch; its weight is about a ton and a half. As the pieces corresponded exceedingly well with each other, they have been united by a cement very much resembling the colour of them, which renders the joinings not particularly observable. Mr. White of Portland, who has favoured me with this account, and the accompanying sketch, and in whose possession the tree remains, states that, as it is now standing against the front of his house, in an erect or natural position, strangers are deceived by its appearance, imagining it to be an old oak tree that is dead; and that the deception is only removed by close examination. Mr. White also adds, that persons who are judges of timber have pronounced it oak. I remain, Sir, yours, &c.—*Jas. Flewker.* *July* 22. 1830.

Cheshire.

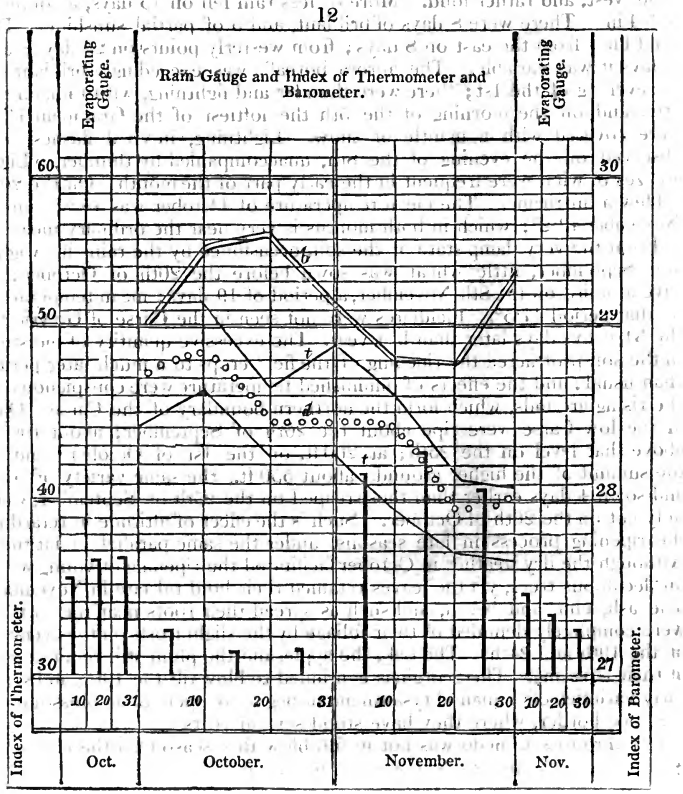
Occurrence of two extremely rare British Birds. —A beautiful specimen of that rare occasional visitant the golden oriole (*Oriòlus Gálbula*) was shot

on the 11th of May, in the present year (1830), at Taxal in Cheshire; and, on dissection, its food was found to have consisted chiefly of coleopterous insects. This individual, which is an adult male in excellent plumage, is deposited in the museum of the Society for the Promotion of Natural History established in Manchester. On the 19th of August last, a remarkably fine specimen of the rose-coloured pastor (Pástor ròseus) was shot near Eccles, in the county of Lancashire, by Mr. Hindle, and now forms an interesting addition to the Manchester museum. From the beauty of its plumage, this bird, previously to being examined anatomically, was confidently pronounced to be a male; and the accuracy of this opinion was afterwards confirmed by dissection. On opening its gizzard, and inspecting the contents, I perceived that they consisted principally of the larvæ of insects, the indigestible parts of beetles, and a few seeds of vegetables. This elegant species has, I believe, been found to occur more frequently in Lancashire than in any other part of the kingdom.—*J. Blackwall, Crumpsall Hall, Sept.* 30. 1830.

Art. III. *Calendar of Nature.*

Scotland.

Diagram, showing the Motion of the Barometer and Thermometer, the Dew Point, and Minimum Temperature, or the Mean of each, for every



Ten Days in the Months of October and November; the Depth of Rain in the Pluviometer, and the Quantity of Moisture evaporated in the Evaporating Gauge, for the same Period: as extracted from the Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′; above the Level of the Sea 172 ft., and 15 miles from the Coast; being the Mean of daily Observations at 10 o'Clock Morning and 10 o'Clock Evening.

The double lines, marked *b*, show the motion of the mercury in the barometer; *t*, mean temperature in the open air, and in the shade; *d*, dew-point; *min. t.* mean of minimum temperature in the open air at night.

The coldest day in October was the 18th: mean temperature of that day 41°; extreme cold 34°; wind westerly. The warmest day in that month was the 20th: mean temperature of that day 55°; extreme heat 64°; wind south-west. The fall of rain, as it will be seen by the diagram, did not exceed a half inch, and that fell in gentle showers on the 2d, 7th, 20th, and 21st. There were 11 days of brilliant sunshine, 8 partial, and 11 days were cloudy. The wind blew from easterly points only on 2 days, and from northerly and westerly points on 29 days. There were loud gales of wind on the 4th and 7th; on the 4th it blew from the west, and on the 7th it blew from the east in the forenoon, and from the west in the afternoon. Light breezes were frequent throughout the month.

The coldest day in November was the 24th: mean temperature of that day 37°; extreme cold 30°; wind north-west. The warmest day in that month was the 1st: mean temperature of that day 53°; extreme heat 60°; wind west, and rather loud. More or less rain fell on 15 days, amounting to 3·4 in. There were 8 days of brilliant, and 5 of partial sunshine. The wind blew from the east on 8 days; from westerly points on 20 days; and 2 days it was variable. The aurora borealis was exceedingly brilliant on the evening of the 1st; there were thunder and lightning, with rain, on the 4th; and on the morning of the 5th the loftiest of the Grampian Hills were covered with a mantle of snow. Lightning, in vivid flashes, was observed on the evening of the 8th, unaccompanied by thunder. Light breezes of wind were frequent in the early part of the month. On the 20th it blew a hurricane. The mean temperature of October was 48·8°, and of November 43·2°; which in both months is very near the ordinary mean.

From the very damp state of the soil, occasioned by the rains in August and September, little wheat was sown before the 20th of October; it gave a braird on the 8th November, a period of 19 days: mean temperature of that period 47·5°. Fieldfares were not seen in the Carse of Gowrie till the 31st, five days later than last year. The excessive quantity of moisture in the soil protracted the ripening of the field crops to a much later period than usual; and the effects of diminished temperature were conspicuous on the rising grounds, which form the northern boundary of the Carse. Oats in the low Carse were ripe about the 20th of September; about 100 ft. above that level on the 25th; at 200 ft. on the 1st of October; and on the summit of the higher grounds, about 550 ft., the same variety of oats, and sown 4 days earlier than those reaped on the 25th of September, were only cut on the 26th of October. Such is the effect of altitude in retarding the ripening process in late seasons, under the same parallel of latitude. Although the dry weather in October facilitated the ripening of young wood on deciduous trees, yet the leaves retained their hold till late in November. The ash, elm, and beech, and such as spread their roots near the surface, were completely denuded of their foliage by the slight frosts on the evenings of the 19th and 24th. The oak, the apple, and the plum still retain a part of their covering. The georginas continued to blow till the 19th, and some early varieties of Indian chrysanthemum begin to open their blossoms in the open border, where they have stood several years.

The *Arbutus Unedo* was not in full blow this season till the middle of November. The blossoms now begin to fall, and the fruit appears to set freely. — *A. G. Annat Gardens, December* 1. 1830.

Art. IV. *Retrospective Criticism.*

Critical Remarks on No. XVI.

"Summa sequar fastigia rerum." *Virgil.*
"I shall trace the principal heads."

Sir, The Third Volume of your Magazine is now brought to a close; and I shall take the liberty of offering a few remarks on some of the chief contents of the Sixteenth Number, which is just published, and completes the volume. I select the last Number for the vehicle of my observations, intending to make it serve, in some sort, as a sample by which to *assay* the work at large; for what is true of a part, is, generally speaking, more or less true of the whole.

In the first place, then, having on a former occasion (Vol. III. p. 89.) presumed to criticise, in no very complimentary terms, the vignette titlepage which you had the liberality to *give* to your readers for the first two volumes, I think it is but an act of common justice on the present to express my entire satisfaction at the new one which you have now given us for Vol. III. Neat and unassuming, and free from the glaring faults of its elder brother, it sufficiently answers the purpose intended; and the execution of the block, which, if I may judge from my own copy, gives a very brilliant impression, may be considered, on the whole, to be creditable to the artist employed. After the titlepage comes the preface, from which I rejoice to learn that the number of contributors to your periodical has greatly increased; a circumstance which tends to show that there is an increasing taste for the study of natural history throughout the country; to the formation of which taste *you* probably have in no slight degree contributed. I also congratulate you on having been the person first to design and start such a work, and, as I now trust, to have established it on a firm and permanent footing. There is much need, it strikes me, of such a miscellany as yours, not only to facilitate the intercourse between naturalists personally unknown to each other, and widely separated by distance of situation; but also to afford a vehicle by which to communicate facts and remarks, which, however interesting or important, are yet, in point of bulk, too inconsiderable to form any thing like a separate treatise, and to be sent into the world by themselves. Of your numerous contributors I suppose there is not one in fifty who would ever have thought of swelling out his lucubrations even into the size of a pamphlet, and running the risk of publishing the result of his observations at his own hazard. Were it not, therefore, for some such general receptacle as is afforded by your Magazine, many an interesting remark and useful piece of information would in all probability never have been given to the world at all.

But to proceed: the Glossarial Index, which you have now for the first time appended to your volume, is, in my mind, a most useful and desirable commodity. In the present specimen, however, there are, I think, some omissions, and more superfluities; for example, the very first word I chanced to look for,—merely because it caught my eye in the page (522.) I happened to have opened,—was the word "operculum," which is not to be found in the glossary, though it more particularly deserved to be noticed, as it appears to be used in the page referred to in a sense somewhat different from that in which it is often employed. Again, the word "adductors" (p. 526.) is omitted. Now surely such words ought to have found a place in the Glossarial Index, rather than those of such common occurrence and easy comprehension, as "alæ," "antennæ," "caput," "formosum," "lanceolate," "oculi," "os," "pectoral," "pes," "proboscis," &c. I am, however, more disposed to find fault with your sins of omission than commission; and do not object to your insertion of the

latter words, which, at all events, is an error on the right side. In the derivation of the word "holocentrus" from "*holos*, hall," &c., the word *hall* is, I presume, a mere misprint for *all* or *whole*, the translation of the Greek ὁλος.

Thus much for the preliminary adjuncts to your volume. Before I proceed to notice particularly any article of your contributors, permit me, Mr. Editor, to express an earnest hope that, in purveying for your readers, you will allow yourself unscrupulously to exercise your own judgment and discretion on the propriety of admitting into your pages the essays, notices, remarks, and queries with which you are furnished by your correspondents. I request that you will not, through fear of giving offence, think yourself bound to give a place to any article, from whatever quarter it may come, merely because it has been sent to you with that view. From the situation in which you stand, as editor, soliciting communications from all sources, you are of course constantly liable to have trifling and unimportant matters at least, if not some trash and nonsense, occasionally thrust upon you. Exercise your own discretion, therefore, and discard whatever is unworthy of insertion in your useful pages; or if, in any instance, you stand in doubt about the propriety of admitting an article, why not refer it to the decision of some judicious friend or coadjutor? I have been led into these remarks more especially by the perusal of one article in your present Number, Art. III., by Agronome, of which I really can make neither head nor tail. I will just observe too, in passing, that the first article, "Original Letters, descriptive of a Natural History Tour in North America. By T. W.," is rather flat and tame, and not much to my taste. This, however, at the worst, is but "a chip in porridge," and the succeeding letters may be better than the first two, and more full of interest. With Agronome's most extraordinary production I have more serious fault to find; and I really do feel myself utterly at a loss to conceive how you could think of inflicting so grievous a penalty on your readers, as to palm upon them such a rambling, incoherent, egotistical rhapsody; which, moreover, has next to no connection, that I can perceive, with the subject of natural history. Can you find no better matter to supply us with? or was this piece of stuff foisted in merely to eke out the necessary quantum of type and usual extent of pages for your Number? If so, I for one must tell you, Mr. Editor, that it is high time you resigned your office, and closed your Magazine. I will not, out of Christian charity, go so far as to wish Agronome himself had perished in the explosion of the powder-mill; but I do most heartily regret that his manuscript had not fared some such fate, or ever it had come into your possession. The catastrophe of Mr. Hunter's arm reminds me of what I have heard did really take place at the siege of Gibraltar; I have been told,—"but mind" (as Cobbett would say), "I don't vouch for the fact,—but I have been told,"—that a British officer had his leg carried off by a cannon-shot; upon which he exclaimed,—"D—n it, there goes my boot!" not being aware that his *leg* was gone with it, till he had occasion to step forward, and thus found the want of his limb. Agronome seems to have a zest for the marvellous, when he relates the circumstance of another unfortunate man having been "blown into so many pieces that his heart and liver were found in different fields!" and "his tongue on a door-step some distance from the other fragments of his head!" But none of the recorded effects of the blowing up of this powder-mill are to be compared with what is said to have taken place on the explosion of a boiler at a colliery in my neighbourhood. Here too, again, I will not vouch for the fact; but the owner of the works positively assured a friend of mine, and with a grave face and air of seriousness as though he meant to be believed, that on this occasion "three men were blown up so high into the air, that to the by-standers they appeared not so

big as gnats!" nay, " to such an extraordinary height were they carried, that their mangled bodies were actually in the air ten minutes or more, by a stop-watch, before they descended to the earth!!!" But enough of these marvels. Should Agronome again be visited by a similar paroxysm of the " scribendi cacoethes," I trust you will hesitate before you send his nonsense to the press. The insertion of such absurd articles does far more injury to your publication than the mere occupying of so much space, which ought have been dedicated to valuable matter. It is calculated to bring the work itself into discredit. For so it is — such is the contaminating effect of intercourse with evil — that even that which is good seems in some degree to suffer deterioration when found in bad company. A few more such articles as Agronome's would be enough to damn your whole Magazine. I assure you, for example, that had I been previously unacquainted with the work, and had picked up this Sixteenth Number, and dropped upon the article in question, I should have felt disposed to throw down the book in disgust, and probably have never looked into it again.

But I pass on to a more agreeable subject. Articles VI. and VII., on the British willow wrens, and some newly discovered British species of sticklebacks, are very useful and interesting papers. The willow wrens are confessedly a most perplexing tribe of birds, and the accounts of them to be met with in books are, as your correspondent observes, involved in no little obscurity and confusion. Their plumage is in some cases so much alike, and that of the young birds occasionally so different from that of the old, that it requires an acute and practised eye in the one case to distinguish those which are of distinct species, and in the other not to separate individuals which are of the same. For myself I know them better by the ear than by the eye. And it may not be out of place here to relate what occurred to me in an attempt to ascertain two of the species in question, which, I believe, were the yellow wren and the lesser pettychaps. I had long been perfectly familiar with the notes of each (which are totally distinct, and cannot be mistaken), and was aware that they appeared, or at least commenced their song, at different periods of the year; but I was uncertain as to their true names and species. I resolved therefore to shoot specimens of each. And in order to be quite sure that my aim was directed to the objects I wanted, I took the opportunity of shooting them while they were engaged in the act of singing, so as to preclude the possibility of mistake. On examining the specimens when shot, I was exceedingly surprised to find them so much alike in plumage, that I could with difficulty distinguish one from the other; and when they were returned to me after having been stuffed, I really was in doubt which was which. I could have wished your correspondent T. F. had entered more into the habits and manners of these interesting little creatures, and especially that he had described their notes, together with their nests and eggs; and I hope you will hear from him again often on similar subjects. We have already had " descriptive and historical notices of British snipes." (Vol. II. p. 143., and Vol. III. p. 27.) Some others of our native birds I should be glad to see illustrated in the same way *, quite agreeing with your correspondent

* As, e. g. the whitethroats, larks, sandpipers, grebes, widgeons, &c. &c., or at least the nearly allied species in each tribe. The same remark, too, I would extend to subjects of entomology; and in this department you have some able correspondents, well calculated for such discussions, as Mr. Rennie, Mr. Swainson, and (for the more minute insects especially) Mr. Westwood with his lynx eyes. Mr. Stephens, too, if he would condescend, might afford some valuable contributions, as might also that veteran in scientific lore, Mr. Haworth. " Omnia bene describere, quæ in hoc mundo

H. V. D. " On the Value of complete Histories of Families of Animals," more especially where the different species (as in the case of the willow wrens) so nearly resemble each other as to be with difficulty distinguished on a close inspection. I would suggest, too, that in all these cases the remarks should be illustrated with figures, and the synonymes of the principal writers on ornithology investigated and settled as accurately as possible.

Mr. Yarrell's notice of two species of Gasterósteus, hitherto unknown as natives of Britain, will set me to work in examining the brooks in my own neighbourhood, to discover whether or not they afford any besides the common species. The discovery of a new species of British fresh-water fish is an event of rare occurrence, and one hardly to be expected except among the minute and more neglected kinds. Without presuming to call in question Mr. Yarrell's accuracy, especially too on a subject which I have not particularly attended to, I would respectfully ask (and with deference to his better judgment and experience), whether it is not possible that the distinguishing marks he points out in the three kinds of sticklebacks may not arise rather from age or sex, than from real specific discrepance.

Article VIII., " On the Metamorphosis of a Species of Cassida, by T. H.," is a fair specimen of individual entomological illustration. The oftener you present us with papers like those by T. F., Mr. Yarrell, and T. H., the better.

It has been hinted to me, that the introductions you have occasionally given us to different departments of natural history are not much relished by some of your readers, though to me they appear quite in place in such a work as yours. The one, however, relating to Molluscous Animals, by G. J., of which the sixth letter is contained in Article IX., is an able and interesting essay, abounding with information on a difficult subject, generally but little understood. I have read these letters with much satisfaction.

I entirely coincide in opinion with Professor Henslow as to " the specific identity of *Anágallis arvénsis* and *cærùlea*" (Article XI.), a point which he seems to have now demonstrated beyond all possibility of doubt. Both varieties occasionally occur together in the same corn fields; the blue, where it is found at all, sometimes greatly predominating over the more common kind. I once introduced the former into the garden, where it propagated itself by seed for many years, and, unless I greatly mistake, at length degenerated into the common sort; or, perhaps, more properly speaking, I ought to say, returned to its original type. I hope the Professor will continue to prosecute his truly interesting experiments, and to communicate the results to the world, through the medium of your pages.

The Rev. L. Jenyns's " Remarks upon the late Winter of 1829-30," &c. (Article XII.), cannot fail to be read with pleasure, by all who take an interest in meteorological subjects. All remarkable seasons, and such surely was the one in question, ought to be recorded in your Magazine.

I shall look with some degree of interest in a future Number for a solution of the difficult problem proposed by E. G. (Article XIII.), in the phenomenon of a " singular appearance of the rainbow," seen on the shores of the Solway Frith. Should it be thought by any one that the occurrence was observed at a rather suspicious hour of the day, when haply, owing to some slight temporary obliquity of vision, the observer might be led to fancy that he saw more objects than were in reality presented to the eye, I can

---

a Deo facta . . . . fuerunt, opus est non unius hominis, nec unius ævi. Hinc . . . . Monographi præstantissimi."—*Scopoli.* " To describe well all the things in this world which have been made by God, is more than the work of one man, or of one age. Hence the great excellence of those who apply themselves to the investigation of individual genera or species."

assure him, on the authority of my excellent friend E. G., that the phenomenon was witnessed by several others in company with him, of whom, I may add, more than one, as well as E. G. himself, the Cambridge tripos for their respective years would point out as distinguished mathematicians.

The reference to "*Phil. Trans.*, p. 1793.," should doubtless have been "for the *year* 1793."

On the review of Strutt's *Sylva Britannica*, partial as I am to the subject of which it treats, I am restrained by motives of delicacy, quite of a private nature, from offering any remarks. I may, however, without impropriety, express my admiration—in common with all those (and they are not a few) whom I have heard speak on the subject—of the beautiful wood-cuts which the review has been the means of introducing, and which are so highly creditable to the able artist you have employed. However expensive these vignettes may be,—and from their merits I judge, Mr. Editor, that you must have paid handsomely for them,—I can inform you that they are valued by your purchasers as they deserve to be, and serve to bring your publication into repute. And here, as an individual subscriber to your Magazine, I may be allowed to offer my thanks to the printer for having, as it should seem, taken some pains in striking off the copies, so as to produce clear bright impressions from the blocks. Of course I can only speak of the specimens I have examined, which amount, however, in this case to between twenty and thirty copies of the work. I cannot endure to see a weak indistinct impression of a beautiful wood-cut. The sight of it gives me quit an uncomfortable feeling, analogous to that (and of longer duration) which you may conceive an alderman to experience when, sitting down to a luxurious repast, he finds the turtle, venison, &c., utterly spoiled in the cooking.

The Number I am speaking of, I observe, contains nothing under the head of Retrospective Criticism, and but little under that of Queries and Answers; which constitute, to my mind, by no means the least interesting or useful portions of your pages, and are those, indeed, which I usually submit to the earliest perusal. You tell us you prefer giving these miscellaneous matters *in masses;* and perhaps you are right. At the same time I would suggest, that the answers should in all cases appear as soon after the questions have been put as circumstances will permit; and that the Retrospective Criticism should be separated at no greater distance from the subjects to which it refers than can well be avoided. Before I quit the subject of this department of your work, I must beg to repeat the advice I have already given towards the commencement of my remarks, viz. that you will not fail to exercise your own discretion on all matters that are forwarded to you, and that you will unscrupulously reject such as are unworthy of insertion. Queries are sometimes put to you, the answers to which are not worth advertising for in print; because any one the least acquainted with the subject could, on application being made to him, at once have satisfied the enquirer. Thus, for example, had your correspondent Mr. Thomas Morgan (No. XV. p. 476.) applied to any one at all conversant with entomology, he would immediately have had a solution of his problem about the "minute eggs produced from the greenish and black-marked worms which are found on cabbages;" or had he only referred to Vol. III. p. 52. of your Magazine, he would there have found the insect itself figured and described, though under a wrong name, as appears from a subsequent communication on the subject by an able hand. (p. 452.) It is rather too late in the day to put forth such matters as remarkable occurrences. It is obvious that whatever a man observes for the *first* time, is new and strange *to him;* accordingly some tyro in natural history, only just beginning to attend to the wonders of creation by which he is surrounded, observes some very common-place phenomenon, with which, of course he is naturally much struck, and straightway he sends off an account of it to

Mr. Loudon as worthy of notice in his Magazine; which is much as if a countryman were to write to the Royal Society to inform its members, that he had made the notable discovery that the earth moves round the sun, and not, as he had always previously supposed, the sun round the earth. People who have paid little or no attention to nature are astonishingly ignorant of the commonest phenomena. I really do not know that the hackneyed story, narrated by Joe Miller, or some of his fraternity, of the cockney, who, going into the country, and seeing an elder bush in full flower, observed that he never in his life saw cauliflowers growing before,—I really do not know that this is altogether improbable, or unlikely to have taken place. I was myself once told by a gentleman, as a remarkable circumstance, that once in his life he saw what he called the flower of a fern; he was shooting, he said, and having occasion to climb up a bank, he happened to turn aside the fern with his hand, and there on the under side of the leaf was the flower in full perfection! not being aware, as it should seem, that he might see the like any day he chose to look for it. I would not, however, be understood as wishing too rigorously to exclude from your pages all queries on subjects generally familiar to naturalists, and well understood; for such queries sometimes serve, in the reply, like *pegs*, as it were, on which to hang a neat and useful little history of the matter in question, illustrated, perhaps, by further information. At the same time I would recommend you to be occasionally a little more select in your choice, lest in these enlightened days of knowledge you should be charged with having filled your pages with remarks and notices relating to facts already known to the less ignorant part of the world for some centuries past; and I trust that all your correspondents will have the good sense not to feel offended, should their communications at any time be deemed unsuitable for insertion in your miscellany.

I now take my leave of that portion of the Magazine of Natural History on which I have made free to offer my remarks, assuring you that I always look forward with much pleasure to the alternate month for the appearance of your Numbers; and I heartily unite with you in the hope you express of "going on in the same course for many years to come, gathering strength as you proceed; and *so rooting this periodical into the literature of the country, as that there must always in future be in these islands a Magazine of Natural History.*" "Esto perpetuus." Yours, &c. — *B. Coventry, Nov.* 25. 1830.

Agronome's Paper on Slobs's Powder Mill. — Sir, With the permission "to pick and cull," (or to reject) as you thought proper, I cannot but express my surprise that you should have given an admission into the pages of your excellent and interesting work, the Magazine of Natural History, to the article under the signature "Agronome." (*Vol. III. p.* 509.) What the writer's meaning is, or under what head of natural history the subject can be classed, I am quite at a loss to know. He has treated with levity the bodily sufferings of his fellow-beings, when writhing under the effects of a lamentable accident; and although he says of himself that "he is no blasphemer," (and I would fain not think him such), yet there exists, in the language of which he makes use, a familiarity and a grossness which it is impossible to read without regret, almost without disgust. Pray, Sir, look to this for the future, nor allow an admission into a work of such interest as your Magazine of articles which cannot, I am sure, be to your *own* taste, nor (I will venture to add) to that of any of your numerous readers. I am, Sir, your well-wisher, — *J. S. Manchester, Nov.* 7. 1830.

We entirely agree with our correspondent, and regret exceedingly to have admitted such a paper; how we did so we cannot well tell; but our readers may rely on our taking better care for the future. — *Cond.*

Mr. Ainsworth's Notes on the Pyrenees. (Vol. III. p. 496.) — Sir, In the last Number of the Magazine of Natural History I perceive a memoir entitled *Notes on the Pyrences*, written by myself, and sent to you more

than a year ago, before my connexion with the *Edinburgh Journal of Natural and Geographical Science*. Not having seen these Notes in your Journal, I inserted them with some alterations in the geographical collections of the *Edinburgh Journal*. As Mr. Cheek, not aware of these circumstances, has been indignant at a supposed plagiarism, I beg leave to offer this statement in explanation. The *Notes*, as published in the Magazine, contain the following orthographical errors, which I hope you will apologise for to your readers, from its not having been in your power to send the author a proof for correction.

Page 498. line 31., for "geognostic stratum" read "geognostic structure;" l. 44., for "superpositions" read "superposition." 501. l. 36., for "alles" read "alla." 502. l. 25., for "Lebau" read "Libau." 504. l. 14., for "Parrat" read "Parrot;" l. 17., for "Deehen" read "Dechen." 505. l. 26., for "alegnation" read "alignation." 506. l. 9., for "Simoux" read "Limoux;" l. 27., for "Bougues" read "Bouguer." 507. l. 12., for "Port de Benasque d'Or" read "Port de Benasque, d'Oo." I am, Sir, &c. — *William Ainsworth.* — 172. *Regent Street, December* 6. 1830.

Typical Formation of all Animals. — Sir, In allusion to the controversy between MM. G. St. Hilaire and Cuvier, respecting a general typical formation of all animals, I beg to remind you, that our own naturalist, Mr. MacLeay, so far coincides with the opinions of the former, as to consider that the modifications of a typical structure may be traced through numerous objects of very different appearance; but that he considers that nature has adopted *two* distinct plans, that the vertebrate and annulose animals respectively represent the perfection of each of these plans, and that all other animals may be regarded as formed upon one or the other of them. — *J. O. W. Sept.* 1830.

The Kingfisher. — Sir, Having observed, in No. XV. of this Magazine for September, the assertion of your correspondent Mr. Jennings, that the kingfisher is never seen in the vicinity of man's habitation, I beg that he may be informed, through the medium of your widely circulated work, that, for the last nine years, and perhaps more, I have noticed that a pair of kingfishers have uniformly constructed their nests in a hole of a bank which projects over a piece of water on my premises, not above 100 yards from the house. On the top of the bank is a sort of hermitage or summer-house, which, though not certainly much frequented, is enough so to justify the remark of J. R. (Vol. II. p. 457.) I could also observe, that any one who is acquainted with the scenery on the banks of the Thames, from Oxford to Reading, and even up to near London, must know that he cannot walk a mile without seeing or hearing the kingfisher; and that although, in some places, it may be a solitary and shy bird, yet there it cannot be considered as such. These facts will, I hope, be sufficient to convince Mr. Jennings that he is mistaken. If you can find a spare corner to insert this article, you will greatly oblige, Sir, yours, &c. — *An Observer of Nature. Sept.* 6. 1830.

Snakes taking the Water. — Sir, In corroboration of Mr. Murray's remarks (Vol. III. p. 450.), I beg to say, that, being when a boy very often at Kenton Hall, in this county, I have *frequently* seen the common snake take the water, crossing the moats which on all sides surround that old-fashioned mansion. They skimmed over the surface of the water, only occasionally swimming under the surface, with the head above. As snakes are exceedingly common in that part of the county, I doubt not, many persons could readily confirm the assertion beside myself. — *W. J. Clarke. East Bergholt, Suffolk, Sept.* 13. 1830.

Birds forsaking their Nests. — I shall offer a few remarks on birds forsaking their nests when their eggs are touched, as stated in your Magazine. (Vol. II. p. 113.) I have known years ago (when I was a lad, and went to school) instances, when a boy found a bird's nest, of his taking the eggs; and if not more than two were laid, substituting two small roundish pebbles.

The greenfinch and hedge-sparrow appeared to take the least notice of the exchange, and invariably produced their regular number of eggs. But some which were tried forsook their nests; and, as far as I recollect, the goldfinch, chaffinch, and wood-pigeon were most particular. I have known boys in this neighbourhood to substitute pebbles for eggs very often. I some years ago found that a pair of hawks had appropriated the nest of a carrion crow to themselves. I climbed to it, and took two eggs, the whole there were in it, and pulled out the greater part of the nest, supposing I should thereby effectually drive them from the neighbourhood. But, in the course of a fortnight after, passing by the same tree, and looking up at the remnant of the nest, I perceived the old hawk's tail projecting over the side of it. I again climbed the tree in silence, expecting (as the nest was built close to the trunk of the tree) to catch hold of her; but she perceived me, and flew off, uttering a sort of harsh shriek, which attracted her mate, and they both several times pounced within a yard of my face; but, in spite of them, I carried off my spoil of four more eggs. It thus appears that hawks are not very particular about having either their eggs taken or nest pulled. Hawks are not very common in the neighbourhood, or else I should have suspected they had been another pair. I must likewise notice an instance of the courage of a young meadow crake (Rallus Crex), when attacked by a young terrier puppy of mine. It was not sufficiently fledged to fly, and was about the size of a thrush; but it could run fast. The puppy caught it up in its mouth, and carried it some distance across the field I was walking in, and then put it down unhurt. I was agreeably surprised to see the little thing extend its featherless wings and neck, and run in that menacing attitude at the puppy, which fairly turned tail. I immediately put it in a place of safety, as a reward for its courage. — *Scólopax rusticola. Chilwell, near Nottingham, Aug.* 30. 1830.

De Re Araneæ Aeronauticæ (the Aerial Spider Controversy). — "One feature of this Magazine is, that the contributors criticise one another, and every one who sends an article must take this into account." (*Conch. of Mag., No. X.*) — Sir, Every reader of your excellent and useful Magazine must observe, with regret, the very uncourteous way in which the spider controversy is carried on between Mr. Murray and Mr. Blackwall. I am not personally acquainted with either of these gentlemen, and, therefore, can have no biassed feeling. I see, indeed, much to admire in each; and only sorrow that two champions who have entered the lists, to break a lance in honour of their fair mistress, Dame Nature, should do it with such hostile feelings. My concern, however, is great at this squabble, as it tends much to lower, in the esteem of its juvenile votaries, the beauteous and lovely pursuits of natural history, and bewilder their minds in the dark and intricate paths of controversy, instead of alluring them to the sunny banks of improvement and delight. Youth is too apt to be a pugnacious season, both mental and physical; and most opportunities are eagerly grasped at to indulge this propensity, either to gratify a feeling of ill-nature, or the ambition of victory: both of which are at utter variance with the well formed and gentle mind. In proportion as opportunities are offered and seized, so will the young and unformed mind be sweetened by a *well directed* pursuit after the loveliness of truth, or jarred and unharmonised by *ill directed* scrambles: either of which must have a great share in shaping the future man.

I am well aware, Sir, of the numberless phenomena in the exhaustless science of nature, yet quite hidden and imperfectly understood; and that active minds, in diligent and anxious search after cause and effect, will often come in disagreeing contact: this is as it should be, and will stimulate to exertion, call forth ability, and ultimately elicit truth. It is, indeed, a pleasure to see noble minds, with all their vigour and subtlety, exerting themselves in unravelling the hitherto hidden mysteries of nature, and obtaining

for themselves never dying fame in the admiration and gratitude of posterity; and it is, indeed, equally a sorrow to see the fair field stained and deformed in serving the purposes of private pique, or party disagreement.

Natural history (too long neglected in this country) has become, or at least is becoming, an important part of education; and the soft rising beams of its morning are silently and steadily creeping into the *nooks* and *corners*, dispelling the dark mists of bigotry, superstition, and error, and leaving light and loveliness in their room. When this shall have spread broadly over all parts of society, the rotten props of old established follies will have gradually wasted away, and the dens and strong holds of mysticism will be cleansed of their masses of Augean filth, which ages have been piling together.

So much, therefore, of benefit to future society (whether it be regarded publicly or privately) depending on the universal spread of nature's truths, surely it is the duty of all well-wishers of the cause to pull together in peace and harmony. "A house divided," &c. &c. —*K. O. Montgomery-shire, Oct.* 11. 1830.

Ascent of the Spider. — The second edition of *Aerial Electricity and Researches in Natural History*, I trust, will be found to contain temperate arguments in favour of my peculiar view of the ascent of the gossamer spider; and I shall, indeed, be surprised if Mr. Blackwall's theory, as echoed by Mr. Rennie, be eventually found to sustain the assault successfully. Those who once thought Mr. Blackwall's opinion plausible now say, "A number of facts, more or less bearing on the question, are here collected together; and if they do not establish the theory, they go a long way towards it." I have made these remarks in justice to Messrs. Blackwall and Rennie, that they may be apprised that their opinions are interrogated and weighed, fearlessly it may be, but still, I trust, in the spirit of inductive science. It is for the public now to judge between us. As far as it regards myself, the subject has been set at rest; and I only now advert to it, to state my regret that I did not sooner receive the *Bulletin des Sciences Naturelles*, containing an account of M. Virey's paper on the ascent of the spider, read before the Institute of France. This author rejects the electrical hypothesis, as well as that of Mr. Blackwall. "Il n'a pas donné," says Virey, "selon nous, une explication satisfaisante du phénomène de l'ascension aeronautique de ces filamens." * He then adverts to their ascent in motionless air, in a close room. M. Virey states a phenomenon which has been often recorded, and I have frequently witnessed; and it seems to me utterly inexplicable on Mr. Blackwall's hypothesis; their occasional sudden ascent, rapid as a dart:— "Un élan si rapide qu'on n'a pas le tems de bien examiner comment elles disparaissent." † In considering Mr. Blackwall's view, this curious phenomenon seems to have startled M. Virey. His view of it, however, is altogether peculiar; in fact, he sees in these aeronauts only "très habiles voltigeurs" ["accomplished vaulters"]. He denies altogether the propulsion of the thread, or at least its attachment, as necessary to the ascent; and considers that they dart into the air as E'laters spring forward, "par sauts brusques" ["sudden leaps"]; and that, in fact, the insect "nage dans l'air; que ces petites araignées volent avec leurs pattes." ‡ Unfortunately, however, for this odd notion (to which we cannot, at any rate, deny the merit of *originality*), the legs of the insect are perfectly still and motionless in its progress through the air. The entire paper, however, is so utterly ridiculous and absurd, that it does not deserve a serious refutation. Indeed, M.

---

* "It does not, in my opinion, give a satisfactory explanation of the aeronautic ascent of these filaments."

† "A spring so rapid that there is not time enough to examine how they have disappeared."

‡ "Floats in the air that these little spiders fly with their legs."

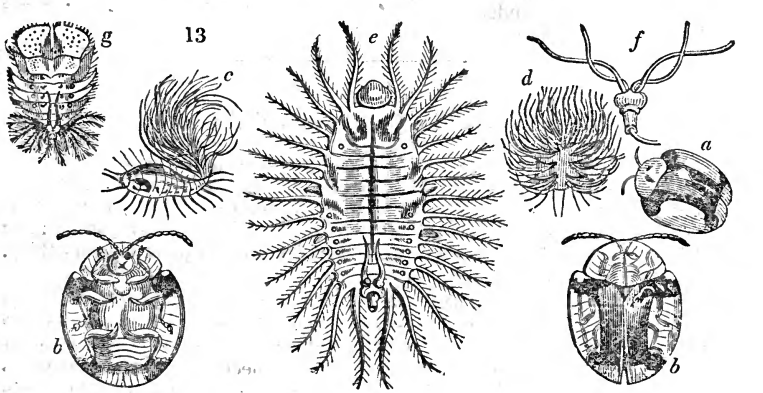
Virey seems to have some forebodings of this kind, when, after having advocated the substitution of these "pattes volantes" for the wings of birds, he thus concludes: "La nature modifie donc les organismes selon les fonctions qu'elle leur attribue pour ses desseins, dans la république de chaque monde!"* I remain, Sir, yours, &c. — *T. Murray. Aug.* 8. 1830.

Your correspondent A. L. A. (Vol. III. p. 458.) is too bold in attacking the authority of so eminent an entomologist as Mr. Kirby, upon a question which nobody but himself doubts. The insect is a Cecidomyia, belonging to the family *Tipùlidæ*, and does not possess, neither does Mr. Kirby's figure represent, what your correspondent unscientifically terms a trunk; and yet the supposed possession of this trunk is the only reason which A. L. A. offers for considering the insect to belong to the *Culícidæ*. — *J. O. W. Sept.* 1830.

Pterόstichus parumpunctàtus. — Your juvenile entomological readers will thank you to correct the confused account of two very distinct insects which a correspondent has sent you under the head of Pterόstichus parumpunctàtus (p. 477.). — *J. O. W. Sept.* 1830.

J. C. Farmer must furnish a description of his two curculios (p. 477.) ere he can receive any exact account of its habits, name, &c. Why did he not himself endeavour to discover some of these things without asking for information? I recollect, when I was a schoolboy, the maxim constantly impressed upon me was, "Read, and you will know." So I would say to some of your correspondents, "Endeavour to find out these things yourselves; and the pleasure and information which you will derive will amply repay your trouble." — *J. O. W. Sept.* 1830.

Erratum. — The following explanation should have accompanied the figure illustrative of the metamorphosis of a species of Cássida given in our last Number. For the sake of greater clearness, the cut is here repeated: —



a, Cássida, the perfect insect, natural size. *b b*, The same, under and upper views magnified. *c*, The larva, side view, natural size. *d*, The same, a posterior view, natural size. *e*, The larva, as it appears stripped of the fæcal secretion. *f*, The tail of the larva, as it appears in the early stage of formation. *g*, The larva under change to the pupa state.

---

* "It appears, then, that Nature modifies the organisation of animals according to the duties imposed upon them in the various departments of her works!"

Disseminating Exotics.—Sir, I observe in Vol. III. p. 460. a reprobation, by E., of the practice of disseminating exotics amongst our indigenous plants; to which you have, in my opinion, appended a very sensible query, whether the beautifying of our wild scenery is not a thousand times more valuable than exclusive devotion to the single science of botany? I certainly should think so. What mischief can arise from the practice? Some few botanists may be led to rank a plant as indigenous on such a plain or mountain, which, in fact, is not so. What then? Why, he labours under a mistake. That is the limit of the evil. And let me ask how he can be certain of the indigenosity (to coin a word) of almost any plant. The wind, birds, and other animals, are constantly conveying seeds, unintentionally, from their former habitats to new ones, where they are subsequently accounted indigenous. Are not these as much transported as if by the hand of man? Why, then, as there is no security against foreign and perhaps unseemly specimens being introduced in such ways, should there be an outcry against the man who is at the trouble of adding a few beautiful plants to the wild ones already growing in any country? I see Mr. Wilson also laments the practice; but, if the perfect and authentic catalogue of indigenous plants he mentions be a desideratum, I fear it must remain so. Independently of the modes of dissemination of new specimens which I have mentioned, the long-practised plan of throwing the refuse of flower-gardens on dung-heaps has already caused many exotics to be ranked amongst our native plants. Some are known to have thus become wild plants, but many others have doubtless escaped detection.—*T. Thompson. Hull, Oct.* 12. 1830.

The Double Shadow, mentioned in Vol. III. p. 468., and in some prior Numbers, was occasioned by some reflected image of the sun, caused by some looking-glass or window in the neighbouring houses; but it were vain to attempt speaking decidedly, unless perfectly acquainted with the localities of the situation where the phenomenon occurred.—*T. Thompson. Hull, Oct.* 12. 1830.

Art. V. *Queries and Answers.*

Zoology.—In what way can the study of zoology be most successfully pursued in its various branches?—*J. B. A. Peckham, Oct.* 6. 1830.

Stark's Introduction to Natural History is not a bad book; but there is an *Encyclopædia of Introductions to Natural History* in preparation for Messrs. Longman, which we confidently expect will supersede every thing. No book is more wanted.—*Cond.*

A phosphoric Fungus.—We do not recollect that any of our botanical visitors have remarked the beautiful phosphoric fungus which is at this season to be found in full luxuriance on our hills. It is branched, or rather umbelliferous, from eight to ten or more stalks proceeding from one trunk, forming an umbel of about 6 or 8 in. in diameter. At night, or in a dark room, when fresh gathered, a very strong phosphoric light is emitted from the gills underneath; so strong indeed as to occasion a shade, and sufficiently powerful to illuminate a bed-room. (*Hobart Town Courier.*)

Can any of your readers inform me if the substance alluded to be a fungus, and, if so, its name, alliances, and whether it is peculiar to Van Diemian's Land?—*John Simpson. Llanberris, Oct.* 1. 1829.

The Cause of Goitre.—Sir, Being accustomed on the disappearance of the snow to lay aside my printed books, in order to study the great volume of nature, until the approach of winter sends me home to the investigation and arrangement of the fruits of my summer rambles, it is by mere chance that I have noticed the queries relative to goitre in Vol. II.

p. 301. 403., which only reached me late in the spring; and this will account for my not having earlier sent you a few desultory observations on the subject.

On my arrival in Switzerland, eight years since, I felt desirous of forming some correct opinion relative to this deformity: my subsequent wanderings have extended to nearly every corner of Switzerland, and most parts of the neighbouring districts of Piedmont, the Tarantaise, and Savoy, where goître is excessively frequent; and, as my rambles are always performed on foot, I have had the best opportunities of stopping at any moment to make such enquiries as might suggest themselves. I began by noting the different opinions which had been formed upon the subject, in order to ascertain which would be best supported by the circumstances of each individual case; and the result of much patient investigation is an adoption of the views taken by Coxe, and detailed in his letter from the Valais, dated Aug. 22. 1776. He there attributes the disease to the presence of tufa in the water drank by the inhabitants; and I have never observed it to prevail in districts where tufa was not in the neighbourhood of the springs, or where the water, on examination, by the few tests I have usually carried, did not prove to contain a considerable quantity of calcareous matter *in chemical solution*: the latter condition appears essential, as neither calcareous nor siliceous particles, however minute, in a state of mechanical suspension produce the effect. Take one example. At Zermatten, situated near the source of the Visp*bach*, which issues from the immense glaciers extending between Mont Rosa and the Matterhorn, you are presented with water of a milky whiteness, and which I have found *still* turbid after a repose of twenty-four hours; carefully filtered, it however affords scarcely a trace of earthy matter, and the inhabitants of the neighbourhood are free from goître (a proof that snow water has nothing to do with it): the impetuosity of the torrent prevents the deposition of the impurities, and at its junction with the Rhone, after a course of nine leagues, it is nearly as clouded as at its source. I have not found that persons who confine themselves entirely to the use of this water are troubled with goîtrous excrescences; neither are those who employ springs (arising probably from the same glacial or snow water, which has become purified by filtering through the soil) in the upper parts of the Valley of St. Nicholas, where tufa does not exist: but, approaching the lower levels towards the Rhone, goître begins to appear amongst persons using water as limpid as crystal, and which has invariably afforded me strong indications of calcareous matter in solution; and my enquiries have always led to the detection of neighbouring tufa. This one instance may be considered as a sample of my experience in a great number of other valleys similarly circumstanced. My observations have never inclined me to adopt the opinion that goître was due to the effect of a stagnant and suffocating air, although not doubting in the least that such an atmosphere may have a very powerful influence by inducing a general debility, which may render the constitution less able to resist the operation of the primary cause. The following circumstances will, perhaps, be allowed to support me in this conclusion: — I have met with many persons of the middle classes, who, in consequence of a greater attention to cleanliness, more exercise, a more generous diet, and *using but little of the water*, might be expected to enjoy more robust health, and who constantly inhabit places exposed to the most oppressive atmosphere, without being materially or at all affected, although surrounded by goître in its most disgusting forms amongst the lower classes, who are dirty, idle, and ill fed. In many tufa districts of the Cantons of Bern and le Vaud, in which the suffocating air of the Valais is never felt, but where the atmosphere is most salubrious and refreshing, goître amongst the lower classes is extremely prevalent. Finally, in many parts of Italy, where the air is still more oppressive, if possible, than even in the environs of Sion, the natives,

however weak and emaciated, are free from goître; the districts in question being equally free from tufa. The remark which has been brought forward, that the children of the peasantry, who are removed to the purer air of the mountains on first being attacked, soon recover, is no more applicable to one theory than the other; as, on their removal to the mountains, they quit at the same time the debilitating atmosphere and the contaminated springs.

I shall now refer, in a cursory manner, to a few passages in your Magazine, and in Coxe's letter.

Mr. J. V. Stewart (p. 301.) is not aware of goître having been observed in the brute species. He will find that Coxe speaks of it as affecting dogs; and I have seen several, particularly at Bern, who have exhibited them of no very ordinary proportions; but I do not, at the present moment, recollect having noticed them in any other animal. Coxe speaks of the assertion that foreigners who settle in Switzerland are never attacked, and questions whether this may be really the case: a great number of strangers having chosen this magnificent country for their chief residence, since the conclusion of the war, the point is no longer doubtful, many having been attacked. The natural horror with which these excrescences are viewed by those who have not been accustomed to see them from their infancy would, of course, occasion prompt measures to be adopted for the dispersion of the swelling, on its first appearance; but, as the disease has frequently made its attack, there can be no reason to doubt that it would not have proceeded in its ordinary manner, had it been neglected.

Obscurus (p. 403.) asks, May it not arise from some peculiar disposition in the muscles of the throat, which certain habits of life have, by time, rendered hereditary; and is the disease curable without having recourse to the knife? To the first I shall merely observe, that goître is seated in the *glands* and not in the *muscles* of the throat; and a medical gentleman remarked to me three years since, that he had noticed a singular circumstance, viz. that in different districts, neighbouring, but not the same, glands were most usually affected. This would seem to indicate that, probably, not certain habits of life, but rather the continuance of the disease during several generations, had established a hereditary susceptibility in certain glands to become diseased in preference to the others; and as the inhabitants of this country usually form their connections in their immediate neighbourhood, intermarriage may have established the peculiarity in the different localities. The remark struck me as being interesting; but I have not sufficient anatomical knowledge to turn it to any account. To the second question it may be replied, that the knife is never resorted to for the extirpation of goître; but that the disease is perfectly curable, at least in its early stages, and in the male subject. The medicaments resorted to are, I believe, all of them preparations of iodine; but these, when taken internally in their purer forms, are classed amongst the powerful remedies which require to be used with caution. The preparations are of several descriptions, such as a candy, which may be taken in considerable quantity; a stronger dose prepared with Malaga wine; or still more powerful drops, which are administered in small quantity. There is also an unguent, made with the hydriodate of soda, which is perhaps preferable; as, being a local application, it acts more immediately on the affected parts, without at first materially attacking the glands in general, as is more or less the case when internal remedies are used. I have a son, who arrived in Switzerland when fifteen months old; at the age of about four years he showed symptoms of goître, which were removed by a few days' application of the ointment, and keeping the throat warm by a piece of flannel. During two years I took the precaution of having the water, which forms his usual beverage, boiled, when calcareous matter was deposited in great quantity: to obviate the unpleasant effects of recently boiled water, it was exposed for some time

to the air in shallow vessels; frequently rendered a little sparkling, by passing through it a stream of carbonic acid gas; or slightly chalybeate, by the galvanic action of a small rod of iron immersed in it, round which a fine silver wire was previously twisted in a spiral manner. This, and strict attention to his general health, have secured him from any subsequent attack.

I have stated that the disease in its early stages is curable in the *male subject*. Females of the upper classes, who avoid the debilitating course of life to which the peasantry are, from necessity or choice, exposed, are not often seriously affected; so that the disease exerts its chief malignity on the fair sex of the lower ranks who neglect it in its early stages, after which the remedies prepared from iodine cannot be safely resorted to. Even when applied locally in the form of ointments these are found to act strongly on the glands in general; so that unless the earliest symptoms are attended to, the iodine has time to affect the glands of the breast, which in some cases have nearly disappeared before the incipient goître was removed.

These observations seem to throw some light on the question of Obscurus, What noxious qualities of the water in the neighbourhood of Lucca would the iodine contained in them tend to neutralise? It would be desirable to examine the contents of the water, and to ascertain in what state the iodine exists; but, as iodine is compatible with the presence of tufa, is it not probable that, instead of neutralising the noxious qualities of the water, it may act by rendering the glands capable of resisting their effects? Its proportion is, no doubt, very trifling; but it would be well to observe what may be the result of the habitual use of water containing it. It is so long since I strolled into the vicinity of Lucca, that I have no recollection of having noticed any striking peculiarity in the form of the females; but should my wanderings again lead me in that direction, I shall not fail to cast an eye towards the busts of the natives, and also to ascertain whether the udders of the cows and goats are materially affected by drinking the water.

Should any of your readers visit this country with a view to the study of its botany or mineralogy, I shall at all times be happy to supply them with such information as my local knowledge may enable me to afford. Yours, &c. — *P. J. Brown. Thun, Canton of Bern, July* 14. 1830.

Cause of Goître. — Sir, Obscurus (Vol. II. p. 403.), among several questions which he proposed relating to goître, or bronchocele, wished to know what was the most generally received opinion as to the cause of that disease. As your correspondents, Mr. J. Aaron (Vol. III. p. 192.) and Old Bengally (Vol. III. p. 470.), have not attempted to satisfy him on this point, perhaps a few additional remarks on the subject will not be deemed superfluous.

Goître is a disease very prevalent in Switzerland, more so, I believe, in that country than in any other part of the world; it is also not uncommon in some parts of England, especially in Derbyshire, Nottinghamshire, and Sussex. As to the cause of this malady, there are different opinions; but as, whatever it be, it is more predominant in Switzerland than any where else, it is by examining the physical condition of that country that we should endeavour to discover the nature of the poisonous agent. By some, the swelled necks of the Swiss have been attributed to the air of the deep valleys; by others, to their food; and by others, to the water, not the snow water. It is this latter element, or rather some mineral substance held in solution by it, that is generally accused in the present day of producing the singular deformity in question. We are told that the food of the inhabitants cannot be the cause of it; for some parts of Switzerland are comparatively free from goître, while the diet is the same, or very nearly so, throughout the country. The hypothesis of its being caused by some deleterious quality of the air has but few, if any, espousers in our time. It is then

ascribed to some unknown influence of the Alpine waters. The facts which are brought forward in support of this theory may be briefly stated. It is observed that the rivers, both great and small, that take their origin in the glaciers, and other elevated crusts of ice and snow, become in a short time perfectly *white*, by being mixed with the particles which they wear from rocks and mineral substances in their noisy and precipitous routes to the lakes below. Hence, water taken from any of these streams deposits, by standing, a prodigious quantity of saline and mineral substances. When it is considered what infinite variety of materials constitute the beds and banks of these Alpine rivers, and the quantity of *detritus* which they carry with them, there can be little doubt that such ingredients, when conveyed into the stomachs of the inhabitants, exert an important influence. This supposition seems to admit of proof, by the fact that goître gradually and progressively decreases as we descend the Rhine, a river that rises in the Alps and is chiefly supplied by Alpine waters. It is scarcely necessary to observe, that the river deposits, as it increases its distance from the Alps, the ingredients with which it was impregnated, and becomes mixed with auxiliary streams from rivers not Alpine. The same change is also observable in the Rhone. The Upper Rhone, where it falls into the Lake of Geneva, is turbid even to whiteness; but its waters, while nearly quiescent in the lake, become clear, and pass through the city of Geneva like translucent streams of bluish crystal. Among those who inhabit the banks, and drink the waters of the upper or turbid Rhone, there are twenty goîtres for one that can be seen in the country adjacent to the lower or filtered Rhone, in its progress, below the Lake of Geneva, to the Mediterranean. In further proof of the theory which these facts seem to verify, it may be observed, that analogy also would lead us to the same conclusion. As there is a mineral or saline substance found in nature, which is capable of *removing* swelling of the neck and of many other parts of the body (for instance, iodine), why should there not be another mineral or saline substance which is capable of producing the same kinds of swelling? The same valley that sends forth the miasma which causes ague, gives birth to the tree from which quinine, which cures the ague, is obtained.

Although much has been said by medical and scientific men of former times in opposition to this opinion relating to the cause of goître, yet it is, perhaps, as likely to be true as any other opinion that might be adduced. The deleterious agent, however, which produces goître in Switzerland, seems to differ in its effects from that which produces the same disease in England. The general health of those who have swelled necks in this country does not suffer much; on the contrary, the whole constitution of the Swiss falls a prey to the destructive principle. Bronchocele is but one prominent feature of a universal physical and intellectual deterioration, which pervades the inhabitants of one of the most romantic and beautiful countries in the world. Their enormous heads, their imbecility of mind, and their stunted forms, arrest the attention of the traveller at every step of his progress in traversing the Alpine regions. The poet justly exclaimed of Switzerland, "Man is the only plant that dwindles here."

I remain, Sir, yours, &c. — *J. Jones. Llanfair, Montgomeryshire, Sept.* 1830.

Substance found in the Stomach of a Horse. — Sir, Having noticed (p. 447.) the description of a hard substance found in the stomach of the alligator, I take the liberty of sending you a description of a substance, although widely differing from that, which was found some time ago in the stomach of a horse, and presented to me. It is nearly round, cracked on one side, soft, and gives to the touch; it is of a light ash colour, and bears more resemblance to sponge than any other substance I am aware of, but is rather more fibrous. Can it have been formed of hair licked by the animal off its shoulders? An answer, through the medium of your Magazine, would greatly oblige, Sir, yours, &c. — *T. W. D. Greenwich, Sept.* 6. 1830.

Partridges and Moorhens (*Note from a Journal*, ——, 1826). — I was once detained for an hour or two in the night at Hal, in Flanders. When the daylight broke, I went into the court-yard of the post-house, and found amusement in watching the behaviour of sundry birds which were shut up in a large cage suspended against the wall. I have forgotten many of them, but I well remember that there were quails, partridges, moorhens, sparrows; goldfinches, canaries, and *owls*, besides several others, which appeared to be reconciled to their place of confinement, and to each other, with a solitary exception. Whilst the owls were composing themselves to sleep after their midnight watch, and the twittering and musical gentry were piping all throats, to repay those grave-looking gentlemen for the hooting they had kept up all the time the others had been at rest, the morning only seemed to be to the partridges and moorhens, what it used to be to the Greeks and Trojans in the days of Ajax and Hector, the "signal-time for strife." Never did I see such work as those quarrelsome fellows made of it; what the aquatic birds had done, I could not learn, but the partridges did nothing but chase them about, backwards and forwards, round and round, without mercy and without relaxation. Once or twice the moorhens took shelter in their bowl, esteeming, with Pindar, *ὕδατι μὲν ἄριστον* ["water best"]: but no sooner had they considered themselves safe from further molestation, than the partridges expanded their clipped wings, and made a sort of indirect flight of it, fairly knocking their enemies out of their element. One of the people at the place told me it was *toujours la même chose* ["always the same"]; that there was no armistice between the combatants till night came; and that they had kept up that fun for several days over since, in short, the partridges, who were the Johnny Newcomes, had been there. Whether the game is still continued, I know not: probably, now the Hollanders and the Brabanters have learned the sport, the birds are no more. But what I should like to know is, whether the partridge is always a pugnacious gentleman, and the moorhen generally a coward; or whether it is more likely a private quarrel or jealousy existing between these individual representatives of their species. Whilst the chase continued, the area was free to the combatants. The owls now and then winked an observation on what was going on below; and the smaller birds kept hopping about, from perch to perch, and singing, as if they were musicians hired to play on the occasion of the gladiatorial exhibition of their fellow-prisoners. — *W. B. Clarke. East Berghalt, Suffolk, Sept.* 30. 1830.

Caprimúlgus europæus. — Have any of the readers of the Magazine of Natural History kept the Caprimúlgus europæus in a cage? During the present season I caught one, apparently from five to six weeks old, as it was capable of flying a distance of 200 yards at the time I caught it. I kept it, in a state of perfect health, between two and three weeks, feeding it on boiled eggs and meat, but I was always obliged to open its mouth when fed; and from its natural habit of taking its food on the wing, I do not think it ever would have picked, or opened its mouth to be fed. After keeping it the time specified, it flew away, from the carelessness of the young man to whose care I had confided it, he having left the door of its cage unfastened. I am, Sir, &c. — *Thomas Allis. York, Oct.* 16. 1830.

Curious Nest and Eggs. — Sir, I have been invited, through the medium of your valuable publication, to send you an account of a nest and eggs which were brought to me by a boy on the 24th of May last, and were taken in a thick wood near the village where I reside. The nest was placed in a young nut tree, about 15 ft. from the ground: it was composed outside of thorns, sticks, and large roots; inside rather deep, and lined with very small curly roots, twigs, and three or four large horsechestnut leaves; and somewhat resembled, both in size and texture, that of the jay. The eggs were five in number, and, when taken, of a most beautiful flesh colour; but since that time they have faded greatly, and now are more like a colour

called French white. They are entirely spotless, and very elegantly shaped, being about the size of a missel thrush's. The boy who procured them says that the female was sitting on the nest; and that he was obliged to drive her away by throwing stones. He describes her as being very beautiful, and says that she endeavoured, as much as possible, to scare him away, by uttering a sharp hoarse cry, and by repeatedly clapping her wings. I have taken one of these eggs as a specimen both to the Oxford and British Museums, where there are collections of eggs, and have compared them with the different sorts there, but could never find any which had the least resemblance to them. If any of your correspondents could inform me what they are, or where I could get them named, they would greatly oblige me. I have a pretty good collection of British birds' eggs, but among them there are a great many the names of which I have not been able to learn in any of the works on that branch of natural history. It is greatly to be regretted that there is no *good* publication to which a person can refer on that subject; and I am convinced that, if a work were undertaken of that description, it would well repay the conductor's exertions, particularly if the figures were *well drawn* and coloured. — *An Observer of Nature. Aug.* 14. 1830.

Lord's Island, Derwent Water. — In the summer and autumn of 1820 I resided, with a party, during the Cambridge long vacation, at Keswick, in Cumberland. One of our chief recreations was to navigate the beautiful expanse of Derwent Water, visiting the islands which so gracefully adorn it. We had heard of a tradition amongst the natives, that the ghost of the unfortunate Lady Derwentwater, who is said to have climbed the steep face of Walla Crag, and so doing to have given a name to the projecting mass of rock called " The Lady's Chair," visited Lord's Island, once the seat of the attainted nobleman, every night; and that her spirit, in the shape of a bird, whose melancholy tones were known to all the boatmen, flitted about in the branches of the ancestral trees, as seeking rest and finding none. Popular traditions, doubtless, have an origin; few of them, however, are inexplicable. It was our amusement to visit Lord's Island by moonlight: I have perfect recollection of the notes of the bird alluded to; yet, though we hunted about the island, and hurled stones amongst the trees, no one ever saw any bird fly from the island, notwithstanding we stationed watchers around to notice its departure, having a desire to discover, if possible, what mortal body Her Ladyship's spirit deigned to inhabit. This, however, we could not effect. It is many years since I made a moonlight voyage to the islands of Derwent Water: but the remembrance of my happy sojourn there is too agreeable to me, not to make any illustration of its interesting inhabitants desirable; and if you can dissolve the charm which fancy is fond of framing at the expense of reason, I shall be obliged to you. — *W. B. Clarke. East Bergholt, Suffolk, October* 1. 1830.

Rooks detecting Grubs. — The author of the *Journal of a Naturalist*, speaking of rooks, says, " I have often observed them alight on a pasture of uniform verdure, and exhibiting no sensible appearance of withering or decay, and immediately commence stocking up the ground. Upon investigating the object of their operations, I have found many heads of plantains, the little autumnal dandelions, and other plants, drawn out of the ground and scattered about, their roots having been eaten off by a grub, leaving only a crown of leaves upon the surface. This grub beneath in the earth the rooks had detected in their flight, and descended to feed on it, first pulling up the plant which concealed it, and then drawing the larvæ from their holes." (Ed. i. p. 184, 185.) If it be true that the rooks in their flight detect the grub under ground, I should be much obliged to any of your correspondents who would give some account of the means whereby this discovery is effected. — *L. D. September* 28. 1830.

Bewick's Birds. — I hear that there is a new edition of *Bewick's Birds*

either in the press, or lately published; if so, I should be glad to see it reviewed. If what I have heard was a mistake, be so good as to inform me what the latest edition is, and whether the figures are well done. — *An Observer of Nature. Sept.* 6. 1830. Those who are interested may answer this query. — *Cond.*

A Ball containing an Insect. — Sir, Walking in the fields the other day, I discovered a ball hanging from a dried plant, about the size of a hazel nut, which at first sight presented the appearance of a piece of wool, rolled tightly up, but upon opening it I found it full of small pentagonal cells, formed of a substance which resembled tissue paper. Some of the cells were empty; others contained a brown dust-like substance, evidently decayed matter; and in one of them I found nearly the entire body of an insect, so minute that I could not distinguish its parts with the naked eye: however, upon examining it with a glass, it presented to me the appearance of a species of wasp or bee, but with antennæ the length of the entire body. The annexed sketch (*fig.* 14.) will give you a farther idea of what

14

a, Insect magnified.
b, Natural size.
c, The ball as discovered.
d, Section showing the cells

I have imperfectly described; and if you or one of your correspondents will favour me with the name and habits of this insect mummy, with which I am totally unacquainted, it will gratify, yours, &c. — *H. Gt. Missenden, Sept.* 30. 1830.

A Caterpillar infesting the Sycamore Tree. — Sir, Towards the latter end of last month I found, under a sycamore tree here (Greenwich), a caterpillar about an inch long, very much resembling that of the common tussock moth. It has one orange tuft of long fine hair on each side of the back, near the head, and three more of the same colour on each side of the back, near the middle of the body; the remainder of the tufts are of a gambouge colour; all along the back, between the two rows of tufts, is a row of oval white spots, surrounded with black, which is the ground colour of the whole body. The head is shining black, with an orange triangle of the same bright appearance above the mouth; the insect feeds upon the sycamore. Can you or any of your numerous correspondents inform me whether it is the larva of the sycamore tussock moth (*Nóctua áceris*); and if it is, whether it is esteemed a rare insect by collectors? An answer would greatly oblige, yours, &c. — *A. E. Greenwich, Sept.* 6. 1830.

A Species of Bee which perforates the Corolla of the Bean in search of Honey. — In the month of July last I observed in my garden, on a great number of the corollæ of the bean (*Vícia Fàba*), on the superior part, within about two lines from the calyx, a small dark spot, which, on closer inspection, I found to be a perforation; waiting a short time, I saw a bee alight on the flower and pass its proboscis into the hole, and so on, from flower to flower. The little fellow found the orifice with the utmost adroitness. I afterwards saw him fix himself upon an unperforated blossom, and perform the operation of boring it in an instant. The corolla of the flower being deep, and the proboscis of the little animal comparatively short, he is obliged to re-

sort to this expedient to rob it of its nectared sweets. Will any one of your correspondents (in case the fact has been observed before) inform me of the name of the bee? — *R. A. Tudor. Montgomeryshire, Oct.* 11. 1830.

A lobster-like Insect attacking the Leg of a House-fly. — Sir, As I was yesterday (July 18.) reading in the parlour, my attention was accidentally attracted to a common house-fly (*Musca carnaria*), which was chafing its fore-legs in a very unusual way. On closer examination, I found, to my surprise, that a small insect was firmly attached to one of its legs, which the fly was ineffectually endeavouring to dislodge. On applying a magnifying glass, my surprise was greatly increased by finding that the insect which had seized the fly's leg had claws precisely resembling those of a lobster, with one of which it had grasped the unfortunate fly; its body was flat, like a bug (*Cimex*), and resembled that insect in colour, but was smaller. I unfortunately lost sight of the fly in an unsuccessful attempt to capture it.

Surprised and interested at the oddness of the circumstance, I consulted several books on entomology, but without finding any account of so curious an insect. In this embarrassment I am induced to send you this brief account, in the hope that you, or some of your correspondents, will be kind enough to tell me, through the medium of your Magazine, where any history of this lobster-like insect may be found. Probably Mr. Rennie, who has lately, in his interesting works on the Architecture and Transformations of Insects, shown such a profound knowledge of entomology, would be good enough to give its history, which doubtless would be a great gratification to many of your readers as well as to myself. I am disposed to think, that, although the insect may be well known to entomologists, the fact of its seizing upon the fly may be new: because I think so accurate an observer as Mr. Knapp, in his *Journal of a Naturalist*, in speaking of the house-fly (p. 212. 2d ed., I quote from memory), would have added to the interest of his work by giving an account of it, had he been acquainted with the fact. — *O. London, July* 19. 1830.

The small brown Flies produced from the Cabbage Caterpillar (Vol. III. p. 476-7.) were doubtless some species of ichneumon fly, whose parents had selected the caterpillar as a proper nidus for its eggs, and thus caused its death in the pupa state before mature for changing into a chrysalis. If Mr. Morgan repeat his attempts to breed butterflies and moths from caterpillars, he will very frequently indeed find his attempts frustrated in a similar manner by insects of this genus. — *Thos. Thompson. Hull, Oct.* 12. 1830.

The Explosion of the Bombardier Beetle (Brachinus crépitans), accompanied by vapour of a fetid smell, is so well authenticated, that I am inclined to think that A. L. A. (p. 477.) must have made his experiments upon a weak or fatigued specimen. — *J. O. W. Sept.* 1830.

The Carabus nemoralis of Illiger (not of Linnæus), which A. L. A. mentions (p. 477.), is doubtless the *Carabus hortensis* of Fabricius, Marsham, and Stephens, which has been described by Stewart, Turton, Leach, and Samouelle under the former name; so that under either name it has already been repeatedly described as a British insect. It is exceedingly common. — *Id.*

Monthly Guide for Young Naturalists. — In answer in part to your querist H. (Vol. III. p. 468.), I would observe that Samouelle's *Entomology* contains a very good monthly guide for explorers in the science of which he treats. — *T. Thompson. Hull, Oct.* 12. 1830.

Nidus on a Rush. — Sir, With respect to the nidus of a spider originally mentioned in Vol. II. p. 104., and frequently by other parties since, I beg to confirm the statement of W. B. B. W. (Vol. III. p. 458.) as to its locality, and the opinion that it is not that of an aquatic insect. This last summer I met with them in Grena Wood, near Sheffield, Yorkshire, both naked and covered with mud, on banks 3 or 4 ft. high, and not near any water, except what might be occasionally in the cart ruts. I therefore sug-

gest whether they are not the nests of that black spider so often seen running about on the ground, and with which the wood I have mentioned above abounded. I regret I have not sufficient knowledge of botany to enable me to state the plants to which I observed them attached; but they were on the bilberry, and several others, but none on rushes. I hope some of your correspondents will favour us with the name of the spider that thus constructs such a beautiful habitation for its offspring. Yours, &c. — *W. A. Sept.* 1830.

Cárabus nemoralis. — Sir, Your correspondent A. L. A. (Vol. III. p. 477.) has expressed a doubt whether Cárabus nemoràlis be a British insect; I beg leave to acquaint him that I have in my small collection a beetle which I have always regarded as one of the species: its body is black, its thorax has violet-coloured margins, and the elytra are obscure copper-coloured, with hollow dots in a triple series. It was caught in my garden; and so far from its being rare in Britain, as A. L. A. seems to suspect, I consider it rather common; in which opinion I am supported by the able entomologist Samouelle, in whose useful *Compendium* he will find it described. I am, Sir, &c. — *W. S. Stamford Hill, Sept.* 14. 1830.

Mr. Morgan's Worms. — It is really provoking to be called upon to reply to observations, when your Magazine itself already contains sufficient answers. Either Mr. Morgan must be a very young beginner in entomology, or he has not profited by your oft-repeated invitation to think for one's self. The worms, as he calls them (Vol. III. p. 476.), are the caterpillars of the common white butterfly; and the minute *eggs* are the cocoons of parasitic Ichneùmon pùpæ, which have fed (while larvæ) upon, and completely devoured, the interior of the caterpillar, and then burst forth out of its body to become pùpæ. Mr. Morgan will further find, in p. 51. and 452., a solution to his question; the former of which communications, I think, it is very evident that he could never have read. — *J. O. W. Sept.* 1830.

Górdii, Beetles, and Dýticus found in the Intestines of a Frog. — Sir, The other day I caught a common frog (*Rana* temporària), which appeared to be in a sickly and disabled state. On examination, I found its stomach filled with the Górdius or hair-worm, two or three beetles (*Lucànus Cérvus*), and a species of *Dýticus*. (*fig.* 15.) The stomach presented the appearance of a sieve, the Górdii having penetrated its coats throughout, more especially at the pyloric extremity. The appendices luteæ, liver, and gall-bladder were in an active state of inflammation, being perforated in a similar manner. That short part of the intestinal canal answering to the jejùnum, and the ileum were also filled with the remains of this extraordinary meal, live Górdii, apparently little injured from the action of the stomach. This was the more extraordinary, as the beetles, with the exception of their horny coverings, were entirely dissolved. Though the gastric juice of the batrachian order is of considerable solvent power, yet it exerts its influence but slowly on living animals, many having been found undissolved and alive at the end of several days. I have myself seen a live earth-worm in the lower part of the

15

intestine answering to the rectum. Yet it is not an anomalous circumstance that the intestines and stomach of the frog should be perforated in so curious a manner. I may mention that it is not a solitary instance, as I have seen the same appearance in several frogs, and also in the common toad (*Bufo vulgaris*); though in these cases the Gordii were not so numerous. Has the Gordius any preservative power to escape the solvent action of the gastric juice of the batrachians? Perhaps some of your readers can throw light upon this curious subject. I am, Sir, yours, &c. — *H. T. Clarke. East Bergholt, Suffolk, Sept.* 1830.

Hard Substances in the Stomach of the Alligator. — Sir, With reference to the round and hard masses, resembling petrified wood, which are asserted (in *Jameson's Journal*, No. xiv. p. 280.) to have been taken from an alligator's stomach, and from which your correspondent Perceval Hunter has made an extract in your Number for September (Vol. III. p. 447), I have in my collection two hard substances, given to me under the name of bezoar stones, and said to be taken from the stomach of some animal, of the same texture as petrified wood, and as if, in some places, intermixed with hair. They are of a fine dark brown, and take a rich glossy polish. If Mr. Hunter, or any of your correspondents, could give me information of what the bezoar stone is composed, they would greatly oblige, Sir, yours, &c. — *A Mineralogist. Sept.* 10. 1830.

The Portuguese Man-of-War. — The following description of this insect is given in a recent number of the *North American Review:* can any of your readers furnish an engraving and scientific description of the animal? — *R. S. Nov.* 1830.

" This polypus, zoophyte, or probably molluscous animal, resembles a worm, between 6 in. and 8 in. in length, and is only found in certain latitudes; it has seemingly the skill and knowledge of an experienced navigator, and is in itself a little ship. Its evolutions are according to the winds; it raises and lowers its sail, which is a membrane provided with elevating and depressing organs. When filled with air, it is so light that it swims on the surface of alcohol; and is at the same time provided with a structure which furnishes it with the necessary ballast. When high winds would endanger its existence, it descends into the deep, and is never seen on the surface of the water. From the under side of the body proceed tubes, which extend 20 ft. in length, and are so elastic and delicate that they wind in a spiral form like a screw, serving at once as anchors, defensive and offensive weapons, pneumatic tubes, and feelers. The insect has the colours of the rainbow; its crest, which performs the office of a sail, is intersected with pink and blue veins, trimmed with a rosy border, and swells with the winds, or at the animal's pleasure. The fibres contain a viscous matter, which has the property of stinging like nettles, and produces pustules. It acts so strongly, that vessels in which they have been kept for a time must be repeatedly washed before they can be used. These fibres may be cut off without depriving them, or the rest of the insect, of the principle of life; and the separation takes place spontaneously whenever the glutinous matter comes in contact with a hard surface, like the sides of a large globe. The insect has, however, dangerous enemies in small dolphins and medusæ, against which neither its nautical skill nor its poison can defend it."

What is the best Work on Vegetable Physiology? — Should you recommend M. Mirabel's *Traité d'Anatomie et de Physiologie Végétale*, or any other in preference? If you would mention what you think most advisable, with its price, together with a microscope best suited to observe what the author describes, you would much oblige, Sir, yours, &c. — *L. D. Sept.* 28. 1830.

THE MAGAZINE

OF

NATURAL HISTORY.

MARCH, 1831.

ART. I. *A Defence of "certain French Naturalists."* By WILLIAM SWAINSON, Esq. F.R.S. F.L.S. &c. &c.

IF we were called upon to describe those signs which indicate the decline of science in any age or country, we should at once enumerate the three following: — First, The denial of the greatest and most acknowledged truths by bold and specious reasoners. Secondly, The zealous adoption by some, and the unqualified rejection by others, of theories or systems *which neither party understood.* Thirdly, The substitution of flowery and sententious oratory for the results of deep and patient research. If to these we added a spirit of dissension and of invective, against all who thought differently from ourselves, we should not overcharge that picture which zoological science, in this country, has exhibited during the last few years. We shall, upon this occasion, confine our remarks to the latter evil.

Those who, with us, deprecate such a state of things as injurious to the best interests of science, must have observed, with deep regret, the extraordinary mode of conducting scientific discussions which has of late arisen among us, and which now forms the conspicuous feature of a scientific journal more particularly devoted to zoology. We should not, however, class all papers of this nature under the same head. There are some which wear an appearance of being private communications, addressed particularly to private individuals, and as such should not have been published. The state and duties of society are such, that, however warmly and allowably a man may express ridicule or contempt in a private letter, his sense of what is due to the courtesies of life will generally withhold him from using similar expressions in

public. It appears to us, therefore, that an editor who publishes such effusions, neither consults the reputation of the writer, nor the taste of the reader; still less does he regard the character of his own journal, or act in accordance with his own recorded professions. *

There are other papers, however, which have not this excuse for their authors; and which, as being avowedly written for the public eye, are much more calculated to foment bitter feeling among individuals, and to bring national reproach upon us all. The zoological school of Britain is, indeed, "strong in its first advances," but it is yet in its infancy: mildness and conciliation will insure to it respect, and its voice will then be listened to. We have caught a glimpse of some mighty truths, which are not thought perceptible by our neighbours. Yet, seeing but the shadow, we must not fancy we have caught the substance; or, to drop metaphor, because we have discovered a *part* of the natural system, we must not arrogantly imagine we have grasped the whole; that all further enquiry, discussion, or opposition is to cease; and that there exists a conspiracy among the naturalists of France against those of England, merely, forsooth, because they choose to study nature in their own way. That such sentiments, however, are implied, no one can doubt who has perused the repeated attacks that have been made upon some of the French naturalists individually, and upon the whole collectively. When personal and national invective is thus substituted for fair and temperate discussion, it is really time to be serious. We are certainly carrying matters too far; and our "infant school" may probably be compared to the boys in the story, who got possession of a little puddle, from which they bespattered every passenger who refused to take a *sup.*

The individuals that have been more particularly selected by Mr. Vigors †, as fit subjects for this discourteous treatment,

* We would gladly have refrained, on this occasion, from all personal allusions; but the name of Mr. Vigors, the editor of the journal in question, is conspicuously prominent in this species of scientific warfare: not only does this gentleman occupy himself a distinguished station as a combatant, but his name stands foremost upon every occasion as "aiding and abetting" the efforts of others. He has thus placed it out of our power to treat the subject in a general way.

† M. Lesson, in a short but temperate and dignified reply (*Bulletin des Sc. Nat.*, April 1830) to the "Notice" in the *Zool. Journal*, tacitly exonerates Dr. Horsfield from all participation in that offensive production; and this he has fully and pointedly confirmed to us in a private letter. Dr. Horsfield, indeed, is as well known for the temperate mode in which his opinions are always expressed, as he is by being one of our very few veterans in science. How his name, therefore, came to be associated in this memorable article, we cannot possibly divine.

are two among the best known naturalists of France. The names of MM. Desmarest and Lesson will remind the zoologist of some of the most magnificent, and some of the most useful, scientific works which have of late years issued from the Continental press; of these gentlemen, therefore, shall we now speak.

Towards M. Lesson this style of language is peculiarly misplaced. We will venture to affirm, that, after the indefatigable Professor of Leyden, no living ornithologist has contributed so much to extend this science, or has added, by personal research, so many new and important forms to our museums. M. Lesson, to be sure, is not a man who merely theorises in his closet, and frames systems "called *natural*" within the walls of a museum. He has viewed and studied nature somewhere beyond the atmosphere of Paris, or even of London. He, and he alone, of all living ornithologists, has contemplated those princes of the feathered creation, the regal Paradise-birds, in their native air. He has given a simple and unpretending account of their manners: and he has thus been instrumental in solving a most interesting and important problem in ornithological affinities. This discovery, it is true, *all but* demonstrates a glaring error of the writer by whom he is thus attacked; but those who are most eminent for real science are generally the most solicitous to elicit truth. M. Lesson, like all men of ardent zeal and warm feelings, may occasionally err from placing too much confidence in first impressions: but it is an error inseparable from their temperament: it is national; and their character without such impetuosity would be perfectly anomalous. But, even admitting that this is a well-grounded charge against M. Lesson, we must be permitted to say, that he possesses a candour and a love of truth which will in vain be expected from little minds and "minor critics." He does not doggedly persist in an error, after he is convinced that it is one: the error is voluntarily proclaimed, and unreluctantly rectified.* In regard to a knowledge of nomenclature, it may be small praise to confess that M. Lesson's far exceeds ours, did we not think that, from this very circumstance, he is peculiarly qualified to point out what animals are described, and what are undescribed. That many species have been thought *new* by us which are *old* to the Continental writers, need not create surprise, when it is remembered that we are without museums or libraries adequate to instruct us. The fact, in short, is of

* See M. Lesson's observations on *Tróchilus recurviróstris Sw.*

every-day occurrence; and the pages of the *Zoological Journal* bear ample testimony to the truth of the assertion.

It is further insinuated that M. Lesson is among "certain French naturalists" who view with envy, and treat with "striking injustice," the merits of our countrymen. It would have been as well if the proof had preceded the condemnation. What are the grounds for these assertions? Is it because M. Lesson maintains that certain animals, described by Mr. Vigors as new species, are in point of fact *not so?* Or is it because that gentleman chooses to follow his own system of ornithology, rather than any other? For ourselves, we see not the slightest show of reason or of proof for the accusation. Does M. Lesson pass over the works of British naturalists? Quite the reverse. A reference to his two valuable little *Manuals* will show how invariably he has quoted the authority of Sir Stamford Raffles, thereby doing justice to the labours of that distinguished man. Dr. Horsfield is no less conscientiously cited upon every occasion, and for every new Javanese animal which he has described. While, to complete the catalogue, M. Lesson is the *only* naturalist who has translated and published the synopsis of that ornithological system which has been proposed by Mr. Vigors, the very writer who now accuses him of "striking injustice to the merits of British naturalists."

We may now pass to M. Desmarest, a name which stood in the foremost ranks of science at a time when our "British school" of students (or rather of lawgivers) were in their leading-strings. But matured age and acknowledged eminence furnish no excuse for duplicity or injustice: let us, then, enquire how these charges are supported. M. Desmarest, in an article on the family of Parrots, prefers the old arrangement of Buffon, Le Vaillant, &c., to the new one of his present accuser; and on account of two or three hasty words, expressing his dissent from these novel views, he is answered by an article occupying no less than thirty-three closely printed octavo pages. To many of the views and sentiments expressed in this production we cordially subscribe. Yet we cannot bring ourselves to believe that M. Desmarest ever imagined, that, because he rejected and criticised a new arrangement of parrots, he was thereby proclaiming*, on the part of himself and

* "In the present instance, however, I consider the attack, which it is my intention to notice, as rather national than personal. We cannot fail to observe, with no common regret, that a disposition to depreciate the zoological labours of this country prevails to a great extent among the Continental writers." The whole of the paragraph is to the same effect. (See *Zool. Journ.*, vol. iii. p. 92.)

of his colleagues, a determination to depreciate the zoological labours of this country, and to "check them in their infancy." Nor do we see the slightest occasion for this "Reply" being set forth, as if the matter in dispute was of national, or paramount importance. If it is considered essential to science, that every writer who makes a dissent, is to be answered by a pamphlet, we must all sit down and begin writing "Replies;" and if it is reprehensible to reject this new distribution of the *Psittácidæ*, we ourselves must be condemned: since we now venture to hint to its author, that this arrangement, even in reference to that system which he professes to follow, and which he fancies he has demonstrated, is false from its very foundation.

We have ever found M. Desmarest (so far as our own researches have gone) equally exact with M. Lesson in quoting the authority of British naturalists, and thereby doing justice to their discoveries and their labours. Neither of these gentlemen, it is true, has chosen to adopt those peculiar modes of arrangement which, to a certain extent, are prevalent in this country: but while one of the greatest ornaments to the entomological science of Britain, or indeed of Europe, has expressed his dissent from some of these opinions *, and much difference exists regarding the correctness of others, we need not be angry with foreigners for preferring their own modes of studying nature.

The last of these attacks we shall notice is that which has more especially awakened our attention to this subject. It is altogether of a much more decided nature, since it is pointedly made upon both these naturalists at once. It assumes, moreover, the aspect of authority, being avowedly "published with the sanction of the council, and under the superintendence of the secretary and vice-secretary, of the Zoological Society." The work which bears this high official stamp is a very pretty, but, as it regards science, a somewhat trivial periodical.† If the reader turn to No. viii. (the last number, as we are informed, which has been published), he will find the following passages relative to the *Malayan* Tapir, brought in to illustrate the history of the *American* species: —

"The history of this transaction (the discovery of the Tapir of India) affords too striking an illustration of the injustice of certain among the French zoologists to the merits of our countrymen to be passed over without observation.

* Introduction to Entomology (Kirby and Spence).

† The Gardens and Menagerie of the Zoological Society. Small 8vo, published monthly in 2*s.* 6*d.* numbers.

"The knowledge of this animal in France, says M. Desmarest, in his *Mammalogie, carefully shielding himself under an equivocal form of expression*, is due to M. Diard. But M. Lesson goes further; *and echoing, as usual, the dicta of his predecessor, with a slight addition of his own*, speaks of the Indian Tapir as a species 'discovered by M. Diard.' Again, in the *Dictionnaire des Sciences Naturelles*, M. Desmarest, *forgetful of his former caution, heightens the farce still more*, by asserting that its discovery in the forests of Sumatra and the Peninsula of Malacca is due to MM. Duvaucel and Diard. In none of these works is the least indication given that the animal in question had previously been ever seen by an Englishman, *much less is the fact suffered to transpire*, that long before M. Diard had "discovered" it, not in the forests of Sumatra, or the Malayan Peninsula, but in the menagerie of the Governor-general of British India at Barrackpore, a full description, together with a figure of the animal, and of its skull, had been laid before the Asiatic Society by Major Farquhar, for publication in their *Researches*. This latter circumstance, it is true, *is not mentioned by M. Fred. Cuvier* when he figured the Tapir, from M. Diard's drawing, *or by that gentleman himself*, in the published part of his letter; but there seems to have been no intention on *their* parts wilfully to mislead their readers."

Now the justice or the injustice of this invective against MM. Desmarest and Lesson rests entirely upon one simple fact, which their accuser completely passes over. Is there either proof, or presumptive evidence, that these naturalists, at the time they attributed the discovery in question to M. Diard, *knew* that such was not the fact; that Major Farquhar in reality was its discoverer; and that a description by him had been laid before the Asiatic Society? If they knew all this, they are convicted of falsehood, and their names deserve to be thus held up to obloquy; but if, on the contrary, *they did not*, we are at a loss for terms sufficiently measured to designate such an act of injustice. If their accuser could have substantiated this previous knowledge, it is natural to suppose he would have done so; since that would have given ten-fold strength to the accusation. But this is not done; nor is there the least internal evidence that the expressions of MM. Desmarest and Lesson were made with an intention "wilfully to mislead." The real facts of the case, according to the statement of Mr. Vigors himself, appear to be these: — M. Diard, during his researches in Malacca and Sumatra, sends to M. Fred. Cuvier a drawing and description of a new animal, *without mentioning by whom it was first dis-*

covered. M. Fred. Cuvier publishes this figure and description as coming from M. Diard, who is thus, naturally enough, presumed by every one to be its discoverer. M. Desmarest accordingly states this as his belief, referring to the original figure and printed description of M. Diard, in which (as it appears) not one word is said of Major Farquhar, Sir Stamford Raffles, or the Barrackpore menagerie. M. Lesson, on the same authority, makes the same statement; both, as we may fairly suppose, naturally presuming that, if M. Diard had *not* been the discoverer, that gentleman, or M. Fred. Cuvier, would have mentioned who was. Are we to take for granted that MM. Desmarest and Lesson are endowed with the gift of divination, in knowing that a previous description of the animal in question *had been laid* before the Asiatic Society *in India*, and was *intended* "for publication in their *Researches?*" Or, supposing that this account was actually published at the time they wrote, are not the chances ten to one, that a bulky and expensive work, printed in India, should be unknown to two naturalists in Paris? We ourselves, living in England, to this day have never seen Mr. Farquhar's original paper; and although we have long wished to be informed on the contents of the more recent volumes of the *Asiatic Researches*, we really do not know where they may be consulted. Is it therefore surprising that MM. Desmarest and Lesson should be equally ignorant with ourselves? and is it not more reasonable, and more just, to suppose that they erred from this cause, rather than from a desire "wilfully to mislead their readers?" If blame is to be attributed to any party in this business, it surely lies upon those whom the writer exonerates; namely, M. Diard, and possibly M. Fred. Cuvier: the former in not distinctly stating that Mr. Farquhar, and not himself, discovered the animal; and the latter in suppressing, *if he really knew it*, this important fact. Why, however, the two first-named naturalists, and not the two latter, should have been selected on this occasion, is sufficiently clear, when we recollect their former misdeeds.

A foreigner, taking up the book in which this statement is sent forth to the world, and seeing it announced as "Published with the sanction of the council, and under the superintendence of the secretary and vice-secretary, of the Zoological Society," will naturally suppose that it is a sort of official record of their opinions; that every thing contained in it has the "sanction" of the council; and that, as nothing should go forth but what has been maturely weighed, the secretary and the vice-secretary, to "make assurance doubly sure," are then charged with its "superintendence." Such an impres-

sion, in short, would be given to any Englishman ignorant of the arts of literary puffing; for we know no other term by which to express the absurdity of affixing such an imposing weight of authority to so very trivial a production. How far the book may really possess these claims to our notice, we know not; but of this we feel quite sure, that the council of the Zoological Society would never *intentionally* sanction such assertions and insults as these, which are here made to appear as their own: while the known urbanity, and the solid, unostentatious acquirements of the vice-secretary form a sufficient assurance that he, at least, is not the guilty person.

But, if we are to suppose for a moment that this is a just and legitimate style of animadversion, we will now inform the writer, that he has exposed *himself* to the very same degree of censure. In the 11th number of the same publication is an erroneous and a meagre account of the famous Hyacinthine Maccaw, of which the writer states that "*no author of the present century appears to have observed it, with the exception of M. Spix.*" Now, it so happened, that at the very time when M. Spix was travelling towards that part of Brazil * where alone this magnificent species is supposed to be found, we had actually returned to Europe with four specimens. Two of these are in two different collections, which Mr. Vigors is in the constant habit of visiting and consulting; one being that of Mr. Leadbeater the bird-stuffer, the other that of the Linnean Society; the gift to the latter (but not the account we sent of its habits and locality) being recorded in the 14th volume of their *Transactions* (p. 601.). Upon these facts, therefore, we might, with as much show of reason, and in the same style, indulge ourselves in an invective against "striking injustice," "wilful misrepresentation," &c. &c. But what is the most probable, and the most candid inference? Merely, that the writer of the above passage had omitted to inform himself upon the subject he was treating about.

But the detractor of MM. Desmarest and Lesson has exposed himself to a much graver charge than mere carelessness; a charge, in fact, which is precisely similar to that which he has brought forward against these gentlemen in its worst features, even if the construction put upon their error had

* The Campos and Catingas of the interior of Bahia, between the forests of Urupie and the banks of the Rio St. Francesco. When we embarked for Europe at Rio de Janeiro, MM. Spix and Martius had just quitted that city, on their journey to the above-named province. Although "vague rumours" (as in the case of the Malay Tapir) had existed in Europe about the country of this superb and rare species, we were the first to discover its true locality, and the first to import it into Britain at least from its native wilds.

been supported by unanswerable proof. In our "Synopsis of Birds recently discovered in Mexico," published in the *Philosophic Magazine and Annals* for June 1827, we described a new and beautiful woodpecker, distinguished from all others of its family by having the shafts of the quill and tail feathers of the brightest vermilion. As coming from Mexico, we named it Coláptes mexicànus. Eighteen months after, in the *Zoological Journal* (No. xv. p. 353.), we have a paper by Mr. Vigors, where this woodpecker is again described as new to science, under the name of Coláptes collàris. On the same occasion we shortly described another remarkable bird, equally conspicuous, and equally easy to be recognised in a short specific character by the student; we called it *Pìca* formòsa. Mr. Vigors describes this also, in the same paper, as new to science, and calls it *Pìca* Collièr*i*. Now, if this gentleman could plead ignorance of our previous descriptions, as an excuse for giving to the world accounts of new animals, which in fact were not so, it would all be well; and we should only hint, that a little more care in consulting the current scientific publications of the day, those, in fact, which are upon every bookseller's counter, would be desirable. But Mr. Vigors, unfortunately, has not this excuse: he himself has informed us that he *knew* this "Synopsis of Mexican Birds" perfectly well. He not only knew it, but he has actually criticised it! * What, then, are we to say on this matter? Simply, what we believe: that the mistakes, however gross, are unintentional; and are only proofs of that looseness of research, and inaccuracy of observation, which the writings of this gentleman in so many other instances unfortunately betray.

We should scarcely have thought it worth while to notice these facts, except among the usual blunders and errors of systematists, did not they forcibly illustrate the caution which should be used, and the forbearance which should be exercised, by labourers in the same science towards each other. The most eloquent professions, and the most "honied" assurances † of *truth* being our only guide, and *amity* our most sincere desire, are utterly worthless when not put into practice; and, as an excuse generally for all parties, we may say ourselves, that in no part of technical natural history is it more difficult, in its present chaotic state, to avoid error, than in ascertaining what objects are really new to science.

In regard to the national jealousy here attributed to "certain French naturalists," we may be permitted to say a few words.

* Zoological Journal, No. xi. vol. iii. p. 442., article "Quìsculus versícolor."

† Zoological Journal, No. ix. vol. iii. p. 123.

We see no reason for this sweeping accusation, whether applied to the French nation generally, or to those individuals whom we have defended. On the contrary, we have good grounds for forming a diametrically opposite opinion. Not being a member, we were prohibited from making any effectual use of the Zoological Society's Museum while engaged on the ornithological portion of a national work, Dr. Richardson's *Northern Zoology*. We therefore went to Paris. The free and unrestrained permission we there sought, and which was absolutely necessary to forward the peculiar objects of our research, was instantaneously and courteously granted. We remained six weeks, daily examining and describing the scientific treasures of the French Museum; assisted in all our wants and wishes by M. Lesson *, and by every other distinguished naturalist whom we met. Does such conduct, to a stranger and a foreigner, savour of the accusations so repeatedly insinuated to their disadvantage by Mr. Vigors? or does it not rather evince how much the Institution, of which he is the secretary and the chief adviser is behind all others, whether of France or of England, in the march of liberality? If "jealousy" exists, on which side of the channel is it most conspicuous?

We wish we could defend all the naturalists of France against the charges of injustice and irritation, with as much ease as we have acquitted MM. Desmarest and Lesson. But we must be impartial in this matter.

In the year 1828 we proposed Achatinélla as the name of a new genus of land shells from the South Seas, not being aware that it formed one of the sections of the French genus Helictères. This is considered a sufficient reason by M. le Baron de Férussac for devoting nearly two entire pages to an attack, infinitely more severe and pointed than the occasion called for, upon our copying ("*n'est que la copie, sous un autre nom*") this genus from the above, for the sake of giving it a new name; although it is very truly said, a few lines after, that "*M. Swainson parait ignorer notre travail sur ce groupe.*" How any thing can be copied, which has not been seen, we are somewhat perplexed to make out. But we have no intention of writing a "Reply" to this article. We shall simply assure the writer, that, when he said we were ignorant of his "*travail sur ce group* †," he was perfectly

* We had not the good fortune to meet M. Desmarest, who was absent in the country, as our friend M. Lesson informed us, during our stay in Paris.

† M. Férussac's great work on the land shells alone, not yet finished, already costs between 40*l.* and 50*l.*; is it surprising that we cannot enrich our library with such a costly publication?

right; that, if he will consult all the recent works of the leading zoologists of this country, he will find that the theory of absolute divisions, for which he so warmly contends, has long been exploded; and that, as it regards ourselves, we have no particular wish of acquiring glory by giving new names to the genera of land shells, after they have been named by Lamarck, and renamed by M. de Férussac. For the rest, we quarrel not with him, or any one, for adhering to the old axioms of the Linnean or any other school. Our modes of studying nature, it is true, are diametrically opposite; but there is not the least occasion for animosity or bad feeling. We say this with unfeigned sincerity; and of this sincerity we shall now give M. de Férussac a proof. Of the high terms of praise in which we have always spoken of his labours he already knows, from the pages of our *Zoological Illustrations*, and this at a time when he was depreciating our own: but he may possibly *not know* that very many of the original figures of the animals of land shells, sent to him by our mutual friend Dr. Leach, were copied from our own drawings, expressly sent for the purpose of aiding M. de Férussac in his great work. Some of these have actually been engraved to be published in it, but we have failed in discovering where the obligation is acknowledged. We say not this in anger or reproach, but as a proof of the desire we always had, and still have, of being the friend, rather than the enemy, of one who has done such real good to science. It is now for M. de Férussac to accept, or to reject, the olive branch we proffer him.

In thus endeavouring to neutralise the effect of these charges and aspersions against the naturalists of France, and thereby promote reciprocal feelings of forbearance and good will, if not of amity and friendship, we trust our efforts will be seconded by the true lovers of science of both nations. Let us hope, also, that they may awaken a better tone of feeling in our scientific discussions, and in our philosophic institutions. It is a singular fact, that at no period of history have the two greatest nations of the world been so closely drawn together by the "silken cords" of respect and friendship; at no period have kings and warriors striven more earnestly to preserve peace; yet at no period have domestic dissensions, political and scientific, been more prevalent. These unkindly feelings, unfortunately for *our* national reputation, have been caught, and have rapidly spread, in the republic of science; and, if the contagion be not timely checked, it will undermine all that is to give energy to individual exertion, and all that is to make us respected in the eyes of foreigners. That the science

of the country has been long declining, is a melancholy truth; but it may be again revived, by calling into exercise temperance, moderation, and self-denial. As men, we know the advantages of these feelings in the happiness or misery of our domestic circles; and, as Christians, we are commanded by a higher authority than man to practise them.

Tittenhanger Green, St. Alban's,
Dec. 13. 1830.

ART. II. *Original Letters, descriptive of a Natural History Tour in North America.* By T. W.

(*Continued from* Vol. III. p. 496.)

LETTER III.

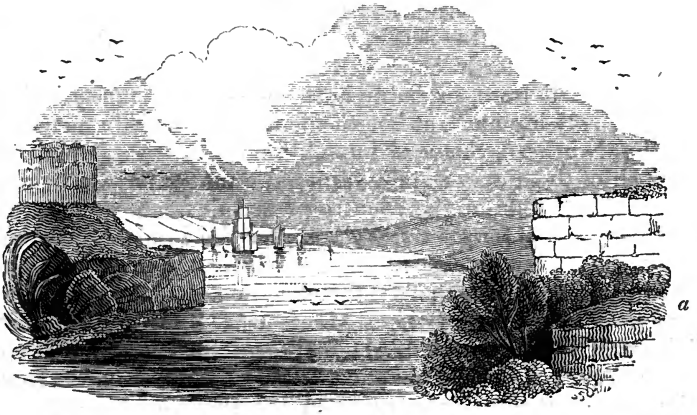
MY dear B. — You may think my choice rather more whimsical than sensible, because I have preferred a sloop to a steam-boat: but the fact is, when on board the former, opportunities now and then occur, which, if you have an inclination to make a short excursion into the country, will enable you to go on shore, and remain there for two or three hours, a boon not to be expected if depending upon a steam conveyance. Sail-boats are very often becalmed; and it is not unusual on this river, when light winds prevail, for them to ride at anchor until the tide again sets in their favour.

Situated on an eminence, within 50 yards of the river stands Fort Lee (*fig.* 16. *a*) named in honour of a general of revolutionary notoriety: it now resembles a crude mass of stones, much dilapidated, and overgrown with weeds and brushwood. It views Fort Washington (*b*), which borders the eastern bank nearly opposite, but in position it is much less elevated than its neighbour. Seated on a high hill, and commanding the river in both directions for some distance, this last fort must have been, to the party in possession, an advantageous post in time of war. Except on the south side it is inaccessible by land, and even there approached only with great difficulty.

Fort Washington, in the revolutionary war, was constantly supported by a garrison of 2000 men; yet notwithstanding its difficulty of access, and this formidable number of Americans (considering the site), it was approached, and compelled to surrender to the intrepidity and skill of about an equal number of the British. Like the other, this fort is in ruins, and at present appears better suited for a lair of wild beasts than a place of warfare. Such a state of these places, where

the deadly engine and all the "sad implements of war" were lately pointed for the destruction of human lives, forsaken, gnawed by the tooth of time, and soon again not to be distinguished from the rocks of the rugged mountain, offers a subject, to the peaceable at least, of the highest pleasure and national congratulation.

16



a

The western shore from Fort Lee, or, indeed, from Weehawk, to Tappan, distance about twenty-five miles, as far back as can be seen from the river, is a pretty regular ascent, and seems an uninterrupted forest.

In consequence of a strong ebb tide and a light wind, we came to anchor: I was glad to make the present an opportunity of going ashore. My intended excursion exhibited too forbidding an aspect to induce any of my fellow-passengers to accompany me; and I was told it required no ordinary strength and perseverance to accomplish the task. After tugging and scrambling up as steep and craggy an ascent perhaps as ever mortal ventured to climb, sometimes depending by the bough of a tree, or holding myself from being precipitated upon the tree tops and rocks below by the tufts of long grass which grew from the chinks of the cliff, I succeeded in reaching the summit of Palisado Ridge. It was an hour's toil; and, almost exhausted, I sat down to view the prospect.

Far below flowed the Hudson, whose silvery waters, studded with all the beauty and variety of shipping, I could easily follow to the ocean. The city of New York was before me; its bay and harbour, one of the finest and most beautiful in the world, could be seen with delightful effect. The eastern shore of the State of New Jersey, Staten Island, Long Island, its

Sound, a part of the State of Connecticut, and the Atlantic, terminated my prospect on the south and east. On my right and left stretched the lofty highlands; and behind me, hazy in aërial height, rose the proud summits of the Catskill Mountains. The Hackensack river, with its tributary streams, variegated the plains and salt marshes of New Jersey. The elevation of the opposite side of the Hudson was mountainous; "rough with wood, and frowning with rocks;" sloping gradually towards the south, until its deserts lost their wildness and character in cultivated districts.

As I shall most probably have ample opportunity before long of noticing more at length the animals usually met with in the Northern States, I intend, for the present, to advert to such of them only as may seem more particularly to belong to the description of the country passed through.

Deer in the forests bordering upon the Hudson have become extremely rare: they are by nature shy and indomitable, and will immediately forsake their former dominions whenever they detect the slightest trace of human resort. The wolf is seldom seen, yet marks of his rapacity but too often occur; and, as if impelled by revenge, he wanders from the distant mountains in quest of the spoils of his greatest enemy, man. The black bear a few years ago enjoyed a secure retreat on this ridge; but of late, however, it would appear, he has thought otherwise: he is now a great stranger in this vicinity. These animals, in common with the unfortunate aborigines of this country, from necessity, fly farther into the wilderness as their limits are encroached upon: the only quarters inferior beings are wont to be treated with by Christians in these parts, and it is to be feared in many others also, may be truly characterised in the very emphatic, expressive, and humane denunciation, "*Quit or die!*"

Here the oak (*Q*uércus) grows abundantly, and thrives well; some of them are very large and straight. I observed three species, viz. *Q. R*òbur, nìgra, and falcàta. I also noticed the maple (*A*cer) of two species, saccharìnum and rùbrum; the American chestnut (*C*astànea americàna); the hickory (*J*úglans), sp. cinèrea or American butternut, and tomentòsa or white-heart hickory, which is much used in this country for fuel, and is in England a valuable wood for many purposes.

The pink root (Spigèli*a* marilándica) was common and in full bloom. This plant has long been known in medicine as a vermifuge, and at one time acquired great celebrity; but, like every thing else overrated, it has lately fallen into disrepute, and is now very seldom used. It is, however, an elegant plant; grows most luxuriantly in the shade from the

chinks and shelves of moss-covered rocks, where there is scarcely the appearance of earth; and, from its spreading bright red flower, forms a relief and an agreeable contrast to the gloom which mostly surrounds it. I also observed, of the Convallària family, sp. latifòlia, ciliàta, and bifòlia; several species of the *Eupatòrium*, the stately plants belonging to which genus do not flower before August; the humble Fragària, the delicate Cóptis, Claytòn*ia*, *A*nemòne, *V*ìola, and the slender *C*orydàlis, Potentílla, and Sagittària, of each one or two species. Among the *F*ílices were the *P*olypòdium, which, not long ago, was thought capable of exterminating the whole race of worms, but in these days of keen enquiry has been reduced to its level, and is now, and very properly too, placed at the very fag-end of the list of materia medica; thus verifying the trite adage of Virgil, so far as its popularity, at least, is concerned, "Stat sua cuique dies*;" the *P*tèris, *A*diántum, Aspídium, and Osmúnd*a*.

The Palisado and neighbouring ridges, on the eastern side of the Hudson, are principally composed of serpentine and secondary limestone, so compact as to admit of a tolerably fine polish.

Descending by a circuitous route, after an absence of three hours, I reached my companions on the river, and felt myself highly gratified with the excursion.

I am, my dear lady, yours most sincerely,

Hudson River, May, 1823. T. W.

Letter IV.

My dear B. — On my return to the Neptune all was in readiness to set sail. The wind sprang up, and we were presently wafted into a broad sheet of water, "the Sea of Tappan." The river here suddenly expands, and for the distance of ten miles will average about four miles in breadth; in many places the water is so shallow, that the helmsman, his track being already marked out, steers by the direction of posts, stationed here and there in the river, that he may keep his vessel free from sandbanks. The shore on each side of us presented a level, agreeably interrupted in places by the intervention of minor hills, apparently fertile, and in fine cultivation. The villages of Tappan and Nyack, a few framed houses and huts scattered irregularly on the western side, and about one mile from the river, claim the attention of the traveller. They are situated near the foot of a valley, and overlooked by some stupendous and abrupt ridges, whose

* "Every thing has its day."

frowning and murky heads throw a grand and solemn, but somewhat suitable, aspect upon the landscape of this memorable place. Old Tappan, which consists of only two or three small houses, and lies a short distance up this valley, was the place selected for the execution of the once brave, noble-hearted, patriotic, and accomplished Major André. I was anxious to make a pilgrimage to the grave of my unfortunate countryman; and, as the wind was scarcely sufficient to bear us up against a strong ebb-tide, I easily prevailed on the captain to anchor his charge, and allow the small boat to go on shore.

Major André, you may recollect, was taken prisoner by the Americans during the revolution as a British spy. The house or hut in which he was kept in confinement had only very lately gone into ruins. It was then a tavern, and its landlord, now extremely old, still resides close by, and recites the melancholy tale with much affection and feeling. He witnessed the gentlemanly manners and equanimity of this heroic soldier, while in his house, under the most trying circumstances, and from its threshold to the fatal spot. In his room the prisoner could hear the sound of the axe employed in erecting the scaffold; and on one occasion, in the presence of a friend, when these sounds, terrible to all but himself, were more than usually distinct, he is said to have observed, with great composure, "that every sound he heard from that axe was indeed an important lesson, it taught him how to live and how to die." When conducted to the place of execution, and on coming near to the scaffold, he made a sudden halt, and momentarily shrunk at the sight; because he had, to the last, entertained hopes that his life would have been taken by the musket, and not by the halter. This apparent want of resolution quickly passed away, and the disappointment he felt told more against the uncompromising spirit of the times than against himself. Rejecting assistance, he approached and ascended the platform with a steady pace and lofty demeanour, and submitted to his fate with the pious resignation of a great and good man. A large concourse of spectators, among whom were several well-dressed females, had assembled on this sorrowful occasion; and it is reported that scarcely a dry cheek could be found throughout the whole multitude. André was then seen as he always had been, and moved by that which had through life presided over all his actions, resolved beyond presumption, and firm without ostentation.

The person and appearance of Major André were prepossessing: he was well proportioned, and above the common

size of men; the lines of his face were regular, well marked, and beautifully symmetrical, which gave him an expression of countenance at once dignified and commanding. His address was graceful and easy; in manners he was truly exemplary, and in conversation affable and instructive. Polite to all ranks and classes of people, he was universally respected; fond of discipline, and always alive to the just claims and feelings of others, he was beloved in the army, and generally appealed to as the common arbitrator and conciliator of the contentions of those around him. In a word, he was a sincere friend, a scholar and accomplished gentleman, a patriot, a gallant soldier, an able commander, and a Christian.

General Washington, when called upon to sign his death-warrant, which he did not do without hesitation, it is said, dropped a tear upon the paper, and spoke at the same time to the following effect: — "That were it not infringing upon the duty and responsibility of his office, and disregarding the high prerogative of those who would fill that office after him, the tear, which now lay upon that paper, should annihilate the confirmation of an act to which his name would for ever stand as a sanction. He was summoned that day to do a deed at which his heart revolted; but it was required of him by the justice of his country, the desires and expectations of the people: he owed it to the cause in which he was solemnly engaged, to the welfare of an infant confederacy, the safety of a newly organised constitution which he had pledged his honour to protect and defend, and a right given to him that was acknowledged to be just by the ruling voice of all nations."

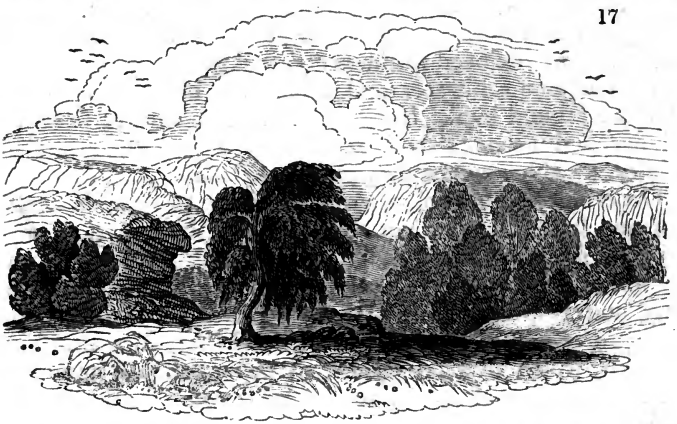
André, after he had heard his condemnation, addressed a letter to Washington: it contained a feeling appeal to him as a man, a soldier, and a general, on the mode of death he was to die. It was his wish to be shot. This, however, could not be granted: he had been taken and condemned as a spy, and the laws of nations had established the manner of his death. But where were the humanity and feeling of the British on this occasion? Why did they not give up the dastardly Arnold in exchange for the brave André; as it was generously proposed by the United States? * This they refused on a

* Arnold was a general in the American service, and had distinguished himself on former occasions like a brave soldier, an experienced commander, and a sincere citizen; but, like another Judas Iscariot, he afterwards thought fit to turn traitor. He deserted to the English as soon as the news reached him of the apprehension of André (because he knew then that his name and the plans arranged previously between him and the British general would be exposed and frustrated), with the expectation of receiv-

paltry plea, and suffered, in consequence, the life of one of their finest officers to be ignominiously lost.

On a green eminence, over which hangs the dark and funereal shade of the willow, is the grave of this unfortunate soldier (*fig.* 17. *a*): it is a short distance south and west of

17



the village. "No urn nor animated bust," only a few rough and unshapely stones, without a word of inscription, and carelessly laid upon a mound of rudely piled earth, are shown to the traveller as the spot where rest the remains of poor André.*

Near to Nyack are quarries of sandstone and secondary greenstone. The ridges and mountains in this vicinity are chiefly composed of coarse and rather compact greenstone, resting mostly upon sandstone, or upon an argillaceous stratum. A lofty range of mountainous ridges terminates the valley on the north; these stretch quite down to the river, and form, at the water's edge, an inaccessible cliff, or promontory, between 600 and 700 ft. in height, jagged with rocks, and of a terrific appearance. This promontory is called Vredideka Hook. Immediately behind these ridges rises, from a lake about five miles in circumference, and upwards of 100 ft. above the level of the Hudson, the principal stream of the Hackensack river. The water of this lake, I was told,

---

ing *a few pieces of silver* for betraying his country. Whatever was his recompence in this way I know not, but I am certain he was despised as long as he lived, and his memory will for ever be pointed at as contemptible and degrading by the people of both nations.

* The remains of Major André were lately, by a special request from the British government to the United States, brought to England, and placed among the worthies of Westminster Abbey.

is clear and very wholesome, and contains quantities of several species of fish, such as perch (*Pérca fluviátilis*), basse (*Làbrax Lùpus Cuv.*), pike (*Esòx Lùcius*), and sun-fish (Tétrodon mòla).

The opposite shore rises gradually until it reaches the highlands, and the eye passes over the villages of Philipsburgh, Tarrytown, Singsing, and Peekskill before it gains the proud and stupendous heights of this grand chain of mountains. Most of these villages are romantically situated, being in notches, or in narrow and deep fissures. In the revolutionary war Philipsburgh was the seat of some hard-fought battles, in which the Americans were generally successful. It contains several mills, having a small river, which, from its rapid descent, renders the place peculiarly advantageous for the operation of hydraulic machinery. Peekskill is a beautiful village, and the largest which occurs on the Hudson between New York and the highlands; the houses are mostly constructed entirely of wood, of two and three stories, well and prettily painted externally, and have consequently always a gay and pleasing appearance.

The eastern shore of the Hudson is altogether of primitive formation, and, what is rather remarkable, although separated only by the river, possesses not a rock in common with the opposite shore. Primitive limestone is found in extensive tracts, as are also granite, mica-slate, crystallised quartz, gneiss, &c. This last, like the limestone, occurs so extensively in several places, and of such an excellent quality, that large quarries are already formed, from which this stone is constantly conveyed to New York.

Some four or five miles above Vredideka Hook the river again contracts, and is here and there interrupted in its course by abrupt angles and juttings of rocks, which give rise to eddies and such powerful currents that vessels approaching too near their sweep have been known to receive serious damage. The river soon opens into another expanse, called Haverstraw Bay, a name derived from a small village, situated on a beautiful and fertile plain a short distance from the western bank. Haverstraw, in summer, is visited by the fashionable and gay from the city, and is the scene of mirth and hilarity.

Verplank's Point stretches from the eastern bank some distance into the river, and forms a kind of peninsula, which was a favourite military stand of the Americans in the revolution: after several skirmishes, and some severe fighting, it was at length forced, and for some time maintained by the British. A little above is Stony Point, which is a promontory,

and more elevated than Verplank's Point. It was fortified and garrisoned by the British, until, in a gallant attack under the command of Major Lee, it was taken by the Americans, who ably maintained it to the close of the war. The fortification is in a state of decay, and sheep peaceably occupy that ground which formerly bristled with bayonets.

Hudson River, May, 1823. T. W.

ART. III. *Additions to the Catalogue of British Birds, with Notice of the Occurrence of several rare Species.* Communicated by WILLIAM YARRELL, Esq. F.L. & Z.S., in a Letter to the Conductor.

Sir,

I AM indebted to the kindness of several friends for the pleasure of transmitting to you the names of four birds as additions to the British fauna, and also a list of occasional visitors, some of which are of very rare occurrence.

FA'LCO RU'FIPES (*Bechstein*).

Ingrian Falcon of Latham, Syn., vol. i. p. 102.; Orange-legged Hobby, Lath. Syn. Supp., vol. ii. p. 46.; Faucon à pieds rouges, Temm. Man., vol. i. p. 38.

Three examples of this small falcon were observed together at Horning in Norfolk, in the month of May, 1830, and fortunately all three were obtained. On examination they proved to be an adult male and female, and a young male in immature plumage. A fourth specimen, a female, has also been shot in Holkham Park; and others will probably be found in preserved collections, on close examination, as some little difficulty occurs in detecting them, from their resemblance to other British species. The old male is somewhat like our hobby, but smaller; and the female resembles the merlin. A figure of the male, in the *Planches enluminées* of Buffon, No. 431., is called "variété singulière du Hobreau." A living female is now in the garden of the Zoological Society in the Regent's Park, which was brought from the European continent during the last summer; and I possess a male and female preserved, which were given me by my friend Mr. John Morgan. These last were brought from Russia, where they are said to be plentiful.

ALAU'DA ALPE'STRIS *Linn.*

Shore Lark of Pennant's Arctic Zoology, vol. ii. p. 392.; and of Lath. Syn., vol. iv. p. 585.; Alouette à hausse-col noir, Temm. Man. d'Orn., vol. i. p. 279.; Wilson's Birds of the United States, vol. i. p. 85. pl. 5. fig. 4.

A specimen of this lark was killed on the beach near Sherringham, in March last, which passed into the hands of Mr. Sims of Norwich, by whom it was preserved; and it is now in the collection of Edward Lombe, Esq., of Great Melton, who also possesses one of the males of Fálco rùfipes before mentioned. The north of Europe and Asia is frequented by this lark; and Wilson gives a characteristic description and representation of it among his *Birds of the United States*, vol. i. p. 85. pl. 5. fig. 4.

WESTERN DUCK (*A*NAS STELLE`RI of Pallas).

*A*nas occídua of the Naturalist's Miscellany, No. 34.; Western Duck of Pennant's Arctic Zoology, vol. ii. p. 497. pl. 23.; Id., Lath. Syn., vol. vi. p. 532.; Id., Lath. Supp., vol. i. p. 275.; *A*nas díspar, Lath. Ind. Orn., vol. ii. p. 866. sp. 83.

A male of this beautiful species was shot by a collector near Yarmouth, and is now in the possession of a gentleman at Acle. This bird has been found on the western coast of America; it is also an inhabitant of Kamtschatka, where it breeds among rocks. It is said to fly in flocks, confining itself to the sea-coast and near the mouths of large rivers. M. Temminck has not included this species in his manual of the birds of Europe.

STE´RNA CA´SPIA of Pallas.

Id., Lath. Ind. Orn., vol. ii. p. 803. sp. 1.; Caspian Tern of Pennant's Arc. Zool., vol. ii. p. 526.; Id., Lath. Syn., vol. vi. p. 350.; Hirondelle-de-mer Tschegrava, Temm. Man. d'Orn., vol. ii. p. 733.

Two examples of this tern, the largest of the European species, have been killed at Yarmouth: one of them is in the collection of a gentleman residing in Norwich; the second I have not been able to trace. Excellent figures of this bird in its summer plumage occur in the works of Meyer and Stor, and a representation of the egg is given by Dr. Schintz, pl. 13. fig. 6.

Descriptions of the plumage of these four birds will be found in the different works to which I have referred; and repetition is therefore avoided here as unnecessary.

Several notices of the occurrence of rare British birds having already appeared in your Magazine, I have selected from a long list the names of such only as are most interesting.

Little Horned Owl; woodchat; roller; nutcracker; Ri-

chard's pipit (*A'nthus Richárdi*).—This bird was made known as an addition to our fauna, by Mr. Vigors, in the first volume of the *Zoological Journal*, p. 411., with a coloured figure; and a second specimen has been lately taken in Copenhagen Fields near London.

Black Redstart (Sýlvia Tìthys).— Since the publication of the notice of the first capture of this warbler in England, by Mr. Gould, in the 17th number of the *Zoological Journal*, p. 102., two other specimens have been taken (and both males), one near Bristol, the other at Brighton.

Three storks; two night herons; purple heron; three little bitterns, one an adult male in fine plumage, shot on Uxbridge Moor; two long-legged plovers; two pratincoles; one olivaceous gallinule; two little gallinules (Baillòn*ii*); four eider ducks; two castaneous ducks (*A. Nyròca*); six long-tailed ducks; one black guillemot, and a second specimen seen, but could not be obtained; three little gulls; and one fulmar petrel.

I am, Sir, yours, &c.

Ryder Street, London, Jan. 1831. WILLIAM YARRELL.

ART. IV. *Some Account of the British Song Birds.* By J. M., A.L.S. &c.

Sir,

YOU have treated your readers with an interesting description (Vol. I. p. 414.) of the song-birds of North America. A correspondent (whose requests should never be denied) wishes that a similar account should be given of our British song-birds; and, though I do not feel equal to the task of giving a sufficiently flowery description, without borrowing too much of what has been a hundred times said or sung by others, yet I am induced to offer a plain one, which, instead of a better, may gratify those of your readers who are unacquainted with the music of the groves.

To begin with the genus Sýlvia, or soft-billed warblers: the first to be noticed is the well known Redbreast (Sýlvia Rubécola). This bold audacious little fellow sings the whole year round, except only during very hard frost. He not only trills his song of love during the breeding season (in which respect he is like all others), but also at other times sings his shouts of defiance, his notes of menace, his impassioned bursts of anger, and his surly under tones of jealousy. But, however actuated, his strains are always of a cheerless pensive character; and though there is considerable modulation in his song, his cadences are almost always performed in the minor key. These "dying falls," and andante movements, give an

air of melancholy to his notes, they seeming more like a shivering complaint than the joyous swell of a song. The season, too, in which his song is most noticed adds to the cheerless character of his strains.

Besides the regular song of the redbreast, they use calls of want, satisfaction, and fear. On the approach of the viper, stoat, weasel, fox, cat, or other strange animal, they give a short note of alarm; and at the sight of the hawk they fly to shelter, uttering a long shrill scream of fear. I believe both sexes sing; but it is entirely their domineering pugnacious character which causes them to vociferate all their feelings in the semblance of song. In this respect the redbreast is exactly like the domestic cock.

The next to be noticed is one equally well known as the preceding, because both are "sacred to the household gods," namely, the Common Wren (Sýlvia Troglódytes). Here we have a very different character, one of the smallest and most vivacious of birds: familiar without impudence, busy and bustling in action, and extremely gallant in manners; so much so, indeed, that every mild and sunny day in winter reminds him of *la jour de noces*, and excites him to pour forth his gay and lively song. This, though short, is full of variety and sprightliness: it is a burst of joy, rapturous and loud; beginning high, and graduated down to rather more than an octave below, and repeated at intervals of about a minute or two. The song of the wren is heard from a month before the breeding season till it is quite over; and, as they commonly breed twice in the year, they sing for at least seven months. So audibly loud is the song, that it may be easily distinguished even in full chorus; and it is astonishing that so small a bird should have such powers of voice. The wren has also a curious note of fear, resembling the winding up of a clock; and his birring note of rebuke over the prowling cat, or prying owl, is most provokingly teasing.

We now come to the smallest British bird, viz. the Gold-crested Wren (Sýlvia *R*égulus). The song of this little chorister has been aptly compared to that of a fairy. It is a short strain, repeated at short intervals; weak, yet agreeable; sung inwardly, in such a manner that, though the tiny warbler may be in the nearest bush, the notes seem to come from a considerable distance; but it can only be heard when near, except in very calm weather. It sings only in the spring months; and is most frequently seen in that season among the lower branches of fir trees, where it seeks its food, and every now and then warbles its fairy strain.

Another warbler is the Hedge Sparrow (Sýlvia modulàris).

This is also a common and well known bird; and though rather low in the scale as a songster, yet he deserves a place in the choir. His song is not longer than that of the wren, is less varied, shrill, and rather sprightly. Under the influence of mild weather, they begin to sing early, and are often heard at the same time with the common wren, continuing their song till after midsummer. Ornithologists have doubts whether this belongs to the genus Sýlvia; and it is probable it will be separated from it.

The foregoing are constant residents in Britain, and appear to be more than others attached to the habitations of man.

The next to be noticed is the Wood or Willow Wren (Sýlvia Tróchilus), a summer visitant or emigrant, arriving in Britain about the 20th of April. This is the smallest of the warblers, except only the common and golden-crested wrens. Their song is heard in thick woods, soon after their arrival. It is a soft pleasant strain, repeated from time to time with considerable pauses between; beginning in a pretty high pitch, forte, diminishing, by slurred gradations, down to lower tones scarcely audible. As their chant is given in the full chorus of the woods, and among several others which sing in the same key, it requires an experienced ear to catch and identify the song. This bird is more elegantly formed than the common wren; brownish green above, and chiefly yellow below. Sing during their breeding season.

Very similar in habits and appearance is the Middle Willow Wren, or Chitchat (Sýlvia hippolàis). This species is remarkable for being one of the first birds of passage that arrive in this country in the spring, and is often heard in the woods before the trees are in leaf. Its notes (song they can hardly be called) are only two, but may be distinctly heard, whether as solo or in chorus: *chit-chat*, *chit-chat*, *chit-chat*, repeated sometimes for five minutes at a stretch, without variation, save only now and then changing the plan of the notes into *chat-chit*, *chat-chit*; or into *chiffy-chaffy*, by doubling them.

Nearly allied to the last is the Larger or Shaking Wood Wren (Sýlvia Sylvícola). In general colour, habits, and economy, it is much like the two preceding, but is somewhat larger. This is only heard and seen in hollow woods, perching on the lower boughs of high trees, and, at intervals, trilling its shaking or tremulous song. Like its smaller congener, it has a graduated strain of 14 or 16 notes, begun high, and finishing in a demisemiquavered slurred cadenza, dim. But the peculiarity of the song consists in the four or five first notes being repeated moderato, expressively staccato, before the beginning of the descending passage.

These three species of willow wren are often mistaken for each other by ornithologists. They all arrive in the course of the spring, and leave in the latter end of summer. All build their nests on the ground, live on the same kind of food, and, what is remarkable, all utter the same note of fear when alarmed for the safety of their nest or young. The last, I believe, was added to the list of British birds by that celebrated and accurate naturalist the Rev. G. White, author of the *History of Selborne.*

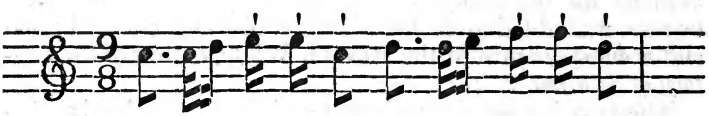
The next is a songster of great eminence, namely, the Pettychaps, or Garden Warbler (Sýlvia horténsis). This species inhabits thick hedges and shrubberies; and being fond of small fruit, particularly raspberries, is often a pilferer in the garden: hence the specific name. It is, however, a shy bird, oftener heard than seen. The song is a continued warble of considerable modulation, sometimes for half an hour at a time, without a pause. There is no theme or connection in the song: wild, rapid, and irregular in time and tone; but the rich depth is wonderful for so small a throat, approaching in deep mellowness even to that of the blackbird. His music is seldom elevated, all seeming to be the ardent accents of persuasion, delivered in the gravest tones.

In the same hedge we see and hear the jocund Whitethroat (Sýlvia cinèrea). Seated on a topmost spray, he distends his garrulous throat, and, with cockaded brow, incessantly pours forth his short but joyous song; and, lest he should not be sufficiently seen and heard, mounts into the air to the height of twenty feet or more, singing his peculiar jerking notes as he descends to his perch. All this exertion of voice and wing seems to be entirely for the gratification of his listening mate, who is attending to her domestic affairs at no great distance from the spot.

In the near neighbourhood may be also heard the Lesser Whitethroat (Sýlvia Sylviélla). This is a smaller bird than the preceding. Their haunts, arrival in, and departure from, this country correspond; but this has less power of song; it is only a kind of convulsive laugh or call, occupying about half a bar of common time. In the general chorus of the woods, the lesser whitethroat bears a very subordinate part: it is the pipe without the tabor.

The next is the contra-alto singer of the woodland choir, viz. the Blackcap (Sýlvia Atricapílla). The fine, varied, joyous song of this emigrant is noticed by the most listless auditor. The strain occupies about three bars of triple time in the performance, and, though very frequently repeated, is somewhat varied in every repetition. Unlike some of the

foregoing, his song is not begun high, diminishing off to an inarticulate pp. cadenza; but the contrary: he begins with two or three short essays of double notes, gradually crescendo up to a loud and full swell of varied expression. The following passage often occurs: —



as truly enunciated as if performed on an octave flute. Like their congeners, they sing only during their courtship and breeding season. The style and key of their song are nearly the same in all individuals; though some may be noticed to vary in style. I knew one bird that frequented the same spot of a wood for three summers, who signalised himself by a peculiar arrangement of notes, very much excelling his brethren around. The blackcap is certainly the finest singer of the whole tribe of warblers, except the nightingale.

The next is a common bird, but more admired for the beauty of his plumage than for the excellence of his song, viz. the Redstart (Sýlvia *P*hœnicùrus). This is one of the most delicate of our birds of passage, arriving in April and remaining till the end of summer. Soon after his arrival he stations himself on the top of high trees, and thence pours forth, at short intervals, his brief, though not unpleasant, strain. His voice is weak, and almost lost among the accompaniments of nearer or louder songsters.

When we visit bushy commons, or rough uncultivated ground, we meet with two others of this vocal tribe, namely, the Whinchat (Sýlvia Rubètra), and Stonechat (Sýlvia Rubícola). Their songs resemble each other; each being a short strain of a few soft notes, occasionally repeated, while sitting on a spray near their nests. They are both alarmists, particularly the first; flitting from bush to bush or along a hedge before the traveller, uttering a quick chee-chuck-chucking cry, accompanied by a quick jerk of the wings and tail.

Before leaving the furze-covered common, let us look for, or listen to the chant of, the Dartford Warbler (Sýlvia provinciàlis). Perchance it may be found among the low bushes. Forty years have I been looking for this rare and pretty little warbler; and never met with it, to my knowledge, till about a month ago (7th July). I was favoured with the sight of three young ones, in the possession of Mr. Bennett, surgeon, New Street, Dorset Square, London, a gentleman fond of ornithology; and who has a fine collection of summer birds, kept

on the plan of Mr. Sweet. Mr. Bennett's young birds were caught on Wimbledon Common, where they have been sometimes seen before, as well as on Hounslow Heath, and in the vicinity of Dartford in Kent. I have never heard their song; but it is said to be soft and pleasing. The retired habits of this warbler keep it out of notice, and therefore it is called rare; though, if the middle of extensive commons were carefully explored, it may be found as plentiful in England, perhaps, as it is said to be in Provence, in France. They are of a dark reddish colour above, with throat and breast brightly tinged with red; about the size of the long-tailed titmouse (Pàrus caudàtus), and, except that their tail is not quite so long, have very much the shape and action of that bird.

From the common let us walk down to the sedgy sides of the brook, or lake: here we may hear, if not see, two more of the tribe of warblers. The first is the Reed Warbler (Sýlvia arundinàcea). This is a small bird, frequenting reedy marshes, or willow holts. Their song is a long irregular strain of notes, quickly and jerkingly enunciated, but without being very loud, and in some passages not unlike its constant neighbour the Sedge Warbler (Sýlvia phragmìtes). This last is a songster of most wonderful powers. He may be called the Italian, as to style: for the whole excellence consists in the variety and extremely ridiculous rapidity of his execution. It is impossible to give any thing like an intelligible description of his long-continued extravaganza. Spirited, changeful, precipitously running over every note and half-note within the compass of his pipe, quicker than even attention can follow; touching, as he passes, the notes of other birds so exactly that he has been called a mocking-bird, and supposed to possess the power of imitating all others. Sometimes he soars up in the air, jerking in his flight, and singing, as he descends, in the manner of the whitethroat. But what adds peculiarly to his value as a vocalist, is his propensity to be a serenader, especially if he happens to be disturbed by any noise.

The Wheatear (Sýlvia Œnánthe) is a warbler, and its song is reported as being agreeable, though soft and low. As they congregate on stony commons, they do not join the harmony of the woods; and, are therefore, less known as songsters than most of the others.

The Grasshopper Lark (Sýlvia trivìalis) is (though, perhaps, incorrectly) classed among the warblers. They frequent thick underwoods, and are easily distinguished from all other birds by their long-continued monotonous birring note, much like that of a field-cricket. It may be observed that they

occasionally drop to a third below the key, but soon resume it again. They always sing upon a bush near the ground, and often in the night as well as by day.

The last to be mentioned in this communication is, deservedly, not only at the head of its tribe of warblers, but at that of the whole feathered race; viz. the nightingale (Sylvia *Luscinia*). It is unnecessary to describe the widely celebrated song of this delightful vocalist. For richness of tone, whether in his highest or lowest notes, he excels all others. He performs passages in both the major and minor keys. In the former he raises an acclaim of joy; in the latter he expresses a kind of wailing affection. The only drawbacks on his merit as a melodist, are his squeaking intermediate notes, which unite his fine and more audible passages.

Two other Continental warblers have been lately added to the British lists; viz. the Sylvia alpina and the Sylvia suécica, but they are as yet but little known. It is said that ornithologists have in contemplation a new arrangement of this interesting genus; by which it will be divided into two or three sections.

Chelsea, August 8. 1829. J. M.

(*To be continued.*)

ART. V. *An Account of the Discoveries of Müller and others in the Organs of Vision of Insects and the Crustàcea.* By GEORGE PARSONS, Esq.

Sir,

IN the works on natural history recently published in this country, at least in those examined by me, no notice has been taken of the curious discoveries in the organs of vision of the lower animals, made within the last few years on the Continent, and principally by Professor Müller of the University of Bonn. Some account of these discoveries may perhaps not be unacceptable to your readers: should such be your opinion, the following is at your service. Professor Müller's first discoveries on the subject were published at Leipzig in 1826, in a work on the comparative physiology of the sense of vision in insects (*Zur vergleichenden Physiologie des Gesichtssinnes*); a paper from him on the same subject appeared subsequently in the *Archiv für Anatomie und Physiologie von Meckel* for January and June 1829, * and a short article, confirming the

* A brief analysis of this paper is given in the first number (new series) of the *Journal of Science of the Royal Institution.*

accuracy of Müller's researches, was lately given in the *Annales des Sciences Naturelles.* The most important facts thus made known on the structure of the simple and compound eyes of insects and the Crustàcea I will endeavour to compress into the following pages.

For the visual perception of distinct images, it is evidently necessary that the light from the different parts of the object to be seen must also be insulated in a corresponding manner upon the different parts of the sentient organ. A retina, without an exterior apparatus for the fulfilment of this condition, can only communicate to its possessor the simple sensation of light. Whatever may be the objects presented to such a retina, since the light, shade, and colours proper to their several parts, are all transmitted indifferently to every part of the sentient organ, it will inevitably result that these qualities (light, shade, and colours) will produce a common and simultaneous impression upon the whole of the organ; the light being no longer distinct from the shadow, nor the colours from either of the two former, as they are in the external object. If there are in nature beings possessed of this simple sensation of light and colours, without an optical organ of vision, such sensation cannot extend so far as to insulate the colours, so as to correspond with those of the exterior object; and this may be the case in some Annélides, which have what are regarded as ocular points or eyes, in which, however, no distinct and separate structures can be discovered.

That parts of many, or of most plants, are affected by the sun's rays, is sufficiently proved by the opening and closing of flowers, by the directions which the leaves take in order to expose their surface to the light, &c.; and the opinion of M. Dutrochet, that vegetables possess, dispersed through their several organs, a substance analogous to nervous matter, and to whose agency this susceptibility to the action of light may be attributed, is certainly far from being improbable. We may fairly assume that, in the organised bodies placed lowest in the scale of the animal kingdom, this nervous matter is less disintegrated, less mingled up with the other textures, than in plants; and that, as it becomes more and more concentrated, and separated from the rest of the animal organisation, the adumbrations, as it were, of organs of sense will simultaneously make their appearance; and thus at length distinct sensations will be produced by the action of exterior agents. It can scarcely be denied that the Annélides, and other allied tribes of the lower animals, possess the sensation of light; but it must also be inferred, from our present knowledge of their

structure, that they do not possess any visual perception of circumscribed forms. These lower animals see only the light, which will be more or less clear, obscure, or coloured, according to the intensity and kind of light predominating. If this, in the true sense of the word, simple eye, assigned to the Annélides, apparently consisting only of a transparent layer or cornea, covering a portion of nervous matter, or retina, is to have the power of distinguishing the relations of locality, it will be necessary that the light coming from any one point of an external object shall not be transmitted to all parts of the retina situated in the same plane. For example; if the nervous or sentient organ be spread out over a flat surface, then variously coloured rays of light, coming from the border of a semicircle, will, it is true, illuminate simultaneously all the parts of such a retina; but the different kinds of rays falling on the retina at different angles of incidence, there will be developed, in addition, certain colours in different parts of the retina. If the sentient surface or retina be spherical, the specific action of the light will be most intense at the point where the light falls on the surface in the direction of the ray, and one side of the sphere will in no degree participate in the colours of the other. This would be the highest point to which this grade of organisation of the eye could attain.

There are two modes of organisation possible and necessary, for the sentient surface to become a perfect visual organ, in which the differences of colour in external objects shall be reproduced upon the retina.

1. By refraction, by means of refracting media or lenses.

Rays from external objects fall upon the whole of the exposed exterior of the eye. Each portion of the surface of the eye is in contact with the different kinds of rays which approach it in every possible direction; but, in traversing the transparent parts of the eye, the divergent rays from each point of emission are again converged into distinct points or foci at a certain distance, where the sentient organ or retina is situated. These points of reunion, these foci of identical rays, are found therefore upon the retina, in an order corresponding precisely with the points of emission on the exterior object; and this reunion of the rays in foci at a determinate distance, by means of refraction, produces distinctness of image on the retina. Such is the case in the eyes of all the vertebrated animals, in the Mollúsca, in the Cephalópodes, and some Gasterópodes, in the *Arachnides*, &c., and in the stemmata of insects.

When the retinæ of two eyes of this kind are organised in such a manner that their different parts are in precisely the

same relation to external objects, they will, when both are equally illuminated, produce only one sensation. But, for the corresponding parts of the two retinæ to receive the same impression, it is necessary that these eyes be movable, without which condition there would frequently be double vision. This is the case (the mobility of the organ) with the eyes of the vertebrated animals and of the cephalopode Mollúsca.

But, if these eyes are not movable, it must necessarily follow that their retinæ cannot bear exactly the same relation to external objects. Eyes of this kind, whose fields of vision are separate, cannot be convergent exteriorly; for, in that case, single objects, illuminating both eyes, would of course produce double vision. Eyes with fields of vision altogether different are therefore necessarily immovable and divergent. Such are the eyes of the *A*ráchnides, &c., and the stemmata and compound eyes of insects, &c. A plurality of these eyes does not increase the intensity, but simply the extent of the field, of vision.

2. In the first species of the organ of vision, the production of the image upon the retina is the consequence of the reunion of the rays regularly emitted from the same points of the external object. But it may be conceived that an image will also be formed when those rays which fall perpendicularly upon the sentient surface are alone admitted, whilst all other rays, coming from the same point of emission, but approaching the retina at other angles of incidence, are intercepted by any organ whatever. If the rays given out perpendicularly from each point of the external object alone impinge upon the retina, it matters little how this is effected, the image of the object will be then reproduced, indistinctly, it is true, but still correctly as it regards the relations of its different parts to each other. We perceive, also, that such a retina cannot be spread out over a level surface, for in such case it could receive the perpendicular rays of light only from few objects, and those of the smallest possible size. The sentient surface or retina of a visual organ of the second species must consequently be spherical, so that the rays of the sphere may correspond to external objects situated in the direction of the rays.

The quantity of light coming perpendicularly will of course be very small; but still, an organ sensible to light will perceive all the minute differences in the form of the image, in the same manner as it occurs in an eye of the first species when the pupil is diminished to a mere point: the light passing through a pupil so diminished will be sufficient for the production of images upon the retina, provided only that the proper insulation of the different rays takes place. In an eye

of the second species, the distinctness of the image will be the greater, precisely in proportion as all rays not perpendicular are the more perfectly excluded. For this purpose an organ will be required, which, situated in front of the spherical retina, shall accurately effect this separation of the perpendicular from the non-perpendicular rays.

The visual organ of the second kind is so simple, and so completely in accordance with the known laws of the motion of light, that we might readily anticipate its existence. When we know what is essential in such a structure, it is very easy to understand every modification of which it is susceptible. The essential conditions are: that the retina be spherical; that the light traverse a transparent medium in the direction of the rays of such sphere; and that this medium be so disposed as to intercept all light not approaching in exact parallelism with these rays. The compound eyes of insects contain indeed all the organs necessary for an eye not seeing by refraction; and these organs have been hitherto almost entirely neglected in anatomical researches upon this subject. Its organisation accords perfectly with the general laws now stated.

A visual organ of the second species, when it is double, must be immovable; and these double or multiple eyes ought to have divergent axes. For, if the retinæ are to be impressed only by the rays coming perpendicularly to their surface, it will be necessary that two spherical eyes form segments of only one sphere; and the axes of the two eyes ought never to converge, for, without this condition, the luminous parts of objects situated at the point of convergence would necessarily be visible to both eyes, and double vision would be the result.

In the anatomical details now to be given, the simple eyes or stemmata will be first described, and the description will be accompanied by a slight account of the vision possessed by animals provided with eyes of this kind. The compound eyes will then be treated in a similar manner.

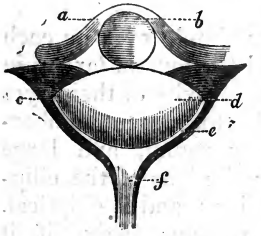
The Simple Eyes of Spiders, Scorpions, &c., and the Stemmata of Insects.

Mygale aviculària.—The transparent cornea of this spider is circular, convex, and of firm consistence: it is a direct continuation of the common integuments, but of course altered in texture. Immediately behind the cornea is found a yellowish, hard, and nearly spherical crystalline lens: its convexity appears to be the same anteriorly and posteriorly; and its posterior surface is closely applied to a spherical body,

or vitreous humour, whose anterior surface corresponds to the convexity of the cornea. The broad basis of the conical-shaped optic nerve is in contact with a membrane investing the vitreous humour: the axis of the nerve being also that of the eye. In the vicinity of the eye the fibrous structure of the nerve disappears; but there the nerve seems to be traversed by dark longitudinal lines. A very thick and black pigment surrounds the vitreous humour on all sides, except at the parts where it is in contact with the base of the optic nerve posteriorly, and with the lens in front; the pigment extending as far as the periphery of the lens and the margin of the cornea.

Scórpio tunénsis, *Scórpio ægyptìacus*. (*figs.* 18, 19.)—In this animal there are two large eyes placed near the middle of the cephalothorax. They consist of a cornea, a spherical lens, a vitreous body, and a membranous retina. These eyes are very near to each other, being separated only by a projecting ridge, and they are so disposed that their axes diverge from each other at a very considerable angle. The cornea (*fig.* 18. *a*) seems formed of the common integuments, which, of course, for that purpose become transparent, and elevated into a convex prominence. The centre is thinner than the circumference, owing to the internal concavity being greater than the external convexity; and the circumference seems to be bordered by a dark band, which appearance is produced by the subjacent dark pigment (*c*). If the cornea be carefully separated from the internal parts, the crystalline lens (*b*) will always be found remaining attached to the under concave surface. The lens of the African scorpion is perfectly spherical, very hard, and of an amber colour; it is in contact with the cornea only at the centre, for at the circumference of the latter there exists between it and the lens a triangular zone, of which a part only, toward the margin of the cornea, is filled with the bluish black pigment. Immediately behind the lens is the vitreous body (*d*), convex anteriorly and posteriorly, the lens not being, in this animal, embedded in the vitreous body. The breadth of the vitreous body is three times greater than that of the lens; its longitudinal axis is to its tranverse diameter nearly as 1 to 2; and it has a greater convexity posteriorly than anteriorly. Its apparent concavity in front is simply owing to the pigment already noticed as in part filling up the zone surrounding the lens. The choroid pigment (*c*) invests

18



19

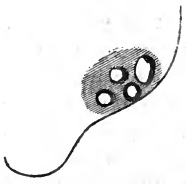
all the internal parts of the eye, and between the two eyes it is elongated to a point both anteriorly and posteriorly. (*fig.* 19. *a.*) It extends a little over the front surface of the vitreous body, and so forms a kind of pupil, whose diameter is greater than that of the lens, and is nearly equal to three fifths of that of the vitreous body itself.

The whole of the posterior surface of the vitreous body is in immediate contact with the retina (*fig.* 18. *e*), which is membranous throughout, and towards its centre forms a conical projection continuous with the optic nerve *f*. This cone of the optic nerve, the external surface of the retina, the margin of the vitreous body in front, and the internal surface of the integuments, where they are continuous with the cornea, are all covered by the choroid membrane, with its bluish black pigment.

Besides these two large eyes, the scorpions have, in the middle of the cephalothorax, other and much smaller ones, generally six in number, and similar in their external appearance to the stemmata of insects.

The *Scolopéndra mórsitans* has four simple eyes on each side of the head; three are round, and the fourth, larger in size than the others, is elliptical. The convexity of these eyes is very great. The lenses are hard, transparent, amber-coloured, convex on both sides, nearly round, and large enough to be seen with the naked eye; the lens of the elliptical eye is larger than that of the others, and is elliptical.

20



21

The vitreous body, if it exists, is extremely small. *Fig.* 20. represents the lenses of the eyes of the *Scolopéndra mórsitans*, magnified, as they appear at their under surface, when they are removed, though still attached each to its cornea. *Fig.* 21. gives a magnified view of the cup-shaped black pigment and retina of each of the three round eyes, with their optic nerves.

The number of simple eyes, or stemmata, in the perfect insects provided with them, is generally three; the dimensions of these organs vary much even in different species of the same genus; in some of the smaller species of *Gryllus* they are of extraordinary size.

The stemmata of insects are always convex on the surface,

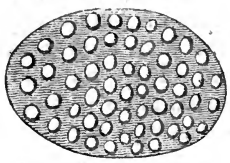
for the most part round, rarely elliptical; and they are generally situated on the upper part of the head, sometimes in a single line, at others in the form of a triangle. They have an organisation similar to that of the eyes of spiders and scorpions, possessing a cornea, a crystalline lens, a vitreous body, and a choroid membrane and pigment. If the exterior form of the eye is elliptical, that of the internal parts is generally ellipsoid. The diameter of the lens is always less than that of the cornea. The optic nerves of the stemmata in the perfect insects do not always unite together into a single trunk; they arise, however, from the same portion of nervous matter.

Aggregates of Simple Eyes.

The Myriápodes, the genera *Oníscus*, *Jùlus*, Lepísma, Lithòbius, Cymóthoa, &c., have aggregated simple eyes, which must be distinguished from the true compound eyes to be hereafter described. From these latter the aggregated simple eyes may be known by their smaller number, which varies from twenty to forty, by their not being in contact with each other, and by their having no hexagonal facets. Often, however, the differences can be strikingly seen only when the parts are examined with the microscope.

In a large Cymóthoa, examined by Professor Müller, there were found about forty of these simple eyes aggregated together: and the general cornea exhibited a similar number of convex elevations, and in its under surface a corresponding number of concavities. Each of these portions was therefore a distinct cornea; and immediately in contact with its under concave surface was a perfectly distinct lens or crystalline globe. The lenses were hard, transparent, amber-coloured, and nearly round. Beneath the lenses lay a dark-coloured mass, having in its anterior surface as many depressions as there were lenses, to the posterior convexity of which the depressions corresponded. They are not, however, similar to the cup-shaped receptacles in the *Scolopéndra*, but are situated in the anterior surface of other bodies larger than the lenses, transparent, tolerably hard, nearly globular, and amber-coloured. The sides and posterior part of these globular or vitreous bodies are covered with pigment, and posteriorly there is attached to each a filament of the optic nerve, which probably is expanded into a cup-shaped retina, placed between the vitreous body and its surrounding stratum of pigment. The optic nerve passes under the aggregated mass, distributing its filaments to the individual eyes.

22



23

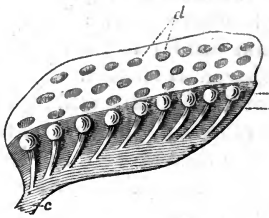


Fig. 22. represents the common cornea, with the lenses attached to it, seen at the under surface.

Fig. 23. is a section of the aggregated mass of simple eyes: *a*, the vitreous bodies; *b*, the filaments of the optic nerve; *c*, the trunk of this nerve; *d*, the depressions in the vitreous bodies for the reception of the lenses.

In a large species of *I*ùlus, Professor Müller counted about forty aggregated simple eyes on each side. Here also the hard, transparent, amber-coloured, and nearly globular lenses were fixed in depressions in the under surface of the common cornea; and the other parts appeared to be similar to those in the Cymóthoa.

The vision of these animals cannot possibly be very powerful, nor extend beyond the nearest objects; for the different rays from distant objects must simultaneously affect all the simple eyes aggregated together, to the complete destruction of all specification of form. Those objects immediately before the eyes can alone be distinguished from each other by means of this structure of the organs of vision, which is indeed only adapted to the Myriápodes, *O*nísci, and a few other kinds of wingless animals, some of which live in the ground, some under stones, and some even as parasites of fishes.

Vision of Spiders, Scorpions, &c., and of Insects provided with Simple Eyes or Stemmata.

It appears from the details given, that the simple eyes of the spiders, scorpions, and insects resemble those of fishes in their structure; especially in the crystalline lens being rounded, separated from the vitreous body, and brought close to the cornea. But, in the stemmata of the articulated animals, the anterior chamber of the eye is completely wanting; the iris, whose internal margin in fishes embraces the lens, is reduced in the Articulàta to a zone of the choroid pigment on the anterior surface of the vitreous body, and the lens is no longer embedded in the vitreous humour, but merely in contact with its anterior and convex surface. The space comprised between the lens, the cornea, and the front of the vitreous body, is probably filled, in the living state, with some peculiar fluid. Whatever this may be, the degree of refraction

which the light must undergo in the stemmata or simple eyes of the articulated animals must be very considerable; for, even if the spherical lens be nearly of the same density as the cornea, and if, in consequence, its anterior surface should scarcely increase the refraction already produced by the convexity of the cornea, still it is very certain that the posterior surface of the lens will, on account of the medium of inferior density with which it is in contact, cause the light to undergo a strong refraction there. The refraction will, of course, be much greater than in fishes, on account of the power of the refracting media in these latter being much diminished by their being surrounded by a fluid of greater density than the air.

In the simple eyes of the articulated animals the rays of light undergo a fourfold refraction: first, through the convexity of the cornea; secondly, through the still greater convexity and increased density of the lens; thirdly, through the posterior convexity of the lens in the hollow space or canal comprised between the vitreous and crystalline bodies; and, fourthly, through the anterior and convex surface of the vitreous body. This organisation indicates the absence of a clear vision of distant objects; but, from the same circumstance, the existence of a clear and distinct vision of near objects ought to be inferred.

If we consider that the larvæ of insects, whose sphere of existence may, from their mode of organisation, be said to be limited to the objects immediately around them, have only stemmata, and that they have no vision of objects placed at distances to which it is not necessary for them to move, it becomes highly probable that the simple eyes of spiders, &c., are also myopic. These organs are to the compound eyes, as it regards vision, what the palpi are to the antennæ, as it regards the sense of touch. The larvæ have no antennæ, but generally they have palpi; for the most part they possess no compound eyes, but commonly they are provided with stemmata. When the simple eyes are of different magnitudes, the smaller ones seem to be specially destined for the vision of the nearest objects, and particularly for the organs of manducation.

The visual horizon of the simple eyes is certainly very small; the light which falls laterally or obliquely upon these organs will, it is true, undergo a powerful refraction; but, beyond a certain point, even these lateral rays will be intercepted by the zone of choroid pigment placed in front of the vitreous body. It is the smallness of the visual field of each of the simple eyes individually, and the position of these organs, always more or less divergent from each other, that alone prevent the several fields of vision from comprising

parts of the same object, and so producing double vision. It may be concluded that smallness of the field of vision, want of mobility in the organ, plurality of simple eyes, and divergence from each other, are conditions necessarily combined.

In the scorpions, the two great simple eyes diverge from each other at an angle of even 90°. In the same animals, these divergent eyes are still farther insulated by an interposed ridge of integuments: they correspond to different parts of the animal's field of vision, and probably both eyes never see at one time the same object.

In the spiders, the simple eyes are always arranged in a line, forming an arch in the skin, and they diverge at different angles. Being of very different magnitudes, even in the same individual, it may be inferred that they must also differ, not only with respect to the extent of the visual field, but likewise as it regards the distance to which distinct vision reaches. The great and very divergent eyes of scorpions possess, undoubtedly, a more extensive visual field, and see also to a greater distance, than the smaller eyes of these animals; which, being but little divergent, like the eyes of most of the spiders, are probably distinguished, on the other hand, by the smallness of the field of vision, and by being myopic. It may be readily conceived, that if the distance to which the power of seeing extends differs in different eyes, a partial crossing of the visual fields will induce no marked confusion of sight, provided that the vision be distinct only in that eye within whose range of power the objects are situated.

(To be continued.)

ART. VI. *On the Sensibility of Vegetables.* By T. E. L.

Sir,

IT is a well-known fact that vegetables possess a physical, though, perhaps, not a rational sensibility, and that they can, and indeed do, avoid what is injurious to them, though probably not immediately; but the power which is employed, and enables them to withdraw out of the way of danger, is still a secret. Of this the Mimòsa pudìca, or sensitive plant, is an instance well known to every body; for, if its leaves be touched ever so slightly, they close and draw back, as if they would shrink from the approach of danger. The leaves of some plants, however, act spontaneously, without any visible or material agency, of which the *He*dýsarum gỳrans is a striking instance, requiring only a warm atmosphere to perform in perfection. Each of the leaves is ternate, and

the lateral leaflets are frequently moving upwards and downwards, either equally or by jerks. It is difficult to suppose what end this motion is intended to answer to the plant itself; as these movements take place without any visible cooperation between the several leaflets. But that plants do avoid danger daily experience proves to be the fact: the most unobserving cannot but have remarked the closing of many flowers before rain; or at night, when the sun has ceased to exert his power. The peculiar habit of many parasitical plants to climb in one particular direction, is also well worthy of regard.

The manner in which the seeds of some plants are dispersed is very wonderful. We will take, as an instance, those of the mosses. The capsules of mosses, when in flower, are covered with a small lid, which, in more advanced fructification, drops off, and discloses to view in most a set of fine teeth, arranged round the mouth of the seed-vessel, and which are called the fringe or peristome: these teeth, in dry weather, close over the mouth, lest the seeds should escape, and, from the parched state of the ground, should not germinate; but when the wet weather comes, they immediately open, and allow the seeds to fly out.

The *N*epénthes distillatòria, is also well worthy of notice. It is found in the marshes of India, though not entirely submerged in water. The extremities of the leaves of this plant are furnished with a very peculiar appendage: it is in the form of a pitcher with a movable lid, and is generally full of water secreted through the footstalk, which is well adapted to that purpose. As to the use of these reservoirs botanists are not quite agreed. Sir J. Smith is of opinion that it is the den of a species of *S*quílla, or shrimp, which feeds upon the flies and other insects which have perished there; while others think that they are intended to support and refresh the plant with water when the surrounding swamps are dried up. Drósera, an English genus, which inhabits our marshes, is also worthy of remark: the leaves of it are clothed with beautiful long scarlet hairs; and if a fly happens to alight upon any of the leaves, these hairs immediately curl over it, and squeeze it to death. Perhaps these hairs may be provided by Providence in order to catch flies and other insects, from which the plant might obtain nourishment.

The care of Providence in protecting the parts of fructification, and effecting the impregnation of the pistil, is also highly curious. In some of the lily tribe, when the flowers are in their prime, you may observe the stamens approaching the pistil in pairs, and the pistil inclining towards them, so as

more easily to receive the pollen. This circumstance may also be seen in the *P*arnássia palústris (grass of Parnassus). Also in the common berberry, if the stamens be touched in the inner part, near the bottom, with a pin, they immediately start forward, and, dashing their anthers against the stigma, impregnate the pistil. The Amaryllis formosissima is furnished with a drop of clear liquid, which in the morning protrudes from the pistil, and in the evening is again absorbed, having collected the pollen, whose vapour renders it turbid, and whose minute husks afterwards remain upon the pistil. The innumerable insects which glitter about the different flowers are of infinite use in bringing about the impregnation of the pistil: the honied bee, and the various tribes of moths and butterflies that glitter in the sun, all aid in performing this one great office of nature, and lead us irresistibly to the conclusion that nothing is made in vain.

The great annual sun-flower is also a very curious plant. According to Sir J. Smith its compressed stalk enables it to turn easily; and when the sun rises in the morning, the action of the heat on the marginal florets, which act as wings, makes it turn its flower constantly towards the sun till evening, when, by its elasticity, it recovers its former position, ready to meet the sun again in the east. My own experience, however, is certainly at variance with this account. I have frequently, from a wish to observe so curious a circumstance, examined the plant at different times; yet, though I have watched it with great care, I never could witness the inclination towards the sun above spoken of. So far from it, the flowers were always facing every quarter of the horizon.

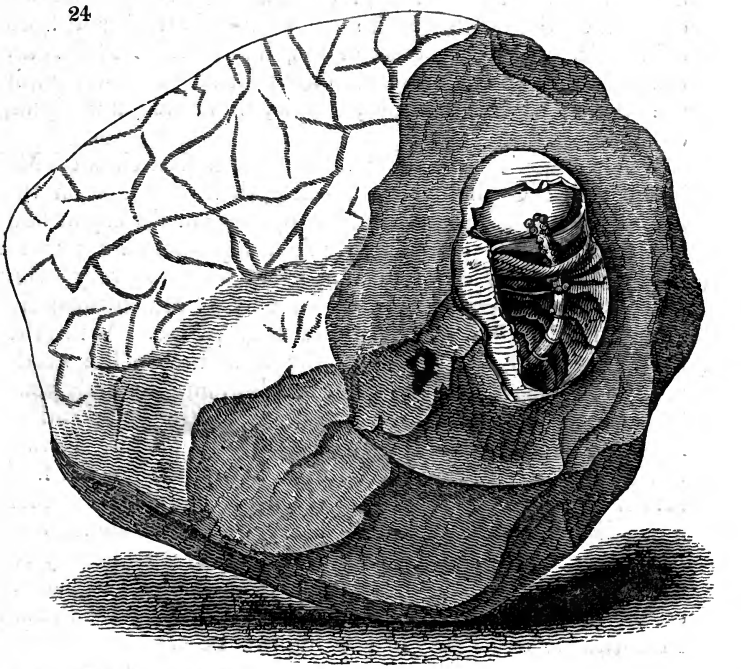
The calyces, in some instances, are possessed of a peculiar delicacy of structure, of which none is more worthy of notice than that of the violet. The seeds of the class Syngenèsia, also, are so light, that they are carried away, when ripe, by the slightest breath of wind, far from their original place of growth. It is by this lightness of the seeds of many plants that the most barren rocks, in the course of time, become clothed with lively verdure. Mosses and lichens first fix their slender and insinuating fibres into the crevices of the rocks, and, as they die away, are again reproduced, depositing a light vegetable mould, sufficient to nourish the grasses and other herbaceous plants; in the course of years vegetation progressively increases; and, by the aid of birds, trees and shrubs are planted, and what was before a barren waste becomes covered with woods and pastures.

Nun Monkton, February 12. 1830. T. E. L.

ART. VII. *Notice of a Fossil Naútilus found in the Sandstone of the Isle of Sheppey.* By Mrs. LEE, late Mrs. BOWDICH.

THE annexed figure (*fig.* 24.) of a Naútilus (a Pompílius?) was made from a specimen found among numerous fragments

24



of shells in the sandstone of the Isle of Sheppey, and now in the possession of the Rev. Francis Cobbold, Cliff, Ipswich. It is in a semifossil state, has lost its brilliancy, colour, and mother of pearl, all of which depend upon the presence of animal matter; and the substance in some places is transformed into silex. It is extremely fragile and brittle, but beautifully discloses the siphon passing through the chambers of the shell. This siphon was long a matter of speculation among naturalists; but Perou's discovery concerning the animal of the Spírula threw full light on the subject, and all the univalves divided into septa. It inhabits the last chambers of the shell, which are always much larger than the rest; a delicate siphon runs through the remainder, for which no use could be assigned for a long time; but it is now proved that a ligament passes from the back through the whole length of the siphon, and attaches the animal to the shell. This, of course, extends as

the number of the chambers increases, and the animal shifts itself into those last formed. It has been suggested that the epidermis is prolonged over the exterior, making it an inner shell, as in other Cephalópoda, whose shells or plates are within their backs; and the present specimen may, perhaps, add strength to this opinion, for all its exterior fragments were covered on the outside with a comparatively thick and brown epidermis. The characters of the shell of the *N*aútilus are: the last turns of the spire not only touching but overlapping the others; septa numerous, simple, transverse, and siphunculated.

Their animals place them amongst the first class of Mollúsca, called Cephalópoda, because their feet are on their heads. This head issues from the opening of the bag or body, has two large eyes, and fleshy feet, sometimes long and at others short, capable of turning every way, and very strong. Most of them have suckers, by which they attach themselves almost inseparably to any object they please. With these they swim and walk; and in the former case the head is always behind, and in the latter is below, and the body above. The mouth is among the insertions of the feet; and two hard horny jaws make it resemble that of a parrot. Between the jaws is a tongue covered with horny prickles; a fleshy funnel is placed in the front of the neck. Some of them have a peculiar secretion of a deep black or brown liquid, which they spout from them to colour the water, and thereby conceal themselves when pursued. From this liquid is made the colour sepia, and the genuine Indian ink. They are the only Mollúsca whose organs of hearing can be traced; and their eggs hang together like bunches of grapes. They are extremely voracious, and destroy a great many fishes. They are found of a very large size off the western coast of Africa, where the natives tell a number of marvellous stories concerning them. Among others is the anecdote told by the Indians of a Cephalopode which sinks their boats. The Africans gravely declare that it pulls the sitters out of the canoes; and, like the Indians, they carry a hatchet with them to chop off the claws, as the only way of making the animal loosen its hold. Pennant seems inclined to believe this story; but there is nothing but native report for it on the western coast of Africa, which generally contains much exaggeration.

Among the fossil *N*aútili there are some of enormous size, and their forms are much more varied than those of the recent shells.

The great genus *N*aútilus of Linnæus embraces all the Cephalópoda that live in shells with chambers.

ART. VIII. *A short Account of the Fall of a Meteoric Stone at Launton, in Oxfordshire.* By Mr. STOWE, Surgeon, Buckingham.

Sir,

AN event occurred in this neighbourhood a short time ago which excited a good deal of curiosity and enquiry, and which, as far as I can learn, is unprecedented in the history of the county in which it happened, and, on that account, worthy of being put on record in a more permanent publication than the ephemeral columns of a newspaper. The circumstance to which I allude is the fall of a meteoric stone, on Monday, the 15th day of February, 1830, at half-past seven in the evening, in the garden of John Bucknell, a labourer in the employment of Mr. Cross, farmer, at Launton, near Bicester, Oxon. Its descent was accompanied with a most brilliant light, which was visible for many miles around, and attended with a *triple* explosion, which was described to me, by a person who heard it at the distance of four miles, as resembling the rapid discharge of three ordinary guns. It penetrated some newly dug mould nearly a foot deep; and, though seen to strike the earth, was not sought for till the following morning, when, of course, it had become cool.

A man named Thomas Marriot was passing near the garden at the moment, and states that it came rapidly towards him from the north-east, not perpendicularly but *obliquely*, appearing about the size of a cricket-ball; and that, expecting it would strike him, he instinctively lowered his head to avoid it. By reference to a meteorological register kept here by my friend Mr. Masters, I find that the day had been foggy, with the wind in the north; and that the barometer was unusually high, being at 10 A.M. 30·9, and at 10 P.M. 30·8; the thermometer being at the same times respectively 43° and 26°. There was nothing like thunder in the atmosphere at the time mentioned.

The stone weighed 2 lb. 5 oz., having all the characters of a meteorite, being covered with a thin ferruginous crust, and composed of a greyish friable matter, interspersed with slender veins of iron, and granular metallic particles, highly magnetic. It appears to contain nickel, which has long been considered the constant associate of iron in meteoric productions; but my examination has not satisfied me that chromium exists in it, which Dr. Ure states, on the authority of some recent experiments, to be the *characteristic* ingredient of these bodies. I send you, however, a small fragment of the stone to authenticate my communication; which, if you please, you may put into the hands of Mr. Farraday, or some

other competent person, for minute analysis, and for confirmation of its celestial origin. The stone itself is now in the possession of the Rev. Dr. Lee of Hartwell House, near Aylesbury. Had I been so fortunate as to have obtained it, I should have deposited it in the Ashmolean Museum at Oxford, as being a *county* curiosity, worthy of a place in that valuable, and *now* scientifically arranged, collection.

There has been great diversity of opinion among scientific men as to the origin of these bodies, whose reality is placed beyond doubt by historical records, competently authenticated, in almost every part of the globe. By some they have been supposed to be ejected from volcanoes on the earth or in the moon; and it has been estimated that, if impelled from the moon at the rate of a mile and a half in a second, which is about three times the velocity of a cannon ball, they would be driven beyond the sphere of her attraction, and enter our atmosphere in about two days, with a velocity of about 25,000 feet in a second. Their ignition is accounted for on this hypothesis, by supposing that sufficient heat would be generated by their rapid passage through our atmosphere, or by regarding them as combustible bodies ignited by mere contact of air.

Dr. Brewster, who regards them as having a common origin with the four new planets, Ceres, Pallas, Juno, and Vesta, states that they are fragments of a planet formerly existing between the orbits of Jupiter and Mars. He says: "When the cohesion was overcome by the action of explosive force, a number of little masses, detached along with the greater masses, would, on account of their smallness, be projected with very great velocity; and, being thrown beyond the attraction of the larger fragments, might fall to the Earth when Mars happened to be in the remote part of his orbit. The central parts of the original planet being kept in a state of high compression by the superincumbent weight, and this compressing force being removed by the destruction of the body, a number of smaller fragments might be detached from the larger masses by a force similar to the first. These fragments will evidently be thrown off with the greatest velocity, and will always be separated from those parts which formed the *central* portion of the primitive planet. The detached fragments, therefore, which are projected beyond the attraction of the larger masses, must always have been torn from the central parts of the original body; and it is capable of demonstration, that the superficial or stratified parts of the planet could never be projected from the fragments which they accompany.

"When the portions which are thus detached arrive within the sphere of the Earth's attraction, they may revolve round that body at different distances, and may fall upon its surface in consequence of a diminution of their centrifugal force; or, being struck by the electric fluid, they may be precipitated on the Earth, and exhibit all the phenomena which usually accompany the descent of meteoric stones. Hence we perceive the reason why the fall of these bodies is sometimes attended with explosions, and sometimes not; and why they generally fall *obliquely*, and sometimes *horizontally;* a direction which they never could assume if they descended from a state of rest in the atmosphere, or had been projected from volcanoes on the surface of the earth."

I do not presume to determine the question, but it requires no great stretch of credulity or imagination to attribute their formation to the *transmuting* powers of electricity, without travelling out of our own orbit for a solution of the difficulty. In the great laboratory of the atmosphere, electricity being the chemist, changes *may possibly* occur attended by the formation of iron and other metals from the consolidation of simple elementary substances; and this conjecture is strengthened by the fact of the uniform connection of meteoric phenomena with electro-magnetism; and of the remarkable coincidence that no other metals are found in meteoric stones but those four only which possess the magnetic virtue, viz. iron, nickel, chromium, and cobalt. When we see the elements of potash newly arranged by the galvanic battery, and assuming the metallic form and qualities of potassium, can we doubt the possibility of more astonishing productions being formed with the great battery of Nature?

I am, Sir, yours, &c.

Buckingham, May 28. 1830. WILLIAM STOWE.

THE portion of the stone received was operated on by Dr. Turner, Professor of Chemistry in the London University, who could not detect in it either nickel or chromium, owing, as the professor observes, "rather to the minute quantity of stone operated upon, than to the total absence of these metals."—*Cond.*

PART II.

COLLECTANEA.

ART. I. *Zoology.*

REMARKABLE Physiological Fact. — A spaniel bitch, belonging to Mr. Robert Scholer of Cheatham Hill, near Manchester, is at present occupied in bringing up a kitten and a fawn of the fallow deer, which she attends to as assiduously as if they were her own offspring. Instances of animals deprived of their young attaching themselves to the progeny of other species endowed with physical and mental powers differing widely from their own, are of frequent occurrence; and the warmth of affection usually manifested towards the nurslings on such occasions, proves how deeply the parental feelings are implanted in the inferior orders of animated beings. I have known the domestic cat, for example, take charge of young squirrels and young hares, which, but for the powerful influence of this active principle, would, in all probability, have fallen victims to feline voracity. But what renders the case before us peculiarly interesting to the physiologist is the fact, that the bitch, which is only about fourteen months old, has never had whelps; the secretion of milk in her teats, therefore, can only be attributed to the excitation induced by the repeated efforts of the kitten and fawn to derive sustenance from that source. The fawn has increased in growth so rapidly, that it is now considerably larger than its foster mother. — *J. Blackwall. Crumpsall Hall, Sept.* 30. 1830.

Church-going Dogs. — The shepherd's dog is one of the most intelligent and useful of the canine race; he is a constant attendant on his master, and never leaves him except in the performance of his duty. In some districts of Scotland this animal always accompanies him to church; some of them are even more regular attendants than their masters, for they never fail resorting thither, unless employed in tending their charge. It may easily be supposed that, to a stranger visiting one of the churches in the pasture district, their appearance there will excite considerable interest. The first time I happened to be placed in that situation I was not a little astonished to see with what propriety they conducted themselves throughout the greater part of the time we were in church; but towards the close one of the dogs began to show some anxiety to get away, when his master, for this unmannerly conduct, very unceremoniously gave him a kick, which caused him to howl, and break the peace of the assembly, and, to add to his distress, some of his fellow dogs attacked him, as dogs are wont to do when they hear one of their species howl. The quarrel now became so alarming that the precentor was forced to leave his seat, and use his authority in restoring the peace; which was done by means of a few kicks. All the time of this disturbance the minister seemed very little discomfited, continuing his preaching without intermission, which showed that such were not rare occurrences.

In one parish great complaints were made against the disturbances occasioned during divine service by the quarrelling, or otherwise unmannerly conduct, of the dogs, when it was agreed that all those who had dogs should

confine them, and not allow them to come to church. This did very well for the first Sunday or so; but the dogs not at all relishing to be locked up on a day when they were wont to enjoy themselves, were never to be found on the Sunday mornings to be tied up; they, by some instinct which I cannot explain, knew the Sunday as well as their masters, and set off before them whither they had been in the habit of going on that day.

It was now evident to the members of the congregation that this plan would not do, and another scheme was laid before them, which was, to erect a house close to the church, in which they might be confined during divine service. This was adopted, and a kennel was according erected, in which the dogs were imprisoned; but the animals being more accustomed to freedom than to confinement, took very ill with the restraint put upon their liberty, and set up a most dreadful howling, to the great annoyance of the people in the church. They however persevered in confining them for a considerable time, thinking the animals would get accustomed to their incarceration: but in this they were mistaken; for, instead of the howling diminishing, it got worse and worse. So it was agreed they should again be set at liberty and have freedom of access to the place of public worship; but their manners had been so corrupted that they were with difficulty restored even to their former discipline. — *J. M. Edinburgh, April* 8. 1830.

Hares taking the Water. — Havergate Island, in the river Ore, is about a mile in circumference. It is every where surrounded by salt water, the depth of which at low tide is from 20 to 27 ft., the width at the same time being 160 yards. The opposite shore to the east is the shingle bank of the North Weir, thrown up by the sea in the same way as the Chesil Bank of the Isle of Portland, being only eighty yards across, and beyond which is the German Ocean. Havergate is situated exactly as an island would be in the Fleet behind the Chesil. When I was there in the spring of 1828, with Henry Edwards, Esq., of Wood Hall, Sutton, the proprietor of the island, I was surprised to find such an abundance of hares. In so small a space I never saw so many. The island, which was composed of London clay, was then being ploughed up for wheat; and from the furrows, and from amongst the broken lumps of clay, the hares rose every few yards. On enquiring how they came there, I was told by Mr. Edwards that they swam over from the Orford side, coming down from the preserves of the Marquess of Hertford at Sudborne Hall, and Gedgrave, between which and the Ore is a high sea-wall, like that which surrounds the island. The steward, who lives in the island, and who, besides his family is the sole inhabitant, confirmed the observation, and stated that he had frequently seen the hares swimming to and from the Gedgrave shore in the morning and evening. What induces the hares to leave the snug covers on the main land, save that love of crossing the salt water which seems indigenous to every English animal, I cannot say; but the fact is beyond denial, and they who doubt the emigration-fancies of the hare need only go to Havergate Island to be convinced.

Not being a fox-hunting or hare-coursing parson, I know little about game; but I shall add an anecdote which I have from a neighbour who has seen as many hair-breadth escapes as most gentlemen of his profession. If the Nimrods of the Natural History Magazine think it beneath notice, they must have pity on my admiration of the skill of a little animal which has too hastily furnished a proverb for brainless people. My friend says, he was coursing last year, when a hare closely pressed passed under a gate, the dogs following by leaping over it; as soon as they had cleared the gate and come up with her, she doubled, and returned under the gate as before, the dogs following over it: and this flirtation continued backwards and forwards, till the dogs were fairly tired of the amusement, and puss, taking advantage of their fatigue, quietly stole away. This was being hare-brained

to some purpose. I had before heard of a hare which, being closely pursued to the brink of a river, turned exactly on the brink, and escaped, whilst the dogs, who could not stop themselves, were precipitated into the water, to the edification of the clever fugitive. If these notes are worth preserving, you know what to do with them. As a friend to such ingenious creatures as these anecdotes prove hares to be, I wish I had power to abolish the babyish amusement of hare-hunting. It is cruelty without a sufficient extenuation. Whilst there are foxes, why cannot our sportsmen be content to harry them? — *W. B. Clarke. East Bergholt, Suffolk, Sept.* 16. 1830.

The Song of the Missel Thrush. — Sir, I trouble you with the following remarks, unimportant as they may seem in themselves, under the idea that your correspondent J. B. (Vol. II. p. p. 123.) may be glad to have the testimony of other observers in confirmation of his own opinion respecting the song of the missel thrush (*Túrdus viscívorus*). The bird is undoubtedly "to be classed among the number of our songsters," and, when he sings his best, is far from a contemptible musician. Its ordinary song is frequently to be heard in the winter and early spring. I am surprised, therefore, to find the excellent author of *The Journal of a Naturalist* stating that "it seems to have no song, no voice, but a harsh predictive note." Bewick says that it "begins to sing early, often on the turn of the year, in blowing stormy weather; whence, in some places, it is called the 'storm cock.'" But besides its ordinary song, which I conceive to be what is described by J. B. as "consisting of only three or four notes, which it continues to repeat over and over again, for perhaps half an hour together, with scarcely any variation, pausing for a second between every stave, till the ear is almost wearied with its monotony," — besides this song, which we are in the habit of hearing every year, the bird occasionally favours us with another and far superior performance, as I ascertained in the following manner: — Some years ago, in the spring, my attention was arrested day after day by the song of a bird near my residence, which I supposed to be that of a blackbird, as it more nearly resembled the note of that bird than any other. Though like the blackbird's, however, the song was more continuous, and had obviously something very peculiar and unusual belonging to it. The bird attracted notice in the family, and was known among us by the appellation of "the strange blackbird." Whether we considered it as a travelled individual, endowed with accomplishments above its fellows, I will not take upon me, at this distance of time, to say; but it occurred to me, I recollect, that in all probability it was a blackbird that had escaped from a cage, and, having been reared in confinement, had acquired, under this artificial education, something more than its usual notes. Wishing to ascertain the point, I resolved, if possible, to get a sight of the bird itself; which, to my surprise, turned out to be, not the blackbird, as I had supposed, but the missel thrush. If I recollect right, the song continued to be heard about the premises till the summer was far advanced.

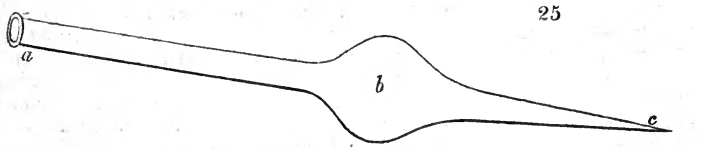
It seems to be generally supposed that this species has acquired the name of "storm thrush," or "storm cock," from the circumstance of its singing in showery blowing weather, as stated by Bewick, in the passage above cited, and other writers.* But may not the appellation have also been given in reference to the quarrelsome, contentious, stormy disposition of the bird? "In severe weather it approaches our plantations and shrubberies, to feed on the berry of the mistletoe, the ivy, or the scarlet fruit of the holly or the yew; and should the redwing or the fieldfare pre-

* "The approach of a sleety snow-storm, following a deceitful gleam in spring, is always announced to us by the loud untuneful voice of the missel thrush (*Túrdus viscívorus*), as it takes its stand on some tall tree, like an enchanter calling up the gale." (*Journal of a Naturalist*, p. 247. 1st edit.)

sume to partake of these with it, we are sure to hear its voice in chattering and contention with the intruders, until it drives them from the place," &c. (See *Journal of a Naturalist.*) I can vouch for the accuracy of this statement, and have been much amused in watching the storm thrush take up its station on some tree near to a favourite holly bush, to guard it from the depredations of other birds, which on their approach it immediately attacks, chattering and screaming, chasing them to a distance, and striking at them in the air "with hawk-like fury." The actions, indeed, of the storm thrush, while darting at the intruders and pursuing them on the wing, very much resemble those of a hawk. — *W. T. Bree. Allesley Rectory, March* 29.

To blow Eggs for Preservation in Cabinets. — The eggs in my collection are all blown with one hole at the side, and so small as to be scarcely perceptible. I use a pipe, which I had made for the purpose, and have here given you a figure of it, with the method of using it, which may perhaps prove interesting to some of your readers who are fond of this pursuit. (*fig.* 25.) The method of blowing them is this: — Make a small pin-

25



hole at the side of the egg, large enough to admit the point of the pipe, which is represented at *c*, one sixth part of an inch; then apply your mouth to the entrance of the pipe *a*, and suck as hard as you can, when immediately the contents of the egg rise, and are lodged in the ball of the tube *b*, without proceeding higher towards the mouth. Next blow the contents down the pipe into a basin or whatever you may have to receive it, and suck a little clean water up into the ball, and blow it into the egg; shake the egg in your hand for about a minute, and, applying the point of the tube, withdraw the water, which leaves the egg perfectly clean. — *An Observer of Nature, Aug.* 14. 1830.

A new Mode of examining Birds, &c. — Having long felt an abhorrence at taking away the life of any of the brute creation, either for mere pleasure or for self-improvement in natural history, I have derived much delight from the use of a good pocket telescope, magnifying about thirty times, whilst exploring the recesses of our forest for the various species of the feathered tribe with which it abounds. By this means, instead of levelling the deadly fowling-piece at the pretty songster, I direct upon him my quiet *vivifying* tube; and thus the living specimen, sporting in all its native character (perhaps quite heedless of its inspector, at a distance of thirty, sixty, or ninety yards), is brought within a visual range of one, two, or three yards of my eye. I have in this way often had an excellent view of the redstart and other shy birds; the green woodpecker (*Pícus víridis*), attacking the tough bark; the nightingale, putting forth its sweet peal of notes, her throat at the time appearing convulsed to an extraordinary degree; the hawk tribe, and many other birds, including water-fowl, have afforded me many an interesting spectacle. Being a warm friend to humanity, I may add, that I hope my practice of "fowling" will find many advocates. — *A. B. Epping Forest, April,* 1830.

Land Birds met with at Sea, on a Voyage from England to South America, in the Years 1824–5. The latitude and longitude are also given. — 1824. *Oct.* 11. A pyefinch (*Fringílla cœlebs*) flew on board; weather stormy, Bay of Biscay, lat. 48° 33′ north, long. 7° 50′ west. Several snipes were seen the same day. — *Oct.* 13. A skylark (*Alaúda arvénsis*) was caught; weather stormy, lat. 45° 4′ north, long. 10° 10′ west. — *Oct.* 14. A

goldfinch (*Fringílla Carduèlis*) was caught in the rigging; this and the two former soon died from exhaustion; at the same time a small white owl flew round the vessel, but did not settle on board; lat. 44° 1′ north, long. 11° 19′ west; wind brisk, our nearest distance from land, Cape Finisterre, 120 miles. — *Oct.* 27. A hawk was seen flying about the ship, but did not settle; distance from the Canary Islands, the nearest land, 250 miles. — *Oct.* 29. In the morning a single swallow was seen flying about the vessel, and frequently settling; it was joined soon afterwards by another, and both continued with us the whole day; lat. 23° 11′ north, long. 23° 13′ west. — *Oct.* 30. Swallows and martens in great numbers about the vessel; they were easily captured by the sailors, as they flew close to the deck in search of flies; they appeared to be more in want of food than tired; lat. 41° 47′ north, long. 25° 58′ west. — *Oct.* 31. Swallows and martens still continue with us in great numbers, and were seen several successive days apparently on a south-west course; a hen redstart (*Motacílla Phœnicùrus*) was also observed about the ship, it continued with us several days, and used to come into the ports of the after gun-room to be fed, food being purposely placed there for it; lat. 19° 54′ north, long. 25° west. — *Nov.* 3. Swallows still with us. — *Nov.* 4. The spotted gallinule (Rállus *Porzàna*) was caught on deck; lat. 8° 2′ north, long. 25° 37′ west. — *Nov.* 7. A fine female kestrel hawk (Fálco *Tinnúnculus*) was captured in the rigging; it was preserved in a cage for some days, but afterwards contrived to escape, and flew off; lat. 8° 2′ north, long. 24° 40′ west; 420 miles from land. It is remarkable that all the above-named are British; they were verified by a reference to *Bewick's Birds.* — *Nov.* 21. A small bat, or large dark-coloured moth, was seen flying about the top of the rigging, but soon left us; we were 300 miles from the nearest point of South America. —*Nov.* 23. A Brazilian land bird (*Córvus dùbius Linn.*) settled on board; lat. 22° 46′ south, long. 37° 42′ west; about 330 miles from Rio Janeiro. — *Dec.* 30. The *Fringílla austràlis* (a small bird common in all the lower parts of South America) flew on board: we were at the time exactly 37 miles south of Staten Land, with a northerly breeze. — 1825. *Sept.* 28. A small humming-bird flew round the vessel, but it did not settle on board; we were at the time about 10 miles from land, off the coast of Chile, opposite Conception.

It may be remarked that, though so many land birds were seen on the passage out, not one was met with on the return. I found swallows both at Rio Janeiro and Valparaiso; at the latter place rearing their young. The *Hirúndo úrbica*, or marten, I also found at Valparaiso and in other parts of Chile. — *Andrew Bloxam. Glenfield, near Leicester, March*, 1830.

The Swallow and the Stoat. — In the fine brilliant afternoon of the 17th of last May I was walking through a retired village lane, when a stoat (*Mustèla ermínea*) issued from the hedge, and placed himself in the path a few yards before me. A swallow (*Hirúndo rústica*), which was winging its airy circles just by, immediately perceived the little intruder upon "broad-eyed garish day," and, what I should have conceived completely contrary to its nature, pounced upon him, and straightway forced him to retire to his hiding-place. In a minute afterwards, however, the stoat again appeared; when the bird, having taken another round in the air, again obliged him to retreat. This was repeated four several times; and to my eye it appeared that once the stoat was actually assaulted by the swallow; but in this I am inclined to think I must have been mistaken. At length, however, tired of the gambols of the frolicksome bird, the little quadruped, which in all probability under other circumstances would have made a hearty meal of his audacious prey, disappeared in the hedge, and I saw no more of him. — *G. M. Lynn Regis, Dec.* 1. 1830.

Peregrine Falcon. — A fine female peregrine was taken by the warrener of G. Gardiner, Esq., of Thetford, on the 15th of October, 1829. The falcon had probably escaped from Colonel Wilson's of Didlington Hall,

Norfolk, during the hawking season, as its jesses were on when taken, and were not much worn. The warrener observed the hawk pursuing a stock-dove with astonishing rapidity over the open part of the warren. The dove, to evade the stoop of the falcon, darted down to a rabbit burrow; but so close was her pursuer that both were caught in a large trap set for rabbits at the entrance of the hole. The bird is now in my possession. — *J. D. Hoy. Stoke Nayland, March* 26. 1830.

The Cuckoo. — I once heard the cuckoo's note (*Cùculus canòrus*) at midnight. This occurred some years ago, as I was coming from Castleton to Douglas in the Isle of Man. It was moonlight, and I enjoyed a delightful walk *en solitaire*, my reveries being frequently interrupted by this interesting note, unusual, if I mistake not, for the "witching hour." — *J. Murray. Carmarthen, April* 2. 1830.

A new Species of Marten. — The following is a description of a short-tailed marten, which I believe has not before been noticed in any zoological work: — Marten, *Á*pus. Length, 4¾ in.; breadth, 14 in.; bill dusky; iris dark brown; chin white; forehead and fore part of the eyebrow light brown mixed with white; rump and corresponding parts of the sides white; all the rest of the plumage blackish mouse-colour, with an obscure greenish gloss; the primary and secondary quills, except the three outer, having narrow light tips; the wing curves considerably, and measures 5¼ in. from the bend to the tip, reaching 1 in. beyond the tail, which is even when expanded, and very short, being scarcely more than half an inch in length; feet black; tarsi short and feathered; foretoes directed forward; claws black, strong, and much hooked; the feathers of the spurious wing are remarkably large, the outer one being more than 1¼ in. in length; the under tail-coverts are of a bluish mouse-colour. This marten is a common bird in Southern India, and does not at all differ in its habits from the black marten or swift of Europe. It is not described in Griffith's *Animal Kingdom;* and has not the forked tail which is assigned to the family by Cuvier's remark in the text, that "the martens (*Á*pus) have the tail forked," and that of the writer in the Supplement, who says the same thing. Yours, &c. — *A Subscriber. March* 23. 1830.

Torpidity of Frogs. — On the 24th of December, 1829, as I was looking at some men digging clay for brickmaking, part of the bank which they had undermined gave way, and exposed a small cavity near the surface, in which were five toads, two frogs, one large yellow-bellied water newt, and two large black shell-less snails. I was very much surprised at the odd assemblage of reptiles choosing their winter quarters together. In consequence of the irregular falling of the clay, I could not find the aperture by which they had got in. They all of them moved, the frogs most; though at that time the snow lay thick, and we had some severe frosts for a week before. — *Scólopax rusticola. Chilwell, near Nottingham, Aug.* 30. 1830.

Snakes taking the Water. — Several notices having appeared in your Magazine relative to the fact of snakes occasionally taking the water (Vol. I. p. 397., and Vol. III. p. 450.), I beg to state that it is by no means an uncommon circumstance. I have myself repeatedly seen a snake, on being surprised, take to the water, and appear quite at home in that element, moving rapidly through it, either diving beneath or gliding above the surface; in the latter case, with the head somewhat erect. I apprehend that this reptile will take the water for security on being surprised (as above stated), or for convenience to transport itself from one side to the other; or, perhaps, occasionally for the sake of food.* Hence I conclude it is,

* This suggestion seems to receive support from the curious fact, communicated by your correspondent Mr. Murray, of an adder having seized the artificial fly of an angler.

that we not unfrequently hear of *water snakes*, the vulgar error being that there is in this country a *distinct species* which frequents that element. A friend of mine, walking by the side of a pit, once surprised a large snake, which, on being alarmed, immediately took to the water; though in so doing, with a view to avoid a perhaps imaginary danger, he incurred a real one: for the reptile had not proceeded far in his watery excursion when a pike was observed to strike at and seize him, and no doubt devoured him, as he was seen no more. That snakes also are ready to make reprisals, and prey upon fish, I am induced to believe from the circumstance of having once myself seen a small snake taken out of the water, with a young pike scarce half swallowed in his throat, the larger portion of the fish protruding out of the snake's mouth. Both the animals were dead; the snake, it would appear, having been choked in consequence of the size of the fish, which was evidently too large to admit of being swallowed. In the foregoing remarks I confine myself entirely to the common species, *Cóluber Natrix*. I am, Sir, &c. — *W. T. Bree. Allesley Rectory, Sept.* 20. 1830.

Voice of Fishes. — We can scarcely deny this faculty to fish. In addition to what Mr. Thompson has remarked (Vol. III. p. 147.), I may observe, that, when the herring is just caught in the net, and brought into the boat, it utters a shrill cry like a mouse; and I have often heard the long-continued "grunting," or croaking, of the gurnard after being freed from the hook. — *J. Murray. Carmarthen, April* 2. 1830.

Foreign Insects. — Every entomologist must hail with pleasure the indications of the spread of his favourite science, afforded by the great increase of Continental insect collectors within these few years. On a late excursion to the celebrated Valley of Chamouni, on entering the apartment of two young entomologists my companions, soon after our arrival, I was not a little surprised to find them surrounded with a levee of six Savoyard boys, from the age of fifteen down to that of eight, each with a large collecting-box fullof insects in his hands, and bargains for rare Alpine butterflies and moths rapidly going on. What I could not at first comprehend was, how the seller and buyer had so soon got scent of each other; but, on enquiry, the former explained the mystery by saying that they had introduced themselves to the young messieurs, knowing, from the insect nets which they saw taken out of the carriage, that they must be *papillonists*. These boys sell in the course of the year many thousand insects, partly to strangers and partly to more considerable insect dealers of maturer age on the spot, with three of whom we subsequently made acquaintance, and purchased many rarities from them. One of these insect dealers on a larger scale, whom we had previously met with on our journey from Italy, Michel Bossonney, at Martigni in the Vallais, told us that he last year sold 7000 insects. It is needless to point out the advantages of this new traffic, both to the individuals engaged in it and to the science in every way. *Sphínx* (Deiléphila) hippóphaes, formerly sold at 60 francs each, and of which one of the first-discovered specimens was sold for 200 francs, is now so plentiful, in consequence of the numbers collected and bred by the peasants all along the course of the Arve, where *Hippóphae rhamnöides* grows in profusion, that a specimen costs but 3 francs: and a general taste for the science is spread by the more striking Alpine species, such as Parnássius Apóllo and Calichròma alpìna, which are often bought for their beauty by travellers who have before hardly deigned to look at an insect.

The above remarks may serve as an introduction to a list which I send, for your Magazine, of some of the more interesting species of Lepidóptera, which can be furnished by M. Prévost Duval of Geneva, a highly respectable entomologist, who also sells insects; whose insects, as to beauty and preparation of the specimens, especially of the minute *Tíneæ* and Tórtrices, and smaller Coleóptera, are the *ne plus ultra* of perfection; and whom I can

strongly recommend, as sure to execute any commissions entrusted to him, in the most exact and honourable manner.

	Price in francs of France.		Francs.		Francs.
Charáxes Iásius	8	Hippárchia Batzèba	2	Calýptra thalictri	7
Parnássius Phœbus	2	Psyche	2	Plúsia divérgens	2
Apollo	1	Lycæna Therètes	3	ain	3
Melitæa Cynthia	2	Górdius	2	Amphipyra spéctrum	2
Argynnis Amathàsia	2	Hière	2	Deiléphila hippóphaes	3
Pàles	1	Póntia Euphène	2	Vespertílio	5
Hippárchia Stygne	4	Ausònia	1½	Macroglóssa œnothèræ	2
Clèo	1	Bèlia	1	Eyprepìa pudìca	3
Aéllo	3	Còlias Cleopàtra	2	gratiòsa	3
Mnéstia	2	Palæne	1½	plantáginis	1½
Fidia	1½	Phicomòne	1½	Zygæna lavándulæ	1
Actèa	2	Philómene	2½	infaústa	1½

Besides the above, M. Prévost Duval can supply upwards of 600 species of Lepidóptera, and as many Coleóptera, of the Swiss Alps, the south of France, and Germany, at prices varying from 1 to 15 francs each, according to their rarity, of all which he will send lists on application. His address is, M. Auguste Prévost Duval, Geneva. — *W. S. Geneva, Aug.* 27. 1830.

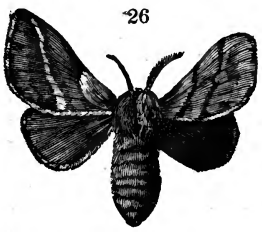
A humane Method of depriving Insects, intended for Specimens, of Life. — In a bottle, which I should recommend to be made with a wide mouth, for the purpose of more easy introduction of the larger species, put a quantity of common smelling-salts. In a few minutes after the insect is confined in this bottle its death will ensue. — *J. Reed. Bridgewater, Nov.* 25. 1830.

Killing large Insects. — As many of your young entomological readers may have found equal difficulty with myself in ascertaining the readiest method of killing the larger moths when captured, I trust you will excuse my troubling you with the following remarks for insertion in your excellent Magazine. In the *Journal of a Naturalist*, prussic acid is suggested; but that is not only very expensive, but a most dangerous thing to have any dealings with. I have tried hot water, steam, hot needles, ether, sulphur, aquafortis, &c., but found none so decidedly effective as *oxalic acid*, which I thus apply: — First shape a nice small quill into the form of a very sharp-pointed blind pen (i. e. a pen without split); then seize your moth with the finger and thumb between the wings on the under side, holding it with its head towards you, firmly but with as little pressure as possible. Then dip your pen-shaped quill into the acid, and run it into its thorax, just below the head, or between the first pair of legs; and, after two or three quick applications, the moth will be found perfectly dead. This is not only the most humane and expeditious, but very economical, as two-pence worth of acid would be sufficient to destroy subjects to fill a whole cabinet. As I am writing for the information of your young friends, I may be excused adding that oxalic acid, when purchased at the druggist's, is in the form of crystals; it must, therefore, be reduced to a liquid by a little water. I am, Sir, &c. — *An Entomological Amateur. London, July* 21. 1830.

A Battle of Ants. — On the 16th of last May, I was walking in the garden before breakfast, when my attention was attracted by an unusual assemblage of ants in the gravel-walk; the species, I believe, was that of which Huber, in his *History of Ants*, has given a representation, and is called by him *F*ormìca fúsca. On a closer examination I found they were fighting; they were collected in groups of forty or fifty, running rapidly about, and then stopping and pulling each other with their mandibles. The field of battle did not extend over a surface of more than 3 ft. square, and there were probably five or six groups all eagerly contending with each other. After watching them with much attention for about half an hour, I was called in to breakfast; and on returning, after a lapse of twenty minutes, the battle was still raging. How long the conflict lasted I am unable to say; for when I first saw them they evidently had been some time engaged in

their deadly game, and I was compelled to leave them before the battle was over. I however visited the spot again, about one o'clock, and they were then busily employed in removing their slain comrades. I counted about thirty dead ants on the field; more, probably, had fallen, as doubtless many had been removed before my return. In one small spot, of not more than an inch square, seven dead ants were extended. Their courage is very extraordinary; for in several instances, with such fury and obstinacy had these little warriors contended, that two might be perceived locked in each other's embraces, having died in this their last mortal struggle. We have all read of the battles of ants, but as far as my enquiries have extended, I believe but few have witnessed their combats. I have observed ants for many years, but, with this exception, never saw any thing like hostility among them. Some of your readers may be pleased with this account from an eye-witness. Your constant reader — *O. July* 10. 1830.

A hermaphrodite Bómbyx castrénsis.— The following is an extract from a letter which we have received from M. Prévost Duval, a celebrated entomologist of Geneva, mentioned in the preceding page by a much-valued correspondent: — "Mr. S. has seen in my collection a very curious lepidopterous insect; it is a hermaphrodite *Bómbyx* castrénsis, captured by me in July, 1829. Having reared the caterpillar with a number of others of the same species, I was surprised to find in the same box an individual presenting distinctly the two sexes. Not wishing to deprive it of life, for the purpose of examining whether the sexual organs were perfectly developed, I left it as it was, have it now in my collection, and send you a correct drawing of it (*fig.* 26.) for your Magazine. Not having the honour of being in communication with the Rev. W. Kirby, you will much oblige me by showing the drawing to that gentleman, and stating to him that I shall be happy to enter into correspondence with him, and to exchange the lepidopterous insects of Europe for those of other parts of the world. I am, Sir, &c. — *Auguste Prévost Duval, Membre de la Société Helvétique des Sciences Naturelles. Geneva, Sept.* 7. 1830."


26

We have sent the original letter and the drawing to Mr. Kirby. — *Cond.*

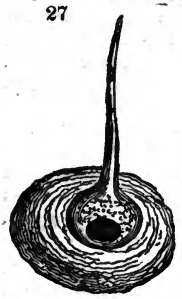
Bómbyx antìqua. — This moth, said by Mr. Samouelle to live in its larva state on the oak, I have never seen in its larva state but on the bramble. This season I took numbers of them on this plant. — Δ. *Barnsley, Oct.* 30. 1829.

Atlas Moth. — It is stated in a Madras paper, that a large moth was caught at Arracan, measuring from tip to tip of the expanded wings 10 inches. One in my cabinet measures upwards of 8½ inches. I have lately had an opportunity of examining some exquisite drawings, by native artists of Malacca, in the possession of the family of the late General Taylor; they seem portraits of the originals. Among the insects are two fac-similes of the Atlas moth of the natural size, measuring *nine* inches. Now it should be remembered that these were rare or singular specimens. — *J. Murray. Carmarthen, April* 2. 1830.

Vèlia rivulòrum and cúrrens. — It is, I believe, a disputed point among entomologists (see *Curtis's British Entomology*, vol. i. fol. 2a.), whether Vèlia cúrrens is the pupa of Ve. rivulòrum. This point is, I think, incontrovertibly decided by the fact that, on the 15th instant, I took two of the Ve. cúrrens in the act of perpetuating their species. I saw no difference between the male and female, except that the latter was larger than the former. I have only met with one specimen of the Ve. rivulòrum here. It appears to me quite distinct.—*A. Wright. Askam Bryan, York, Nov.* 1830.

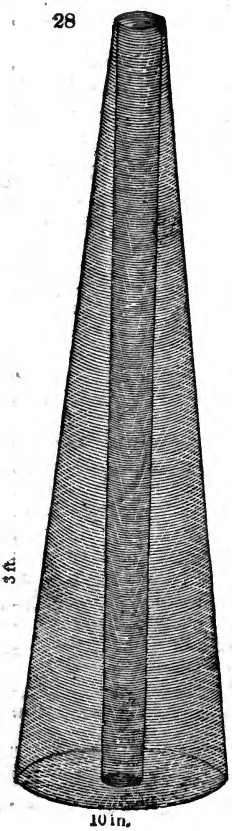
Hydróphilus píceus. — Sir, I am of opinion that the curious floating nest of the Hydróphilus píceus (see *Shaw*, p. 96. vol. vi. p. 1. London 1806) yields in interest to none figured or described in the *Insect Architecture* of the Library of Entertaining Knowledge. It is formed of a web or case of silk, somewhat circular and compressed. This floats at random on the water (*fig.* 27.), and in its turnip-shaped structure repose the ova of the insect. From this floating nest, the larvæ, as soon as they are excluded, plunge into the watery element. The dome terminates in an elongated process, much resembling the central fibre of the previously named root; and while the case itself is white, the horn is more dense, and of a brown colour. I see Mr. Rennie, the writer of *Insect Architecture*, has honoured me with a notice, but certainly couched in terms I can neither admire nor approve. In the second edition of my *Researches and Remarks* (almost, from its novel interest and materials, a new work), it may be seen that the writer, in echoing Mr. Blackwall's opinion, has been premature. — *J. Murray, Feb.* 12. 1830.

27



Spider of Solomon. — In Vol. I. p. 375. reference is made to Dr. Scott's paper on the semamith of Solomon, the original of which I have since read. The Rev. Dr. Harris, who, in his *Natural History of the Bible*, has given an interesting article on this subject, shows the absurdity of translating the word "spider," and adopts the explanation of the learned Bochart, viz. that the animal alluded to was a small lizard. He quotes Bellonius, Pliny, St. Austin, and Sonnini, to prove the great abundance of these reptiles in the houses of the Eastern countries. — *J. M. Philadelphia, Aug.* 1830.

28



Spider's Web.—The following diagram (*fig.* 28.), from a sketch supplied to me by a friend, illustrates the fabric constructed by some species of spider (*Mýgale aviculària*?). It was discovered in the Brazils, in the hedges, a few miles from Rio Janeiro, on the road to the gold mines of Tejuco. The structure was trumpet-shaped, perfectly circular, and three feet in length. A cylindrical gallery, two inches in diameter, traversed this truncated cone from end to end, and preserved its central position by lateral lines of attachment in the form of radii converging toward the central orifice at the greater end of the web, which was 10 in. in diameter. Yours, &c. —*J. Murray. Feb.* 25. 1830.

The Water-Spider. — The saunterer by the marsh ditches in the month of May may frequently observe the dead shells of the marsh snail (Lymnæa palústris) floating, with their mouths upwards, on the surface of the water. Now, why should this be; since, if you throw a dead shell into the water, the chances are ten to one that it sinks to the bottom? Let them be taken, and the reason will soon appear. Each shell will be found tenanted by a water-spider (*Aránea aquática*) with its bag of eggs; and the ingenious inha-

bitant has enclosed the mouth of the shell with a beautiful web, so that it cannot sink, but floats on the surface; and thus the precious charge receives the vivifying powers of the sun, and is hatched into life. The natural history of this little spider is extremely interesting; particularly the mode in which it forms its web under the water. In this it lives, being surrounded by air which shines through the water with a silvery lustre. See Kirby and Spence, and some recent popular works on natural history. —*G. M. Lynn Regis, Dec.* 1. 1830.

Scólytus destrúctor not a Destroyer of healthy Trees.— Sir, Letter A. is a reprint from the *Cambridge Chronicle:* letter B. is a reply I prepared to it, but which the editor, wishing to give time to Mr. Deck's experimental application of the oil of tar, declined to insert. Letter C., which I address to you, includes my subsequent researches on the subject. I am, Sir, &c. —*John Denson, sen.* Waterbeach, near Cambridge, Sept.* 9. 1830.

[A.]

Sir, The sudden decay of some of the elm trees in front of Catherine Hall having much excited the public attention, and given rise to a variety of erroneous opinions respecting its cause, I am induced to offer a few remarks upon this subject (the result of personal observation and experiment), as it is one of deep interest to all who possess woodlands and ornamental plantations. It appears to be a prevailing opinion in the vicinity of Cambridge, that when the roots of a tree penetrate the gault or blue clay, which extends over a large portion of the county, and in geological position lies immediately below the chalk, they cease to derive nourishment, and soon perish; but sufficient satisfactory evidence not having been adduced upon this point, I give no credit to the hypothesis, having in repeated instances found the real source of the evil to proceed from the same cause as in the trees above alluded to, as well as in some which have perished in the plantations of Madingley Park. Their death has been decidedly occasioned by the ravages of a small beetle, of the genus Scólytus, and of the species emphatically termed destrúctor. This insect penetrates the bark till it reaches the alburnum or soft wood. It is in this portion of the tree, and the inner bark or liber contiguous to it, that the vital principle more especially resides; and here the female insect works her way for about two inches, in a direction parallel to the surface, and in her progress deposits numerous eggs. About September these are hatched into the grub or larva state, and from this period the work of destruction commences. The young grubs eat their way into the alburnum and liber, at right angles to the channel formed by the parent insect, and in parallel lines to each other's progress. Thus very considerable patches are totally deprived of vitality; and it will be readily understood that, when a tree has numerous wounds of this nature in a part so important to its functions, the circulation of its sap would be so impeded as to cause its immediate decay. From September to March, by removing a portion of the bark, the larvæ may be found of the size and much resembling the nut maggot; and about the latter end of May the perfect insects begin to make their appearance. These soon eat their way through the bark, and in June and July may be observed busily employed in preparing to deposit a fresh stock of eggs, for the propagation of a new brood of grubs, the harbingers of destruction for the ensuing year. When a tree has perished, they no longer lay their eggs in it, but proceed to those in its immediate vicinity (a remarkable instance of which is exemplified in their ravages at Madingley), which are destroyed with greater facility, as the increase of the species

* Author of *A Peasant's Voice to Landowners*, reviewed in the *Gardener's Magazine* for February, 1831. —*Cond.*

is very rapid, and their numbers compensate for their diminutive size, 80,000 being sometimes found in a single tree.

By carefully examining the bark it may be readily ascertained which trees are infected. The bark will appear perforated with small holes in various parts, and little patches, similar to fine sawdust, will be found upon its rough surface, and at the foot of the tree. This examination should take place whilst the insect is in the larva state, and, if the evil has proceeded far, the tree should be immediately cut down, and every portion of the bark taken off. Even this operation is not sufficient to destroy the enemy: the bark must be burned. But where the tree is only slightly infected, it may be done over with the oil of tar. This, as I have found, will penetrate the bark, and destroy all the larvæ lying towards the surface. April is perhaps the best time of the year for this operation, as the perfect insects are then working their way towards the surface, and will be obliged to eat through the bark freshly imbrued with the liquid. Those healthy trees in the vicinity of the infected, which it is a particular object to preserve, ought likewise to be subjected to the same process, as an effectual preservative against the approaches of the insect. It has been suggested that some mineral poison, as corrosive sublimate, might be advantageously mixed with the oil of tar; but I am not prepared to say whether the tree itself would not be injured by such an ingredient: the experiment has been tried, and the test of experience will alone determine.

Those who may wish for further information respecting the form and characters of this insect will find an elaborate description of it, together with an admirable figure, given by Mr. Curtis in his *Illustrations of British Entomology*, No. 11. fig. 43. There is also an able paper upon its habits, and a detailed account of the destruction it has occasioned among the elms in St. James's Park, published by Mr. M'Leay in the *Edinburgh Philosophical Journal*, 1824, p. 126. Specimens of the insect, and portions of the bark exhibiting its very curious progress, I shall be happy to show, in illustration of these remarks, which are with deference offered, with a view to excite the attention of those interested, and to provoke further enquiry into this highly important subject; and I am more especially inclined to do so, as the pest appears to be widely spreading in this neighbourhood, and, if not timely checked, we may soon expect to see its destructive effects visible in some of the ornamental trees in the justly admired walks of the university; nor will this fear be considered imaginary when it is stated that a similar insect, a few years since, caused such devastation in the Hartz Forest in Germany as threatened to suspend the mining operations of that extensive district. — *I. Deck. Cambridge, Nov.* 6. 1827. (*Cambridge Chronicle*, Nov. 9. 1827.)

[B.]

To Mr. Deck, on the Decay of the Elms in Catherine Hall Grove.

Sir, In reply to your letter in the *Chronicle* of the 9th of November, I am happy to be able to agree with you that gault or blue clay will not destroy elms, as I know healthy elms which grow wholly in blue clay. I must, however, differ from you totally in imputing the death and disease of the trees mentioned to the ravages of the Scólytus destrúctor. The grounds of my dissent are the following: —

1. My cottage stands within a few poles both of a fine elm grove and a wheelwright's timber-yard, and although thousands of the Scólytus destrúctor are annually hatched in this timber-yard, no healthy tree in the contiguous grove has ever been injured by them.

2. The wheelwright himself, familiar enough with the larvæ of the Scólytus, although not by these names, attests that, in stripping the bark off

very recently felled healthy trees, which, though not a usual practice, he has sometimes occasion to do, he has never found any of these larvæ.

3. Wounds made in a healthy tree, equal to those made by the pregnant Scólyti eating their way in to deposit their eggs, will be healed in a single summer; and as the Scólyti perforate in June or July, when the sap, doubtless, is in full circulation, I have scarce a doubt that these perforations would be filled up as fast as they would be made, and the insects themselves drowned for their temerity.

4. Supposing it possible for a healthy tree to be suddenly killed by the perforations of these little insects, that tree would, as a last effort, emit from its roots numerous suckers or shoots; and this process would be effected with such a vigour and tenaciousness of life, as to defy even the pebbly pavement of Catherine Hall grove to resist it: but no such emission of suckers has appeared.

These considerations lead me to exonerate the Scólytus destrúctor of the heavy charge you prefer against it; and to assume that it is guiltless not only of the death of the Catherine Hall trees, but also of every other tree.

The death and disease of the Catherine Hall trees I impute to their insulated condition. The grove is bounded along one side by the foundation of a wall, and a paved walk beyond this wall; at each end by the foundations of houses; and by the flag and pebble pavement of the public street on the remaining side; and further by a pebble pavement all over the surface of the grove between the trees themselves. So that, besides the confinement, and possibly drought, inflicted on their roots, a perpetual trampling is induced over them, and the cheering influence of the sun's rays almost totally excluded from them.

As to the prevalence of the Scólytus in these trees, I consider it but as one instance, in addition to many others already known (and multitudes have yet to be discovered), of an economy surpassing admiration which obtains in nature, and while it admits the disorganisation of beings, provides at the same time for their transmuted reorganisation, through the intervention of appropriate agents. Putrescent flesh (the decomposing organs of animals), by the intervention of carnivorous animals and insects, is again animated, again modified into organs, form, and consciousness. So, in the next lower world of nature,

" See dying vegetables life sustain,"

as the dying elms sustain the Scólytus; and the revivification of dying elms through the agency of the Scólytus I take to be analogous to the reorganisation of animal remains by the agency of the flesh fly.

On my belief in this view I assume that whatever elm or other tree is found to be attacked by Scólyti will exhibit proofs of having been fatally diseased, either wholly or in the part attacked, previously to the date of their attack. That appearances are against this assumption I readily admit, but on close research they will be found to be appearances only. Healthy trees felled in winter will, not unfrequently, through the resources of sap and vitality contained in their vessels, emit from their bark, through the spring and summer succeeding, buds and leaves, and even feeble twigs. In like manner, standing trees, although affected with a disease so mortal, that

" No medicine in the world can do them good,"

will not unfrequently exhibit verdure and other signs of life and vegetation for a season or two before they actually expire. We even occasionally witness instances of trees growing freely in one limb while dying in another. It is these dying branches or dying trees that are the peculiar food of the larvæ of the Scólytus, and therefore the nidi into which the prescient mother takes care to insert her eggs, that, when her offspring shall awake

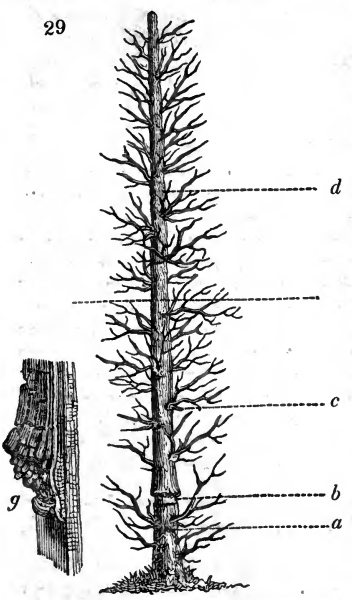
to life, they may be surrounded with the means of sustenance. The perforations made by the pregnant Scólytus in effecting her ingress are performed, as I believe, a short time previous to the death of the part perforated; and because we no not seek the cause of death until that effect has resulted, and in doing so find the Scólytus already in possession of the part, we have too hastily stigmatised this insect as the cause of the death and disease we witness. The Scólytus, in its very office and instincts, is the concomitant of death and disease, but ever as a consequence, never as a cause.

While, however, I so zealously contend that the Scólytus never perforates a healthy living tree, I have the pleasure fully to agree with you that it will never perforate an absolutely dead one. I take the Scólytus to be the first agent in the process of transmutation. By the time its larvæ escape in a winged state from the part into which they were introduced in the egg state, that part is wholly dead, and is never again perforated by the Scólytus. Then succeed other tribes of insects to expedite the process of decomposition or transmutation; and, after a series of species have performed this office, the latter of these become themselves the food of *Scolopéndræ* and other carnivorous insects.

Let us, then, discard our apprehensions, nor longer impugn the Scólytus, hitherto mistakenly called destrúctor, as the lawless destroyer of sylvan magnificence, but, devising for it some more suitable epithet, behold hereafter its joyous revellings with sympathetic pleasure, or at least with indifference. Thanking you for inducing me, by your letter, to express these opinions, I am, Sir, yours, &c. — *John Denson, sen. Waterbeach, near Cambridge, Jan.*, 1828.

[C.]

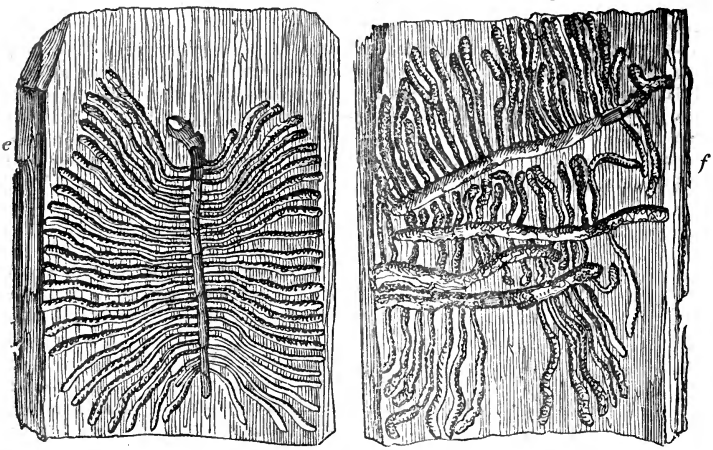
Sir, Pursuantly to writing letter B, I had recourse to experiment to confirm or disprove the opinions there advanced. I selected, the same spring, in my own garden, a healthy young elm, about 18 ft. high and 1 ft. diameter at the surface of the ground. At about 30 in. up the stem, that is, at *b* (*fig.* 29.), I cut out completely round the stem a band or ring of bark, about 4 in. broad, expecting by this act to intercept the passage of the sap to *c d*, and thence to have *c d* in a duly diseased and paralysed state, to be perforated by the Scólytus in June or July; while, by retaining *a* alive, and in a growing state, I should be able to witness whether the insect would attack the live part also or not. Quite contrary to my expectation, *c d* (the tree had been deprived of its head when I adopted it for my experiment) emitted side shoots, and grew as freely through the seasons of growth, both of 1828 and 1829; as *a* itself, evincing indeed on difference either from *a* or other elms standing near, except that the leaves turned yellow somewhat earlier, and fell somewhat sooner. Too impatient to wait longer, early in 1830 from *c d* I cut off *d*, a piece about 9 ft. long, and placed it near the remainder of the tree, and, to my great gratification,



in June *d* was *visited by Scólyti, perforated in many places, and, from the eggs then deposited, now, September 9., teems with larvæ, while a b c did not in June receive a single perforation, and now does not contain a single larva!*

This result satisfies my mind that the Scólytus destrúctor is altogether guiltless of causing the death of healthy growing trees. Those who may agree with me will discover another instance of the harmonies of nature, in the season at which the Scólytus commences perforating, for the purpose of depositing its eggs. This season is June or July; and by June or July the processes of vegetation for the year have always determined and distinguished the healthy growing trees from the sickly and the dying, and have thus demonstrated to the Scólytus the materials most appropriate for hatching, nourishing, and developing her offspring. I have seen insects much like the Scólytus destrúctor in the bark of spruce fir, and in that of the ash and other trees. The track made by the insect which lays its eggs in ash bark is always horizontal, that is, at right angles with the direction of the stem (*fig.* 31. *f*), and larger than that made by the Scólytus destrúctor in elm

30 31



bark (*fig.* 30. *e*), whose track, besides being smaller, is always perpendicular, that is, parallel to the direction of the stem of the tree. Although out of place here, I must not omit to remark that the oil of tar, applied by Mr. Deck, as a preservative, to the Catherine Hall trees, proved inefficacious.

I would notice as a fact in vegetable physiology, that in the tree experimented on (*fig.* 29.), the part immediately above *b* projects over *b* all round, being 26 in. in circumference, while the part immediately below *b* is but 22 in.; this difference is the result of three seasons' growth. The part projecting over *b* exhibits, on its lower side, short pendulous granular excrescences, like incipient roots (*fig.* 29. *g*); and two queries have arisen in my mind respecting it; one, whether this gibbous projection is not partly owing to nutriment absorbed into this newly formed part from the atmosphere; the other, whether the root-like excrescences might not, by the application of a body of moist soil about them, have been developed into actual and effective roots, in the manner that any cutting or layer forms roots, and becomes a distinct plant. I am, Sir, &c. — *J. Denson, sen. Waterbeach, near Cambridge, Sept.* 9. 1830.

In our *Gard. Mag.*, vol. i. pp. 378—382. will be found an interesting article on the charges against the Scólytus, and in our remarks appended to that article we shall be found of our correspondent's opinion. The present

time is a most eligible one for all persons who doubt the accuracy of his conclusions to repeat his experiment. — *Cond.*

The Crab and the Oyster. — An amusing and instructive correspondent in your Magazine (Vol. II. p. 149.), quoting Carreri Gemelli, says, that the oran otang (*Símia Sátyrus*) feeds on a large species of oyster, and that, fearful of inserting his paws between the open valves, lest the oyster should close and crush them, he first places a tolerably large stone within the shell, and then drags out his victim with safety. Now the oran otang is one of those animals to which Locke would have allowed a certain degree of reason, from the superiority of their instincts; but what shall we say of the crab (*Cáncer Pagùrus*), which has generally been considered so much lower in the scale of animated beings, but which, from good authority, is said to make use of the very same contrivance to accomplish the same end? The oyster-dredgers on this coast will tell you that one of their greatest enemies is the crab; and I have been assured by an old dredger, that he had with his own eyes, more than once, seen the crab take a stone in his claw, and insert it between the opened valves of the oyster (*Ostrea edùlis*) before he ventured to seize upon his prey. Another man asserted that, although he had never detected the crab in the act, he had frequently found a stone placed between the emptied shells of the oyster. Surely this must be something more than mere instinct, if instinct be, as it has been defined, "A determination given by Almighty Wisdom to the mind of the brute, to act in such or such a way, upon such or such an occasion, without intelligence, without knowledge of good or ill, or without knowing for what end or purpose he acts." — *G. M. Lynn Regis, Dec.* 1. 1830.

Art. II. *Botany.*

Absorption by the Roots of Plants. — In the *Bulletin Universel*, M. Weigmann has charged me with denying the power of absorption to the roots, and has mentioned a numerous series of experiments in refutation of this supposed opinion of mine. Now, M. Weigmann has all the time been fighting with a phantom of his own creation. About twelve years ago I made some experiments on the fibres of bulbous roots grown in distilled water, such as the hyacinth, Persian iris, and narcissus, and found that such water was saturated with carbonic acid gas, though altogether excluded from atmospheric air. All the inference that I drew thence was merely this, that though the roots might absorb the requisite vegetable pabulum, it was evident that carbonic acid gas was also excreted, and a double current moving in the same channel is a phenomenon by no means incompatible. Even Dutrochet's theory of the circulation of the sap is incomplete without it; for, what becomes of the elaborated excess? — There are egesta in the plant as well as in the animal. About two years ago I put into the hands of my friend P. Neill, Esq., a communication detailing a multitude of experiments on vegetation, with the effects of solutions of lead, arsenic, mercury, copper, iron, &c., with their several fatal results, and the specific periods of time in which vegetation was extinguished. I there prove what has been with M. Weigmann a *work of supererogation.* The respective poisons were found in the stems, &c., of the plant by careful analysis. I requested Mr. Neill to present that paper either to the *Memoirs of the Caledonian Horticultural Society* or the *Transactions of the Wernerian Society*, and presume it has been published long ago. In that paper I mentioned having repeated the late S. Tennant's celebrated experiment with carbonate of magnesia, but with very different results, since *vegetation did take place*, a fact of immense importance to the agricultural interest. On mentioning this circumstance to Professor Jameson, he told me, in corroboration of my views, that farmers in the neighbourhood of Kelso were in the constant habit of using magnesian limestone as manure, and found it as good as any other. — *J. Murray. Carmarthen, April* 2. 1830.

PART III.

MISCELLANEOUS INTELLIGENCE.

ART. I. *Natural History in London.*

THE Zoological Society have commenced printing abstracts of their proceedings, in an octavo form, for distribution among the fellows, in the manner of the Geological Society. The first of these papers, of sixteen pages, now before us, commences with November the 9th, and terminates with the sitting of December the 14th, 1830.

On Nov. 9. *Extracts from the Minutes of Council, July* 21. were read, as follows:—"On a consideration of the advantages likely to accrue to the Society, by cultivating an extensive correspondence on subjects of Natural History; it was resolved, that a committee be appointed, to be entitled 'The Committee of Science and Correspondence,' for the purpose of suggesting and discussing questions and experiments in animal physiology, of exchanging communications with the corresponding members of the Society, of promoting the importation of rare and useful animals, and of receiving and preparing reports upon matters connected with zoology. That the Committee be requested, in the first instance, to prepare a report upon the animals, for the importation of which it is most desirable that the Council should take measures, whether for purposes of utility or exhibition, under the heads of the several countries in which they are produced; and pointing out the means which should be taken for their preservation, either on the passage or after their arrival; and, secondly, to obtain all information possible upon the subject of the importation and breeding of fish."

On Oct. 6. "it was ordered, that the Committee of Science, nominated at the Council of the 21st of July, should be requested to meet at the Society's rooms, at eight o'clock on Tuesday the 9th of November, and on every subsequent second and fourth Tuesday of the month. It was also resolved, that the Committee should have power to add to their numbers; and that the members of the Council should be *ex officio* members of the Committee."

Extract from the Report of the Council, Nov. 4. 1830. "It has been objected to the Council, that but little of their attention has been directed to the advancement of zoological science; and the apology which they have to offer is, that their time has been necessarily devoted to the very complicated and extensive arrangements under which the formation of their present establishments has been begun and accomplished. They have latterly been particularly anxious to place the responsibility of detail upon their salaried officers, so that their own time may be principally applied to more general superintendence, and particularly to the encouragement of scientific researches: they have, therefore, endeavoured to establish meetings of such members of the Society as have principally applied themselves to science; at which, communications upon zoological subjects may be received and discussed, and occasional selections made for the

purpose of publication. They propose from time to time to publish, in the cheapest form, an abstract from the most interesting of these communications; and they trust that the first of these papers will be ready for delivery on the first of January, 1831. They further propose that these meetings shall take place on the second and fourth Tuesdays in every month; and they have invited, for the 9th of November next, such members of the Society as appeared likely, from their scientific pursuits, to take an interest in their views.

"The Council have moreover suggested that letters be sent to the superintendents of the principal menageries in Europe, viz. at Paris, Leyden, Munich, Vienna, Madrid, &c., proposing mutual communication of all observations upon these matters, and an occasional interchange of such animals as may be most easily produced or imported in each country. They have also proposed that circulars be addressed to the corresponding members of the Society, requesting particular information upon such facts of natural history as it may be desirable to investigate at each place: and they further propose that a prize be offered for the essay which shall contain the best and most extensive practical knowledge upon the importation and domestication of foreign animals in this and other countries."

The chairman concluded his address by calling on the members, collectively and individually, to forward the views of the Council, by communicating such facts as might tend to the advancement of zoological science.

A Zoological Garden on the Surrey side of London.—On January 25th, a public meeting was held at the Horns Tavern, Kennington, for the purpose of establishing a zoological institution on the Surrey side of the metropolis, similar to the one already existing in the Regent's Park. It was stated that 10,000*l.* would be required to carry into execution the objects of the meeting; and it was calculated that the expenses of purchasing animals, laying out the ground, buildings, &c., would fall within that sum. The money was proposed to be raised by 400 debentures of 25*l.* each; the annual subscriptions and the admission money received at the doors to form a fund for the payment of interest. Resolutions, declaring the expediency of forming a Zoological Society, and stating the mode in which it was to be managed, having passed, a committee was appointed to carry the above-mentioned objects into effect. (*Examiner*, January 30. 1831.)

We are much gratified to see this attempt to elicit a taste which is inherent in all mankind, and only requires to be called forth by such establishments, and by a little instruction in the different departments of natural history at school. As London increases in extent, and as society improves in knowledge and comforts, institutions of this kind will arise all round the suburbs; or rather they will be distributed at such distances as to be within access of all, perhaps something in the manner suggested by us in our prospective plan for establishing breathing and recreative zones. (*Gard. Mag.*, vol. v. p. 686.) A botanic garden was lately in contemplation at Islington; one will probably soon be arranged north of the Regent's Park; and a mixed garden of botany and festivity, the Panharmonicon Garden, is actually established (*Gard. Mag.*, vol. vi. p. 477.) at Battlebridge.—*Cond.*

Art. II. *Natural History in the English Counties.*

Hitherto the counties in this article have been arranged geographically, following the order of the Circuit Courts, as in the Statistics of the *Ency-*

clopædias of Gardening and Agriculture; with the present Volume we commence an alphabetical arrangement, thinking it will admit of more convenient reference, during the publication of the successive Numbers which form the Volume. When the Volume is completed, the counties can be easily referred to from the General Index.

Bedford.

A General Library and Museum for the County of Bedford are establishing here; and though the museum is yet in its infancy, it contains several hundred specimens of fossils, shells, birds, insects, and vegetables. Our curator, T. M. Nash, Esq., may probably very shortly furnish you with an account of some of the most rare local productions. —*W. H. W. Bedford, Jan.* 12. 1831.

Meteor. — On Friday, the 10th instant, at 8 P. M., a most beautiful meteor appeared just below Benetnasch, in Ursa Major, and took a westerly direction, the wind blowing strong from the west. It appeared about 4 in. in diameter, and was of a very brilliant blue, which gradually faded into a yellowish green as it descended: it disappeared about 10° above the horizon. Its train was about 6° in length, and appeared to be composed of distinct sparks of white light. It continued upwards of three seconds. — *W. H. White. Bedford, Dec.* 14. 1830.

Aurora Borealis, seen four successive nights at Bedford, lat. 52° 8′ 48″ N. long. 2′ 49″ E. — On Saturday, the 11th inst., about 6 P.M., a very bright aurora appeared, which extended from N.W. to N. by E., and had greatly the appearance of strong twilight. The arc increased towards the east till about 11 o'clock, emitting at intervals some very thin columns, or rather flashes, of white light; wind N.W.; freezing hard. Soon after 11 o'clock there arose several wide columns of red light, extending from the magnetic north almost to the east. These were followed, at short intervals, by others; and so varied were they, both as to their magnitude and situation, that the whole of the northern parts of the globe seemed like one dreadful conflagration. Some of the columns reached the pole star, and appeared as if tipped with black smoke. Such, in fact, was their appearance, that several persons felt assured that the incendiaries had been exercising their midnight deeds in several places at the same time. During the most magnificent appearance, α in Lyra appeared near the horizon, calmly twinkling in a clear twilight, while all the stars above were enveloped in red flames. Just before the red flames emanated, a meteor fell perpendicularly towards the earth, just below β in Ursa Major: its train was very short, and it did not continue more than two seconds. Several other small meteors fell during the evening near the Twins, and one in the west. On Sunday, the wind blew a strong gale from the N.W. and was piercingly cold. The evening closed in with an aurora which afforded a powerful light, with very slight coruscations, till half-past 10 o'clock, when an appearance altogether different from that of the preceding evening, but not less beautiful, presented itself. Wind blowing gently from the west. In the N.W. rose huge masses (if I may so term them) of clear white light, which sailed majestically along the horizon to the N., and some of them to N.N.E., where they burst forth into thick white columns of various breadths, which reached above Ursa Major. These masses followed each other at short intervals, and continued for about an hour and a half, when the aurora gradually assumed its calm twilight appearance, and as gradually vanished. On the two following evenings the aurora presented the appearance of the early dawn of a summer's morning. —*W. H. White. Bedford, January* 16. 1831.

Cornwall.

List of rare Plants found in the Neighbourhood of Penzance. — Sir, The county of Cornwall being the most western part of the island, possessing considerable peculiarities of soil and climate, and containing, moreover, very extensive tracts of uncultivated land almost in a primitive state of nature, may be expected to afford some corresponding peculiarities in its native flora. The following list of rare plants, which I observed during a residence of some months chiefly in the neighbourhood of Penzance, may not, perhaps, be unacceptable to some of your readers. In offering it, however, to your notice, I beg to state that I entirely agree with several of your correspondents, that, in some of the lists of rare plants forwarded to you for insertion in your Magazine, articles of very common occurrence have been occasionally introduced, and such as have no claim to be distinguished as rarities; and, perhaps, I have not myself been altogether free from the fault complained of. I promise, therefore, on the present occasion, that the list shall be more select, and, accordingly, shall not include in it many plants which yet might not improperly be ranked *inter rariores*: such, for instance, as Neóttia spiràlis, *O*rchis pyramidàlis, *V*erbáscum nìgrum, *S*mýrnium *O*lusàtrum, Osmúnd*a* regàlis, &c. I have also excluded many maritime plants, such as *G*laúcium flàvum, *C*onvólvulus Soldanélla, *E*ryngium marítimum, *C*rithmum marítimum, Eròdium marítimum, *A*'ster *T*ripòlium, &c.

To those plants which I have never happened to have met with in a native state, except in the county of Cornwall, a double asterisk is affixed, thus (**).

Pinguícula lusitánica. Bogs near Penzance.
Utricularia vulgàris. Between Rosemorran and Kenegie.
**Pánicum *D*áctylon. Beach between Penzance and Marazion.
**Brìza mìnor. Corn fields between Ludgvan and Gulval; plentifully.
**E'xacum filifórme. Marsh between Penzance and Marazion.
Anchùsa officinàlis. St. Ives.
Campánula *h*ederàcea. Moist banks in the neighbourhood of Penzance, &c., Scilly Islands.
**Chirò*nia* littoràlis. Beach between Penzance and Marazion.
Sámolus Valerándi. Land's End.
**Illécebrum verticillàtum. Gear Stamps, Gulval, Land's End.
**Herniària hirsùta. Between Mullyon and the Lizard.
**Daúcus marítimus. Land's End, Logan Stone, Botallach Mine, St. Ives, &c.
**Ligústicum cornubiénse. Near Bodmin.
**Tamarix gállica. St. Michael's Mount, Lizard, Scilly Islands (possibly not truly a native, but introduced).
Drósera longifòlia. Marsh between Penzance and Marazion.
Ornithógalum umbellàtum. Near Marazion.
**Scilla vérna. St. Ives, near Zennor, Morvah, and many other parts of the county.
Rùmex sanguíneus. Gulval.
Alísma *D*amasò*nium*. Between Penzance and Marazion.
**Erìca vàgans. Near the Lizard, Soap Rock, Kinance Cove, and between Kelston and Mullyon (several varieties in colour).
Saponària officinàlis. St. Levan, Tresco Island, Scilly.
Silène ánglica. Corn fields (very common), Scilly Islands.
Arenària vérna. Kinance Cove.
*E*uphórbi*a* portlándica. Brehar Island, Scilly.
** Paràlias. Scilly Islands.
Rùbus saxátilis. Near Bodmin.
Aquilègia vulgàris. St. Ives, Lelant, &c.
Helléborus víridis. Between Rosemorran and Kenegie.
Ménth*a* rotundifòlia. Between Penzance and Newlyn, Whitesand Bay.
Bárts*ia* viscò*sa*. † Bogs near Penzance, &c., frequent; corn fields near Hayle, Scilly Islands.
Antirrhìnum Oróntium. Gubbal, Land's End Brehar Island, Scilly.
**Scrophulària Scorodònia. St. Ives, Gulval, and Chyandour, plentifully; within the ruins of the Abbey, Tresco Island, Scilly.
**Sibthórpi*a* europæ'a. ‡ Moist banks near Penzance, common; Gulval, Maddern Well, Trereife Road-Avenue, Helston, Scilly Islands.

† In a moist wheat field near Hayle I observed this plant growing to the height of between 4 and 5 ft.

‡ As a striking proof of the superior mildness of climate in Cornwall, it may be mentioned that this little plant, a native of the county, is generally killed down to the ground during the winter in a Warwickshire garden.

***Brássica oleràcea.* Cliffs at Penzance.
Geránium sanguíneum. Kinance Cove.
***Genísta pilósa.* Kinance Cove.
Trifólium scábrum. Sea-shore, near Penzance, &c.
Hypéricum Androsæ̀mum. Gulval, Trevayler Bottom, &c.
Inula Helénium. Gulval, St. Michael's Mount, St. Ives, St. Mary's, Scilly.
Pyrèthrum maritimum. Sea-shore, Penzance.
Anthemis nóbilis. Pastures, and near the sea-shore, in many places.
Ruscus aculeàtus. Lamorna Cove, St. Martin's Island, Scilly.
Myrica Gàle. Gulval and Ludgvan.
Aspídium dilatàtum, var. recúrvum. † (*fig.* 32.) Moist banks, frequent.
Asplènium lanceolàtum. Gulval, St. Michael's Mount, Lamorna Cove, &c., frequent.
marinum, St. Michael's Mount, Lamorna Cove, &c., Scilly Islands.
Hymenophýllum tunbridgénse. Among the loose stones at Castle An Dennis, near Penzance.
Díceranum cerviculàtum. Gulval, Scilly Islands.
crispum. St. Mary's, Scilly.
Trichóstomum polyphýllum. Gulval, Land's End, &c.
Neckèra heteromálla. Trevayler Bottom, Try, &c.
Hýpnum scorpioïdes. Gulval, Zennor, Land's End.
***Hookèria lùcens.* Trevayler Bottom, between Rosemorran and Kenegie, &c.

— *W. T. Bree. Allesley Rectory, Jan.* 7. 1830.

Leicestershire.

Plants found in Charnwood Forest (See Vol. III. p. 167.):—

Rosa spinosíssima, Diánthus deltoïdes, and Málva rotundifólia. A rocky knoll near Grooby.
Plantago Coronopus.
Origanum vulgàre.
Arabis Thaliàna.
Brydnia dioïca.
Hypéricum humifúsum.
Ornithopus perpusíllus. Near Grooby Pool.
Nardus stricta. Broombrigg Hill.
Cnicus praténsis. Meadow above Glenfield.
Rhámnus cathárticus. Between Glenfield and Kirby, on the foot-road.
Tormentilla réptans.

—*Andrew Bloxam. Glenfield, near Leicester, March,* 1830.

---

† This fern, I have very little doubt, is really a distinct species; and one which, I believe, has not hitherto been described, at least not as a native of Britain. Although it strikes the eye immediately as being different from Aspídium dilatàtum, it is difficult, I confess, to seize upon those permanent characters by which it is to be distinguished. The minute divisions of the leaflets in Aspídium dilatàtum frequently droop or curl under, while the corresponding parts in the present subject invariably curl back or upwards in an exactly contrary direction (*fig.* 32. *a*, which represents a leaflet magnified), and thus give the whole frond a singularly crisped appearance. But the strongest character by which it may be distinguished from its near ally, consists in the lower pair of pinnæ or leaflets being much larger than the others (which is not the case in A. dilatàtum); so that the frond assumes a deltoid or triangular form, broadest at the base, and tapering to the apex. The fern occurs plentifully in the neighbourhood of Penzance, growing in situations similar to those in which A. dilatàtum is found. I have also met with it in several parts of Ireland, particularly near Killarney; and have received plants of it from the celebrated cryptogamist the late Mr. James Dickson, who procured it from Sussex, and considered it as a distinct species. Like A. dilatàtum, it is a very variable species, the plant differing greatly in size according to the situation in which it grows: on very dry banks I have found perfect fructifying fronds not more than a few inches high.— *W. T. Bree.*

Mosses found in the Spring of 1829, *in the Neighbourhood of Glenfield, and Charnwood Forest:* —

*Sphágnum obtusifólium, and S. acutifólium. Beacon Hill.
*Hýpnum splendens. triquetrum. párum. cuspidátum. proliferum. squarrósum. dendróides. Branston. cordifólium. Shallow pond between Kirby Muxtoe and Newtown Unthank. lóreum. Bardon Hill. sericéum. mollúscum. denticulátum. Swithland slate-pits. plumósum. cupressifórme. adúncum. *Hýpnum breviróstre. prælóngum. rutábulum. *Polýtrichum undulátum. commúne. Sheet Hedges Wood. *juniperínum. Beacon Hill. piliferum and alóides. Grooby. nánum. Newbold Verdun. *Brýum palústre. Beacon Hill. ligulátum. hórnum. cæspititium. turbinátum. Dicranum scopárium. cerviculátum. *taxifólium. Trichóstomum lanuginósum. Swithland slate-pits. Bartrámia pomifórmis. Funária hygrométrica. Grímmia pulvináta. Anictangium ciliátum. Banks of Grooby Pool. Leúcodon sciuróides. Neckéra heteromálla. Gymnóstomum intermédium. Didýmodon purpúreum. Weissia cirráta. Orthótrichum pulchéllum. Tórtula murális. Eucalýpta vulgáris. Marchántia polymórpha. Jungermánnia asplenióides. bidentáta. platyphýlla. Banks of Grooby Pool. complanáta. *amariscina. dilatáta.

— *Andrew Bloxam. Glenfield, near Leicester, March,* 1830.

Suffolk.

List of scarce Birds killed in Suffolk since the Autumn of 1827, sent as addenda to the list of Mr. J. D. Hoy of Stoke by Nayland. (Vol. III. p. 436.) Those marked with an asterisk are in my own collection: —

*P*latàlea Leucoròdia, or spoonbill. Three shot at Thorpe, out of a flight of seven, in the autumn of 1828, by Mr. Almond of Aldborough; *another shot at Thorpe Fen, Nov. 1829, by Mr. Durrant of Hazlewood. — Cursòrius Isabellìnus, cream-coloured plover. Shot at Freston, near Aldborough, on Oct. 3. 1828, by a shepherd of the name of Smith. —*A*rdea *C*icònia, stork. Three seen for some weeks at the spring of this year, about Butley Creek and Thorpe Fen; only one killed, and that by the Marquess of Hereford's keeper on the Sudbourne estate. — **Scólopax* pygmæ*a*, pygmy curlew. Butley; 1830. — *S.* lappónica, red-breasted godwit. Thorpe Fen; 1828. — *S. Tótanus*, spotted snipe. Thorpe Fen; 1829. — Pódiceps obscùrus dusky grebe. Woodbridge; 1827, 1829. — *P. hebrídicus, black chin grebe. Middleton; 1827. — *C*olýmbus septentrionàlis, red-throated diver. Snape; 1827. — Léstris parasíticus, Arctic gull. Aldborough; 1830. — **M*érgus albéllus, smew. Snape; 1829. — **A*nas álbifrons, white-fronted goose. Aldborough; 1829. — **A.* spectábilis, king duck (female). Aldborough; 1827. —* *A.* Clángula, golden eye. Aldborough; 1829. —**A*lca *P*ica, black-billed auk. Aldborough; 1827. — Fálco *H*aliæ*e*tus, osprey. Aldborough; 1830. — *F. Lithofálco, stone falcon. Theberton; 1829. —*A*mpelis gárrulus, waxen chatterer. Burgh; 1828. — **T*úrdus torquàtus, ring ouzel. Yoxford; 1827. —*U*pupa *E*pops, hoopoe. Sutton; 1830. —*Lóxia curviróstra, crossbill. Yoxford (several); 1827. — **F*ringílla Montifríngilla, brambling. Grundisburgh; 1828. —**M*otacílla Boárula, grey wagtail. Grundisburgh; 1830. — The Fálco Lithofálco is not a very uncommon bird in Suffolk, and I think there can be no doubt as to its being a distinct species from the hobby or merlin. I have known both males and females shot. — *Edward Acton. Grundisburgh, near Woodbridge, Nov.* 29. 1830.

Sussex.

Large Whale recently found in the Channel near Brighton.—The curiosity of the inhabitants of Brighton and its vicinity has been highly excited and gratified by the interesting circumstance of an enormous whale having been landed by our fishermen on the shore between Kemp Town and Rottingdean. This monster of the deep was observed in the channel on Wednesday, Dec. 29.; and, late in the afternoon of that day, a party of about sixteen fishermen succeeded in towing it to land. It appeared to have been dead a considerable time (perhaps a fortnight), and, it is said, bore marks of injury in various parts of the body. It measures 63 ft. in length (implying a weight

of nearly 70 tons, being equal to that of 280 or 300 fat oxen!); the jaws are 15 ft. long and 8½ ft. wide; the tail is 15 ft. wide. Unfortunately, we were not able to inspect it till late on Friday, when it had been so much disfigured by the partial removal of the blubber by the fishermen, that we were prevented from ascertaining the species, and describing it minutely, which we very much regret. The proprietors were cutting off pieces of the baleen or whalebones (gills they erroneously called it), which they sold to the visitors. This substance is extremely curious; and although so well known to every one from its being used in various articles of dress, &c., but few, we suspect, imagine it to answer the purpose of teeth to this leviathan of the ocean. It is disposed in laminæ on the inside of the jaw; in some species there are not less than 300 or 400 on each side. The edges of the baleen are furnished with a sort of fringe formed of bristles, and which is tufted and longer near the extremities of the whalebones. The whales live on small fish, but principally on worms, mollusca, and zoophytes; and they chiefly take those small ones which become entangled in the filaments of the baleen. Another remarkable character in the structure of the whale consists in the spiracles or air-holes, which are situated towards the middle of the head, and through which the animal breathes; for the whale is in fact not a *fish*, but a warm-blooded animal having a heart with two ventricles, and lungs through which it respires; and is obliged, in consequence, to come to the surface of the water to breathe, having no gills, as fishes have, by which the air can be separated from the water. The blubber is a coat of fat from 6 in. to 1 ft. in thickness, situated between the flesh and skin. The oil extracted from a rich whale sometimes amounts to 30 tons! The whale suckles its young, and the milk resembles that of the cow, but contains more cream and nutritive matter. The tail is the principal weapon and moving power of the whale; it is endowed with the most astonishing rapidity of motion and force, and is capable of overthrowing boats of considerable burden. It is worthy of remark, that in the cliff, but a few hundred yards from the spot where the whale is now stranded, Mr. Mantell, about two years ago, discovered part of the jaw (9 ft. long) of a whale in a fossil state: it was lying embedded in the shingle of the cliff, in which the teeth and bones of elephants are also found. What a subject for reflection is here! Man is now the contemporary of the whale: but at the remote period when the strata which form these cliffs were deposited, enormous elephants existed, which subsequent revolutions have swept from the face of the earth. (*Communicated to the Brighton Gazette of January* 6. 1831, *by Mr. Mantell of Lewes.*)

Warwickshire.

The Waxen or Bohemian Chatterer. — Sir, A very fine specimen of the Waxen or Bohemian Chatterer (*Ampelis gárrulus Linn.*) has just been brought to me, which was shot about the 5th of December, in the fields, only a short distance from this village. Two others were in company with my specimen at the time it was shot; and from my informant I learn that they appeared to associate with the starlings. Bewick, in his *Introduction to British Birds*, vol. i. p. 24., says, that "the Bohemian chatterer, the grosbeak*, and the crossbill are only occasional visitors, and,

* Several specimens of the grosbeak were shot near this place during the hard weather of the year 1822–3, since which I have not heard of any having made their appearance. Crossbills, too, have occasionally visited the neighbourhood in considerable numbers. In Staffordshire, I have seen the latter species frequenting the larch and fir trees in the middle of summer (July), and have been informed that they usually made their appearance there about that time; it is probable, therefore, that they must have bred in the neighbourhood.

observe no regular times in making their appearance. Great numbers of the former were taken in the county of Northumberland in the latter end of the years 1789 and 1790, before which they had not been observed so far south as that county, and since that time have never been seen there."

The chatterer is certainly a very rare bird in this country, and the present is the only instance that has come under my personal knowledge, of its having been met with in this immediate vicinity. Its visits, therefore, being, like those of "angels, few and far between," I thought the occurrence in the present season might not be unworthy of being recorded in your Magazine. The fact, too, may be worth recording, perhaps, for another reason: the periodical arrival and retreat of the swallows, and other summer birds of passage, as well as of many of the winter birds, the fieldfares, *e. g.* redwings, woodcocks, &c., are uniform and constant; but the chatterer and the other species mentioned by Bewick "observe" (as he justly remarks) "no regular times in making their appearance." So eccentric, indeed, are they in their periods, and their migrations so erratic, that they may be said to be among birds, what comets are among stars; and accordingly we cannot calculate the time of their coming. It is worth while, therefore, to note the dates of their visits, in order, if possible, to ascertain by what circumstances their motions are guided, and whether or not their approach to our climes prognosticate (as it is often supposed) severe weather, either in this country or in those which they have deserted. Yours, &c. — *W. T. Bree. Allesley Rectory, near Coventry, December* 16. 1830.

The Bohemian chatterer is not extremely rare in Suffolk and Norfolk, as within the last three winters not fewer than twenty have been shot in those counties, according to notices in the local newspapers which have met our eye. See also a notice of one in Mr. Acton's communication from Suffolk in the present Number (p. 163.) Mr. George Creed, surgeon, Bury St. Edmund's, shot one of the twenty alluded to, and it now occupies a place in his interesting collection. This gentleman could gratify our readers with many communications of interest, and we invite him to do so.— *J. D. for Cond.*

Yorkshire.

Rare Insects taken in the Neighbourhood of Askam Bryan, near York: —

Coleo'ptera.

Drò̀mius sigma.
quadrinotàtus.
melanocéphalus.
Chlæ'nius nigricórnis.
Anchómenus oblóngus.
Agò̀num púllum.
Synù̀chus vivàlis.
Bróscus cephalò̀tes.
Stò̀mis pumicà̀tus.
Patrò̀bus rù̀fipes.
Pteróstichus oblongopunctà̀tus.
màcer.
Amàra tibiàlis.
Trèchus pállipes.

O'cys melanocéphalus.
Blethìsa multipunctàta.
Hygrotus scítulus.
Nóterus crassicórnis.
Colymbètes pulverò̀sus.
ágilis.
exsolètus.
abbreviàtus.
quadrinotàtus.
(Of this genus I have taken 19 different species.)
Hydáticus transversàlis.
Hybnèri.
Heterócerus marginàtus (two)
Dytiscus dimidiàtus.

Hydróphilus caraböìdes.
Necrò̀des littoràlis.
Micrópeplus porcàtus.
Megátoma sérra.
Byrrhus dorsàlis.
Cámpylis dispar.
Elicòpis quadripustulàtus?
Ptinus imperiàlis.
Rhinchỳtes æquàtus.
Pogonócerus pilòsus?
Leptùra abdominàlis.
Cássida viridula.
Endómychus coccíneus.
Cistèla fúlvipes.
Notóxus monóceros.

Lepido'ptera.

Polyómmatus Argìolus.
Macroglóssa stellatàrum.
Callimórpha miniàta.
Maméstra pisi.

Bryóphila pérla.
Thyatìra deràsa.
Cósmia trapetzìna.

Hippárchus papilionàrius.
Biston betulàrius.
Mèlla sociélla, &c.

I shall not send you any more names at present, as some of your correspondents are rather fastidious as to what are, or are not, rare insects. The fertile source of the principal part of the above-mentioned rarities, which are the result of one season's collecting, is Askam Bogs. They are

situated a short mile from this place, and are overgrown with birch and willows, and a shrub commonly called gale (*Myrica Gàle*, Smith's *English Flora*, vol. iv. p. 239.); and surrounded by large and deep ditches, which, after any extraordinary fall of rain, overflow their banks, and sometimes cover the whole with water. I hope that at some future period I may be able to give you a more copious account of this interesting place, but I shall not at present trespass any farther on your patience. I am, Sir, &c. — *A. Wright. Askam Bryan, York, Nov.* 25. 1830.

Art. III. *Natural History in Scotland.*

The Birds in the Plantations at Abbotsford. — During the month of October, the plantations throughout the grounds at Abbotsford, which are as yet mixed with a large proportion of larch, swarmed with titmouses of different species, namely, Parus màjor, P. cærùleus, P. caudàtus, and P. palústris. Their clear sharp lively call was heard incessantly everywhere through the woods, which seemed to swarm with them, and the number was surely twenty times as many as are bred in the district. One of the species, P. caudàtus, long-tailed titmouse, is by no means a common bird in the breeding season; and P. palústris, or marsh titmouse, I never saw at that period.

They were all extremely restless, as is natural to the kind, and seemed constantly intent and eager in the pursuit of food; and it appeared to me that the escape of the most minute insect, or even egg concealed in the crevices of the bark, or in the junctions of the branches, was almost impossible, so incessant and continued was the hunger-edged scrutiny, and such the numbers of this little lynx-eyed bird. They spread over woods that are irregularly connected, and extend for about three miles in length, and perhaps about a mile in breadth. There can be little doubt that they were a passing flock of migrators, either collected by some mysterious instinct from the innumerable native woods of our own northern counties, or sojourners from the still farther north; and, in the meantime, it would be gratifying if any of your correspondents would inform the writer whether this genus of birds is known to congregate and migrate together in great numbers. — *W.* ——, *near Melrose, Nov.* 10. 1830.

Botanical Exchange. — Sir, In Vol. III. p. 470., I noticed a letter offering an exchange of ornithological specimens Will you allow me to make use of your pages to solicit a similar exchange of botanical preparations with any of your readers. The plants of Cornwall and Scotland I could offer for those of Ireland or Wales, or of the eastern or midland counties of England. Among your numerous readers there may be some to whom this proposal will be acceptable; and if so, I shall be glad to exchange lists of *desiderata* and *duplicates* with them. The lists need not be limited to the particular districts named. A letter, addressed " H. C. W., College Post Office, Edinburgh," will be immediately answered. I am, Sir, &c. — *H. C. W.*

The Rùbus *tiliæfòlius*, a native of Germany, and not hitherto considered to be indigenous in this country, I found in August last, by the side of the small river Broom, in the west of Ross-shire, and afterwards in Strath Glass, in Inverness-shire, the first on gravel, and the last on sand; and since that I found the plant in the remains of an old natural wood, near Selkirk, on a clay soil, where it grows much taller, reaching nearly 8 ft. It is a beautiful plant, and would be very ornamental in a shrubbery. — *W. L. Selkirkshire, Nov.* 1833.

Art. IV. *Natural History in Ireland.*

Belfast Museum.—The foundation of this building was laid by the Members of the Natural History Society of Belfast, on the 4th of May last. A full account of the ceremony is recorded in the *Belfast Chronicle* of May the 5th, 1830.

Erica mediterranea.—In an excursion I made to Cunnemara, a wild district of the county of Galway, on the western coast of Ireland, in October, 1830, I discovered a species of heath (*Erica* mediterránea) not known before as being indigenous to Britain or Ireland. It grows on a declivity by a stream in boggy ground at the foot of Urrisbeg Mountain, near Roundstone, on its western side, occupying a space of above half a mile in length, and covering between two and three acres of ground. The Mediterranean heath is also indigenous to Portugal, whence it appears to have been first introduced into our gardens, and it is the principal heath of Corsica. In gardens it forms a handsome shrub, from 3 to 5 ft. high, and is very ornamental in spring, when in flower.

The Menziè*sia polifolia* (*Erica Dabeoci* Lin.), it may be mentioned, is very abundant on the sides of mountains and dry heaths all over Cunnemara, and in Mayo, as far north as the mountain called Croagh Patrick; and, although nowhere else found in Britain or Ireland, is, as well as the other, indigenous to the south of Europe, being found on the western Pyrenees, and at Anjou. A variety of this last, with white flowers, of which I have a living specimen in the college botanic garden, has lately been found sparingly growing along with the common variety. It is remarkable that two such interesting plants, indigenous to the south of Europe, should be found in so remote a corner of our island. I am, Sir, &c.—*J. T. Mackay, Assistant Botanist, Trinity College, Dublin, and Curator of the College Botanic Garden. College Botanic Garden, Dublin, Jan.* 17. 1831.

Art. V. *Calendar of Nature in England for* 1830.

Journal of the Weather kept at High Wycombe, Bucks, Lat. 51° 37′ 44″ North, Long. 34′ 45″ West, during the Year 1830, with Monthly Observations. By James G. Tatem, Esq., Member of the London Meteorological Society.

Table of the Thermometer and Barometer.

Month.	Thermometer.				Barometer.			
	Mean.	Greatest variation.	Greatest Heat.	Greatest Cold.	Mean.	Greatest variation.	Greatest Height.	Lowest extreme.
January -	28·92338	24·92338	37·75	4	29·71849	1·21849	30·35	28·50
February -	32·95535	30·70535	55	2·25	29·62875	0·50875	30·08	29·12
March -	43·38508	24·61492	68	27·25	29·82376	0·68376	30·34	29·14
April -	49·36041	28·38959	74·75	20·25	29·502	0·572	29 95	28·93
May -	51·05645	26·94355	78	31.25	29·60677	0·56677	30·03	29·04
June -	52·46250	21·5375	74	35	29·56444	0·42444	29 85	29·14
July -	59·51612	22·98388	82·50	40·5	29 69031	0·51031	30·08	29·18
August -	53·96774	20·03226	74	34	29·62709	0·52709	29·98	29·10
September	50·11041	17·88959	68	32·50	29·51877	0·55877	30·10	28·96
October -	47·52217	20·97783	68·50	28	29·9558	0·5358	30·26	29·42
November	41·04791	16·79791	56·75	24·25	29·55655	0·73655	30·15	28·82
December	31·54032	21·79032	46	9·75	29.03784	0·38785	30·19	28·65
For the Year	44·98732		82·50	2·25	29·60254		30·35	28.50

Table of Rain, Snow, Fair Days, and Wind.

Month.	Number of fair days.	Number of rainy days.	Number of snowy days	Rain.	Winds.							
				In. Dcl.	N.E.	East.	S.E.	South.	S.W.	West.	N.W.	North.
January	3	11	17	2·61375	4		5	4	4	3	8	3
February	8	5	15	2·36875	1	2	5	2	9	3	6	
March	5	1	25	0·725	3	5	1	1	10	9	1	1
April	14	—	16	3·19375	2	3	1	4	12	4	4	
May	11	—	20	3·75	2	5	1	2	6	9	2	4
June	15	—	15	4·11875	1	1	1	1	12	4	8	2
July	10	—	21	2·45475	3	1	5	4	10	7	1	
August	15	—	16	2·43075		1	2	1	8	11	7	1
September	18	—	12	3·525			3	2	11	8	6	
October	10	—	21	1·1375	4	4	3	2	5	7	4	2
November	16	—	14	3·01275		6	7	8	4	4	1	
December	11	5	15	1·695	6	7	1		5	4	7	1
For the Year	136	22	207	31·02575	26	35	35	31	96	73	55	14

January. The severity of the cold during the month was remarkable; the minimum of the thermometer 28° degrees below the freezing point, and the mean was much lower than for the last seven years. The barometer has not been so high since 1826, and the range was the contrary of that noticed last month, being nearly two inches. Snow fell on the 11th, 12th, 13th, 19th, 20th, 21st, 23d, 27th, 29th, 30th, and 31st, and sleet on several other days. The whole, if added together, would give a depth of 19 inches. The rain and melted snow measured 2·61375 inches. A partial thaw commenced on the 25th and 26th, but the frost returned on the following day. The evaporation 0·0625 of an inch.

February. The early part of the month was very cold, attended by snow. On the 5th, at night, the thermometer stood at 2° 25′, which was much colder than for many years in the same month. A thaw commenced on the 7th, and rain fell on eight different days; the greater part on the 7th and 8th, and on the 21st and 22d. The whole quantity of rain and melted snow 2·36875 inches, which was more than since February 1826, which was remarkably wet. There were five snowy days, and the whole depth was about 4·5 in. The mean of the barometer lower than last year, and the range less than usual. The evaporation 0·08125 of an inch.

March. The month was particularly fine, and the thermometer rose to a height not experienced at Wycombe during the last seven years: the mean temperature was also much above those of the same period. The last six days had more the appearance of summer than of spring; but in the night of the 31st an extraordinary change took place, and rain, sleet, and snow fell. The whole quantity of rain and melted snow was small for the month, though much more than last year. The barometer was considerably higher than usual, and the mean 0·24 of an inch above that of March 1829. The evaporation 0·55625 of an inch.

April. Rain fell on fourteen days, and the quantity was great for the season, though not equal to what was experienced in April last year, which was an extraordinarily wet month. The mean temperature considerably higher than since 1825, and the extremes of heat and cold greater than in any one of the corresponding months of the last seven years. The barometer was generally higher than for the last two years, although the maximum did not reach the average. A rainbow seen on the 23d, about 3 P. M., and soon after thunder was heard. The evaporation 0·475 of an inch.

May. The month was not so warm as in the last two years, although the maximum was much higher than usual, and the range 47°. The barometer has not been so low in the month of May since 1827, as it respects the

extremes, and the mean was less than last year. The quantity of rain was remarkably great, much more than in any of the corresponding months of the last seven years, and more than seven times as much as in May, 1829. On the 21st thunder was heard about midnight, attended by vivid lightning: there was also a slight thunder storm on the 23d, about 3 P. M., with very heavy rain. Large hail on the 30th, in the afternoon, during a squall, attended by thunder and some lightning. The evaporation 0·46875 of an inch.

June. So wet and cold a June, attended by so great a depression of the barometer, has not occurred during the last eight years. The quantity of rain was extraordinary, exceeding, by upwards of half an inch, the quantity which fell in the same month last year, which was noticed as being particularly great, the mean temperature was upwards of 2·75 below the average of the last seven years. On the 25th there was much lightning all round the compass from 8 P.M. until midnight, but the thunder was not loud. An indistinct lunar halo observed on the night of the 2d, about 10 P.M. The evaporation 0·21875 of an inch.

July. The commencement of the month was extremely wet, and the greater part of the rain fell in the first eleven days, but the whole quantity was little more than half of what fell in July last year; the latter end of the month was very fine, and the thermometer rose higher than 1826; the barometer was also above the maxima and means of the last two years. Thunder heard on the 3d, 7th, and 30th, and lightning seen on the 29th to the northward. An indistinct rainbow seen on the 9th. The evaporation 0·69875 of an inch.

August. The latter end of the month was particularly cold, even colder than in August last year, and although the quantity of rain was not one half of what fell in the same month in 1828, and very considerably less than the quantity last year, yet the mean temperature was lower than any one for August in the last eight years, the greatest elevation of the barometer the same as in the corresponding month last year, and the mean rather higher, but low for the season. Thunder heard, and lightning seen, on the 9th, about 2 P.M. The evaporation 0·3125 of an inch.

September. Although rain fell on nearly as many days as in September last year, the quantity was almost an inch less, and very little for the month. The mean of the barometer below the usual average, yet higher than last year, as were both the extremes; the temperature generally low, and on the night of the 21st only half a degree above the freezing point, which was lower than the thermometer has been in September since 1824. Thunder was heard on the 14th, about 3 P.M. The evaporation 0·13125 of an inch.

October. The month was uncommonly fine, the quantity of rain considerably less than during the last eight years, the mean temperature higher than since 1827, and the maximum above any observed at Wycombe, in October, during the journalist's residence; the barometer was also remarkably high, the mean 29·9558, and the maximum exceeding that in the corresponding month in 1825, which was considered extraordinary for the season. A rainbow seen on the 25th, about 3 P.M. On the 28th and 29th the wind blew strong from the S.W. and W., but could not be considered as violent gales. The evaporation 0·125 of an inch.

November. Thirteen days of the month might be denominated fine, and the thermometer reached an elevation above any one in the same month during the last seven years, while the mean temperature was nearly 4° higher than in November last year. The barometer was generally low, and the mean gave a depression greater than since 1826; the quantity of rain much greater than usually falls in the month, indeed more than since 1825. Lunar haloes were seen on the nights of the 25th and 27th, and a faint

aurora borealis was observed on the 17th, about 11 P.M. The evaporation 0·13125 of an inch.

December. The mean of the barometer was lower than any one in December during the journalist's residence in Wycombe, and the range of the thermometer greater than in the same month for the last eight years, while the mean was lower, except in last year, than any in the corresponding month, for the same period; of the quantity of rain and melted snow, the like report must be made as of the mean of the thermometer. Snow fell on the 12th, 15th, 22d, 24th, and 27th; the whole quantity not more than 2·25 in. On the night of the 11th a beautiful aurora borealis was seen for several hours; about one o'clock on the following morning it assumed the form of an arch, of great brilliancy, surmounted by a brown tint, which faded away into a silvery light, something resembling that afforded by the moon before she appears above the horizon, a deeper brown colour filled up the space beneath the luminous arch; another but very faint aurora was observed on the 15th. Lunar haloes seen on the nights of the 23d, 24th, and 26th; that on the latter night was remarkably bright, and well defined. The evaporation 0·0625 of an inch.

Journal of the Weather kept at Bedford, Lat. 52° 8′ 48″ North, Long. 2′ 49″ East. By W. H. White, Esq., of the Commercial Academy, Bedford.

January. This year commenced with severe frost, which continued the whole month. Wind blowing generally a strong breeze from the N.E., except on the 16th and 17th, when it blew from E.S.E., and then returned to N.E. Snow fell on the 17th, 18th, and 23d; the average depth 16 in. Not a single flower in bloom. Atmospheric phenomena: one lunar halo; and one gale of wind from the N.E.

February. The frost continued with all its intensity till the 7th, when the wind shifted to due S., with continued mild rain. On the 8th the Ouse was greatly swollen, and the ice, the average thickness of which was 21 in., broke up. On the 10th the frost returned for three days; wind N., but not with the intensity of last month. — Plants. The catkin of the hazel expanded on the 16th; snowdrop (Galánthus nivàlis), on the 20th; crocus, 25th; whitlow grass (*D*ràba vérna), Newnham Wall, 27th. — Birds. The throstle (*T*úrdus mùsicus) in full song on the 20th; on the 28th some woodmen found a throstle's nest with one egg in it; during the last week rooks (*C*órvus frugílegus) were actively engaged in building their nests; the titmouse (Pàrus cærùleus) very scarce.* — Scale of general winds. N. 11 days; N.E. 3; E. 1; S.E. 3; S. 2; S.W. 2; W. 4; N.W. 2; total 28 days. — The atmospheric and meteoric phenomena noticed this month were, two solar haloes and one lunar; one meteor; and four gales of wind, viz. two from the W., one from the N.E., and one from the S.W. From the 1st till the 20th the weather was cold, gloomy, and cheerless; the remainder of the month was very mild, and vegetation made rapid progress.

March. This month commenced with bleak winds from the W. and N.W.; generally cloudy till the 14th; the rest of the month was very fine, and well suited both to horticultural and agricultural pursuits, except on the last day, when we had heavy rain. — Plants. During the 1st week

---

* This little bird was very abundant here during the summer of 1829, but during the spring of the present year they were very scarce, many of them, no doubt, having fallen a prey to the severity of the winter, and many also to the guns of hedgerow sportsmen.

bloomed, chickweed (*Alsìne mèdia*), marsh marigold (*Cáltha palústris*), green hellebore (*Helléborus víridis*). 2d week: heart's-ease (*Víola trícolor*), stinking bear's-foot (*Helléborus fœ'tidus*), dwarf mouse-ear (Cerástii species), coltsfoot (*Tussilàgo Fárfara*). 3d week: sloe tree (*Prùnus spinòsa*), primrose (Prímula vèris), violets (*Víola odoràta*), spurge laurel (*Dáphne Laurèola*). 4th week: red currant in leaf (*Ribes rùbrum*), barren strawberry (Potentílla Fragària), cotton conferva (*C. bullòsa*), golden saxifrage (Chrysosplènium oppositifòlium). — Animals. Bees were very busy after the first week; frogs croaked on the 12th; a blackbird's nest found on the 14th, with three eggs in it; the nuthatch (*Sítta europæ'a*) arrived on the 24th; the wheat-ear (*Sylvia Œnánthe*), very scarce through this year, on the 26th. Field larks (*Á'nthus trivialis*) were warbling on the 27th; and on this day a robin's nest was found, with four young birds in it three or four days old. Ants were in motion, and bats were flitting about, on the 28th. — Scale of general winds. N. 6 days; N.W. 7; W. 4; S.W. 2; S. 0; S.E. 3; E. 4; N.E. 5; total 31 days. Rain on the 1st, 7th, 8th, 10th, and 31st. —The atmospheric and meteoric phenomena noticed this month were, one solar and two lunar haloes; one meteor and five gales of wind: three from the N.W.; one from the W.; and one from the N.E.

April commenced with extremely cold N.E. winds and rain. Sharp frosts on the 4th, 5th, and 6th, which gave a great check to vegetation. On the 6th the ice in ponds was upwards of 3 in. thick. Snow fell the whole of the 3d, and till noon of the 4th, almost without intermission. On the 10th the weather became fine and showery. — Plants. In the first week bloomed, least periwinkle (*Vínca mìnor*), daffodil (*Narcíssus Pseudonarcíssus*), checkered fritillary (Fritillària melèagris), tuberous moschatel (Adóxa Moschatéllina), which is rare here. 2d week: apricots and peaches, sycamore (*A'cer Pseudo-plátanus*), and larch (*Làrix europæ'a*). 3d week: lady's-smock (*Cardámine praténsis*), wood anemone (*Anemòne nemoròsa*), early spotted orchis (*O'rchis máscula*), ash (*Fráxinus excélsior*), sedge (*Cárex præ'cox*). 4th week: horse-chestnut (*Æ'sculus Hippocástanum*), stitchwort (Stellària *Holóstea*), clammy mouse-ear (Cerástium viscòsum), wood sorrel (*O'xalis Acetosélla*). —Birds. Swallows first seen on the 8th, but retired again till the 14th; white-throat (*Motacílla Sylvia*), 10th; cuckoo (*Cùculus canòrus*), on the 19th; swift (*Cypselus A'pus*), on the 27th; redstart (*Motacílla Phœnicùrus*), 29th; same day, corncrake (*Ortygomètra Créx*, Rállus *Créx Linn.*) — Scale of prevailing winds: N. 7 days; N.E. 5; E. 2; S. 5; S.W. 4; W. 3; N.W. 4; total 30 days. — The atmospheric and meteoric phenomena noticed this month were, three solar and two lunar haloes, two paraselenes, three rainbows, one meteor, one aurora borealis on the 19th, with several reddish coruscations, and seven gales of wind, viz. two from the N., one from the N.E., two from the S. one from the W., and one from the N.W. Thunder and lightning on the 8th, 10th, and 19th.

May came in very fine, but after the 2d there were several hoar frosts with strong westerly winds, which made the tender shoots of vegetables to droop; from the 8th till the 14th much rain and cold winds from the N. and N.E. Great blights appeared in many places, and gooseberries and currants fell very copiously from the trees, except in very sheltered situations. Plants. In the first week bloomed the lilac (*Syrínga* vulgàris), broom (*Spártium scopàrium*); germander speedwell (*Verónica Chamæ'drys*), and also *V.* agréstis, walnut (*Júglans règia*), and sweet vernal grass (Anthoxánthum odoràtum). 2d week: water violet (Hottòn*ia* palústris), scorpion grass (*Myosòtis sylvática*), woodroof (Aspérula odoràta), butterfly orchis (*O'rchis bifòlia*), blue pimpernel (Anagállis cærùlea), and also *A.* arvénsis; spindle tree (*Euónymus europæ'us*). 3d week: hemlock-leaved

stork's-bill (Erodium cicutarium), common fumitory (*F.* officinalis), fine-leaved sandwort (Arenaria tenuifolia), bistort (*Polygonum* Bistorta). 4th week: berberry (*Berberis* vulgaris), goat's-beard (*Tragopogon* pratense), mouse-ear hawkweed (*Hieracium* Pilosella), glaucous cineraria (Cineraria integrifolia), enchanter's nightshade (*Circæa* lutetiana), mountain speedwell (*Verónica* montana), wild chervil (*Chærophyllum* temulentum), red campion (*Lychnis* dioica).—Birds: Heard the blackcap (*Motacilla* Atricapilla) on the 4th; saw a fern owl on the 10th. — Scale of prevailing winds. N. 4 days; E. 4; E. 2; S.E. 8; S. 1; S.W. 6; W. 4; N.W. 2: total 31 days. — Rain fell on 19 days; a heavy hail storm, which lasted two hours, passed over on the 23d, accompanied with much thunder and lightning. — The atmospheric phenomena observed this month were, one solar and one lunar halo; lightning on three days, and thunder on two; and two gales of wind, viz. one from the S.E. and one from the W.

June was a cold wet month till the 26th, rain having fallen on twenty days, accompanied with cold northerly winds. The heavy rains and cold winds greatly retarded the growth and ripening of fruits and vegetables. A field of grass was cut on the 1st, but was not stacked till the 27th. Haymaking did not commence generally till the last week. The crops of grass were generally abundant. — Scale of prevailing winds. N. 7 days; N.E. 3; E. 2; S.E. 1; S. 0; S.W. 9; W. 1: N.W. 7: total 30 days. The atmospheric and meteoric phenomena noticed this month were, two parhelia, one paraselene, one solar and two lunar haloes, one meteor; thunder and lightning on four days, and on one evening, the 25th, the lightning was exceedingly vivid; and six gales of wind, viz. 2 from the N., 1 from the W., and 3 from the S.W.

July. This month commenced with showers. On the 12th was a thunder storm, with very heavy rain from 11 A.M. till 5 P.M. From the 8th to the 11th was very wet, with cold northerly winds. After the 11th haymaking was often retarded by showers, but the hay was generally good; the last week was very hot, and brought the crops of corn, which had almost been despaired of, rapidly forward. The cuckoo departed on the 3d. — Scale of prevailing winds. N. 0 days; N.E. 0; E. 4; S.E. 3; S. 3; S.W. 11; W. 6; N.W. 4: total 31 days. Rain fell on 17 days during this month. — The atmospheric and meteoric phenomena noticed this month were, one solar and one lunar halo, four rainbows, three meteors, and four gales of wind, viz. three from the S.W., and one from the W.; thunder and lightning on the 7th, 12th, and 30th.

August was showery till the 18th, which retarded the harvest greatly; the wheat crops in this neighbourhood were in general very good, and, considering the season, very well got in. Rain fell during this month, on 18 days. — Birds. The swift disappeared on the 25th from this neighbourhood, but was seen at Ampthill as late as the 30th. Scale of prevailing winds: N. 8 days; N.E. 1; E. 0; S.E. 0; S. 0; S.W. 11; W. 9; N.W. 2: total 31 days. — The atmospheric and meteoric phenomena noticed this month were, two lunar haloes, one meteor, and four gales of wind, viz. two from the S.W. and two from the W.; thunder and lightning, accompanied with heavy rain, on the 9th, 16th, and 29th.

September. Still wet, cold, and windy; rain on 20 days; a hail storm, accompanied with much thunder and lightning on the 12th. — Birds. The main flight of swallows took place about the 19th. — Scale of prevailing winds. N. 1 day; N.E. 0; E. 0; S.E. 0; S. 0; S.W. 20; W. 4; N.W. 5: total 30 days. The most remarkable I ever witnessed. — The atmospheric and meteoric phenomena noticed this month were, 6 meteors, 10 rainbows, three auroræ boreales, viz. on the 7th, 8th, and 17th; from the last only arose any columns of light that were remarkable; the aurora did not continue more than 1½ hour. Six gales of wind from the S.W.

October was a fine dry month; a few sharp frosts about the middle affected tender plants; towards the latter end of the month we had refreshing warm rains. — Birds. The final departure of the *Hirúndines* took place on the 11th, when I saw between 20 and 30 taking their flight in a S.E. direction, but so amazingly high that I could not distinguish their species. A flock of fieldfares (*Túrdus pilàris*,) arrived here on the 26th. — Scale of prevailing winds. N. 2 days; N.E. 6; E. 5; S.E. 4; S. 2; S.W. 3. W. 6; N.W. 2; total 31 days. — Refreshing showers fell on 11 days. — The atmospheric and meteoric phenomena noticed this month were, one solar and two lunar haloes, two auroræ boreales, and one gale of wind from the N.W.

November was a very wet and boisterous month. On the sixth there was a strong gale of wind from the S.W., with continued heavy rain; sharp frosts on the mornings of the 24th and 25th. — Scale of prevailing winds. N. 1 day; N.E. 1; E. 5; S.E. 0; S. 8; S.W. 10; W. 3; N.W. 2: total 30 days. — Rain fell on 21 days. — The atmospheric and meteoric phenomena noticed this month were, two solar and three lunar haloes, two auroræ boreales, viz. on the 1st and 4th; six meteors, two rainbows, and six gales of wind, viz. three from the S.W., two from the E., and one from the S.

December was a dry and seasonable month, slight showers having fallen only on six days. The wind was exceedingly variable and boisterous about the middle of the month. On the 17th the wind veered completely round the compass in sixteen hours, blowing hard all the time; it finally became stationary due N., with very sharp clear frost. The 21st and 22d were remarkably warm clear days, so much so that the robin and the throstle were vying with each other for preeminence of song. On the night of the 22d the wind shifted from S.W. to N.W., with very hard frost, so that on Christmas day several persons ventured to skait on the Ouse. Snow fell on the 28th, from 3 A.M. till 2 P.M. On the 30th a thaw commenced, with continued warm rain. The year closed with a calm cloudy night, the frost and snow being entirely gone. It is calculated that from thirty to forty thousand sheep have died of the rot in this county, owing to the very wet summer; some farmers have lost their flocks entirely. — Scale of prevailing winds. N. 1; N.E. 5; E. 4; S.E. 2; S. 3; S.W. 17; W. 2; N.W. 7; total 31 days. — The atmospheric and meteoric phenomena noticed this month were, two solar and seven lunar haloes, six paraselenes, sixteen meteors, five auroræ boreales, and three gales of wind, viz. one from the N., and two from the N.W. Of the sixteen meteors mentioned, I observed one on the 10th, at 8 P.M. It was of a brilliant blue colour, which faded into a yellowish green as it approached the earth; its train was about 5° in length, and emitted very bright sparks; its altitude was 40°. I saw another on the 17th, at 6 P.M. just below the belt of Orion, which took a S.W. direction. It was of a bright red colour, but, a building intervening, I could not observe it vanish.

Calendar of Nature for Bungay, in Suffolk, for 1830. By Daniel Stock, Esq. F.L.S.

January. The weather this month was very variable, frost and thaw succeeding each other rapidly: one day the roads rendered impassable by the quantity of snow, and then by the quantity of water. On the night of the 30th the frost commenced with great severity. No record of any plants in flower, in consequence of the quantity of snow.

February. The frost continued its severity until the evening of the 6th: thermometer as low as 18°. Thaw began about one o'clock on the 7th, and produced a very high flood. Two or three fine days then intervened; then frost from the 16th to the 20th inclusive. On the 21st, rain and snow; 24th, mild; and the last 4 days fine, with the exception of a very heavy rain on the evening of the 28th. Aconite in flower on the 9th; snowdrop, 19th; Christmas rose, marsh marigold, and primroses, 21st; hepatica, 23d; crocus, 25th; spurge laurel, barren strawberry, whitlow grass, and hazel (mas. and fem.), 28th. Jackdaws chattering on the 8th; bees on the wing, 24th.

March. The weather such as is usual in March, cold and windy. Wind exceedingly high on the afternoon of the 12th. It rained on three days, viz. the 7th, 16th, and 20th; the 26th, 27th, and 28th were warm days. Violets (in garden) in flower on the 7th; dandelion, 12th; violets (in fields), alder, and hellebore, 14th; dog's-tooth violet, 18th; great periwinkle and dog's violet, 21st; gooseberry, 26th; ground ivy, hemlock-leaved stork's bill, willow, and moschatel, 28th. Snake, 21st; frogs spawn, 21st; blackcap, 21st; brimstone butterfly, 14th; great and small tortoise-shell butterfly, 28th.

April. A cold unpleasant month, with a few exceptions. On the 2d, snow and rain; and the frost in the nights of the 3d and 4th very severe. Rain on 13 days; the 9th very warm; and the month ended with fine weather. Wood sorrel in flower, 4th; cherry, cowslip, and blackthorn, 9th; thyme-leaved speedwell, 11th; white saxifrage, stitchwort, horsetail, bugle, and germander speedwell, 18th; maple, 25th; woodroof, 27th; and hyacinth, 28th. Swallows appeared on the 1st; nightingale, 9th; cuckoo, 25th; swift, 27th; wood argus, peacock, and white butterflies, 9th; and orange-tip butterfly, 29th.

May. Upon the whole, a cold unpleasant month, though we had occasional snatches of fine weather to remind us of what May ought to be. Thunder on the 2d and 23d; rain on 13 days. Whitethorn in flower on the 2d; butterfly orchis and twayblade, 23d; and bryony, 30th. Fritillary and little copper butterflies, 15th.

June. Except the last four days, a cold wet month. Thunder on the 3d, 6th, 13th, and 25th; rain on 16 days. Green orchis in flower on the 6th; bee orchis, 20th.

July. It rained only on 9 days, but yet it was by no means a fine month: the greater part cool and cloudy. On the 25th fine weather began, and lasted till the end. White lily in flower on the 10th; houseleek, 11th; hollyhock, 19th; sunflower, 27th. Harvest began partially on the 30th.

August. Rain on 17 days (as in 1829); thunder on the 28th; but very little fine weather. Golden rod in flower on the 1st; tiger lily, 23d; orpine, 26th; ladies' traces, 20th. Admiral butterfly appeared, 7th.

September. Rain on 22 days; thunder on the 18th. Stemless thistle in flower, 26th.

October. A fine month; it rained only on 7 days. Ivy in flower, 24th.

November. A very tolerable month. Rain on 4 days. Primrose in garden on the 2d; in the fields on the 25th. Dog's violet and hogweed, 25th.

December. Except the first 4 or 5 days, a cold, wet, snowy, and frosty month. Rain and snow on 15 days. The frost commenced severely on the 25th; but lasted only till the 28th, when it rained, and continued to thaw until the end. Sweet coltsfoot, two or three flowers on the 31st; Christmas rose still bent to the earth, but the colour visible. Violets and primroses in flower all the month in garden.

Table of Rain, Snow, and Fair Days, 1830.

Months.	Number of fair days.	Number of rainy days.	Number of snowy days.
January - - -	18	3	10
February - - -	15	6	7
March - - -	28	3	—
April - - - -	16	13	1
May - - - -	18	13	—
June - - - -	14	16	—
July - - - -	22	9	—
August - - -	14	17	—
September - - -	8	22	—
October - - -	24	7	—
November - - -	26	4	—
December - - -	16	9	6
Total for the year	219	122	24

Art. VI. *Monthly Calendar of Nature for Scotland.*

Extracts from the Meteorological Register, kept at Annat Garden, Perthshire, North lat. 56° 23½', above the Level of the Sea 172 ft., and Fifteen Miles from the Coast; being the Mean of Daily Observations taken at Ten o'Clock Morning and Ten o'Clock Evening.

In place of the diagram, the form of which must now be familiar to the readers of the Magazine of Natural History, and which the younger part of them may easily copy from the following statements, it is now proposed that the mean results, for every ten days, of temperature, dew point, the depth of rain, and evaporation should be given in figures, which will, in another form, convey the same information as the diagram; and, as the mass of figures giving daily results is thus avoided, it is hoped this method will not offer any thing fatiguing to the reader. A circular diagram, containing the annual results, the same as last year's, may probably be given at the end of each season.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
December 10. 1830.	40·6°	39 3°	37·5°	28·96	2·00	·1
— 20. —	37·1	33·7	32·7	29·38	1·00	·2
— 31. —	28·0	27·3	26·6	28·72	·45	·1
Monthly mean	35·2°	33·4°	32·2°	29·02	3·45	·4

The average mean temperature for December at this place is 39·9° for the seven past years. The temperature in December last, it will be seen, is 4·7° lower than that average; it is also 2° lower than in any corresponding month during that period. The mean temperature for the year 1830 is

46·9°. The average annual mean for the last seven years is 47·7°. In 1823, 1829, and 1830 the mean was under that average. The depth of rain in December was near the ordinary fall in that month; but the annual depth of rain in 1830 was 37·77 in.: the annual average at this place is 26·38 in. The following are the results for January: —

Month.	Mean temperature.	Dew point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
January 10. 1831.	38·9°	36·1°	34·9°	29·37°	·50	·2
— 20. —	36·6	36·0	33·0	29·08	·72	·1
— 31. —	32·9	32·0	28·0	29·11	·30	·2
Monthly mean	36·1°	34·7°	31·6°	29·18	1·52	.5

The mean temperature in January is about 0·5° under the ordinary average, and the depth of rain nearly 1 in. below the ordinary fall. The coldest day in December was the 24th: mean temperature of that day, 23°; extreme cold, 20°; wind N.W. It may be remarked, however, that at the point of observation the thermometer stands about 132 ft. above the adjoining Carse lands, and, less liable to be affected by hoar frost. On swampy soils, in the Low Carse, the extreme cold was 15°. The 21st, only three days previous to the 24th, was the warmest day: mean temperature of that day, 43·5°; wind west; extreme heat, 47·5°. There were 7 days on which rain fell; and on 2 days a light sprinkling of snow, not exceeding 2 in., which only gave 0·2 of an inch when melted in the rain-gauge. There were 8 days of brilliant and 6 of partial sunshine. On 17 days the atmosphere was cloudy. The wind blew a loud gale from the north-west on the 19th. On the evening of the 25th the aurora borealis appeared unusually brilliant. The wind set in from easterly points on 11 days; from the north on 4 days; from the south and west on 10 days; on 6 days it was variable.

The excessive moisture of last season, with its usual accompaniments, cold and a clouded atmosphere, retarded the ripening of fruits in the open air till a later period than usual, and the quality was less saccharine. In the field the quality of wheat and barley was also much deteriorated. Young wood would have suffered from the same cause, but that little rain fell in the month of October: hence young wood is better ripened, and flower buds more bold and profuse than otherwise could have been expected.

The coldest day in January was the 31st: mean temperature of that day, 28°; extreme cold, 25°: this cold was accompanied with a heavy fall of snow, the first of any depth for the season; a loud north-easterly wind blew it about in the shape of drift. The warmest day was the 9th: extreme heat, 48°; mean of that day, 45°; wind west. The wind set in from the west on 10 days; from the east on 10 days; and from the north on 11 days. There were 11 days of brilliant and 4 of partial sunshine; 16 were cloudy, and for the most part misty. In the course of the two months that are past, vegetation could make little perceptible progress. Winter beans that had been sown on the 5th of November, appeared partially above ground on the 10th of January; a period of 66 days: mean temperature of that period, 38°. Wheat that was sown on the 16th of November began to appear above ground on the 24th of January; a period of 69 days: mean temperature of that period, 37·2°. While the cold retards the vegetable process in the ground, it is worthy of remark that plants growing in spring water make their usual progress. The Aponogèton distachyon, a green-

house plant and native of Africa, has, during the late intense frost, sent out healthy foliage, and a strong flower stem, the blossom of which is ready to open, in a spring well at Annat Garden, and without any protection. The temperature of the water in the well in January, 47·5°, which corresponds nearly with the annual mean temperature of the place. The winged tribes have hitherto picked up a scanty subsistence in the fields and hedges. Many of them are now, by the snow, impelled by hunger and cold to approach near the haunts of man, who ought not to abuse their confidence in the time of their distress. — *A. G. February* 1.

Art. VII. *Hints for Improvements.*

Natural History Collection. — Sir, I observe in Professor Jameson's *Edinburgh Philosophical Journal* for last year (vol. xxi. p. 113.) a list of geological and mineralogical collections in Great Britain and Ireland, which appears to me to be very defective; I beg leave to suggest to your numerous correspondents, in order to complete so desirable an object, that they would forward you lists of collections in their respective counties or districts for insertion in your Magazine, embracing every department of natural history. Such a list, when complete, would, I conceive, greatly promote science, by making the scientific traveller acquainted with those local collections which would materially assist him in his researches; collections which have probably cost their proprietors many years of unremitted exertion and attention to the subject, independently of expense. I subjoin a list of the collections in Norfolk, marking with an asterisk those whose proprietors would probably be desirous of exchanging duplicates. — *Sam. Woodward. Norwich, Sept.* 27. 1830.

Norfolk.

Beachamwell. Mr. John Scales. Entomology and Eggs.
Caister, by Yarmouth. Rev. —— Steward. Ornithology.
*Catfield. Rev. James Layton. Geology. Mammalian remains, &c., of Norfolk coast, and botany.
*Cromer. Mr. J. Earl. Ditto, ditto, and Entomology.
Mr. Fox. Lapidary, and Dealer in Geological Specimens.
Lynn. Rev. Edward Edwards. Geological Specimens from Hunstanton Cliff.
Melton Hall. Edward Lombe, Esq. Ornithology, British.
*Norwich. Norfolk and Norwich Museum. General Collection.
Rev. James Brown. Entomology.
*Mr. Richard Griffin. Ornithology.
J. J. Gurney, Esq. (Earlham Hill). Ditto, British and Foreign.
Mr. John Hunt. Bird-stuffer and General Dealer.
Mr. John King (St. Andrew's). Geology. Chalk Fossils.
Mr. John Sims, Jun. Bird-stuffer and Naturalist.
Mr. Thomas Smith. Ditto, and Dealer.
*Mr. Joseph Sparshall. Entomology.
Mr. George Thurtell. Ornithology.
Mr. Robert Wigham. Ditto and Botany. Dealer.
*Mr. Samuel Woodward. Geology. Norwich Crag and Chalk Fossils.
Plumstead. Rev. C. Penrice. Ornithology, rare British.
Sandringham Hall. H. H. Henley, Esq. Ornithology and Geology. Lias.
*Shropham Hall. Rev. G. R. Leathes. Geology. Norfolk and Suffolk Crag, Chalk, &c.
Swaffham. Rev. John Dugmore. Ornithology.

Swaffham. Robert Hammond, Esq. Ornithology. Fine Specimen of Great Bustard.
*Mr. C. B. Rose. Geology. Diluvium and Hard Chalk.
Yarmouth. —— Girdlestone, Esq. Ornithology.
Mr. Harvey. Ditto. Dealer.
Mr. John Smith. Entomology and Eggs.
Dawson Turner, Esq. Botany.

To this list we beg to add the name of the Rev. Thomas Image of Whepstead, near Bury St. Edmund's, Suffolk, who possesses a general and intimate knowledge of nature, and is rich in specimens in all the departments, but most so in that of chalk fossils,. These he exchanges with correspondents in different parts of the kingdom for the redundant specimens of their neighbourhoods, and he has many in slate from Westmoreland, obtained in this way. We remember, with proud and grateful feelings, the patience and pleasure with which he showed us, some time since, many matters of the highest interest in his excellent collection, and entertain not the slightest doubt, from what we experienced from Mr. Image, that he would be most willing to gratify any fellow student with the sight of it.

The Rev. T. E. Rogers, of Lackford, near Bury St. Edmund's, has also a fine collection of fossils and shells. These are splendid specimens, and many of them Swiss, and the fruit of his own most diligent personal research in that country. His cabinet contains a specimen, but whether foreign or British we are not aware, of the extremely rare O'vula Leathèsii figured in Sowerby's *Genera of Fossil Shells*, and named in compliment to the Rev. G. R. Leathes, Shropham Hall, Norfolk, by whom it was first discovered in one of the Norfolk crag pits. We perceive with pleasure this gentleman's name in our correspondent's Norfolk list; and from personal experience of the great liberality and kindness of Mr. Leathes, who is, on all occasions, the warmest patron of natural history pursuits, we are confident he would be happy to meet the wishes of any brother collector. The botanic garden at Bury St. Edmund's has derived very important advantages from this gentleman's influence and great liberality.

At Bury St. Edmund's, also, the Rev. Henry Hasted, A.M., possesses most interesting cabinets of natural productions, and amongst them many rare local fossils. — *J. D. for Cond.*

Depôt for Exchange of Specimens. — Sir, I approve so highly of H. C. W.'s suggestion of a depôt for the exchange and sale of specimens, and feel so confident that such an establishment will both be generally acceptable, and will remunerate the proprietor, that I hope you will allow me to say a few words in furtherance of the plan. I take it for granted that most lovers of natural history are collectors of subjects in their favourite branches, for future reference and collation; and those who are not, especially young students, ought immediately to become so. The very partial distribution of many of our native plants and insects (which constitute their variety), and the causes named by your correspondent, which confine most of our respective districts, present obstacles against forming extensive collections which only a favoured few can overcome; and not unfrequently occasion erroneous ideas of species known only through the medium of books, and are a great bar to extended views and general conclusions. Faithful coloured engravings are too expensive for the majority; indifferent ones are worse than useless; and even the best are less valuable for reference than the specimens themselves. At present, very few of these last can be purchased, even in London; some of our birds perhaps may, and the entomologist, by well-directed exertion, may procure a few of our finer Lepidóptera; but the botanist of plants absolutely none. The great stimulus lately given to every department of natural history by many able

publications, and by none more than by your valuable and delightful Magazine, is evinced by the increased number of its students, especially among the young and ardent, in every part of the country, and by the altered feelings and sentiments of many who formerly looked down upon it with contempt. From the unalloyed pleasure experienced at every step of our progress through this enchanting and exhaustless field, the number of its votaries must, with the progress of education and knowledge, keep increasing; and this view of it at once points out the ample support such an establishment would receive, and the numerous contributors who would supply it with specimens. So well assured am I of its success in proper hands, that did I know any competent person to whom its fair and reasonable profits would be an object, I would at once, on my own responsibility, urge him to undertake it. You, Sir, or some of your readers, probably do; for there are doubtless many, well qualified both from their zeal and knowledge of the science, who would rejoice at the proposal, particularly if it should be the means of releasing them from some present toilsome and uncongenial occupation which absorbs all their time and thoughts. Let me, however, suggest, that no private feeling of friendship, or laudable desire to benefit an individual, should be allowed to operate in recommending one not perfectly competent. Much of the prospective advantage, both to the naturalist, and, consequently, to himself, would depend upon this. When a proper person comes forward, let him, before he embarks in the undertaking, be introduced to two or three scientific naturalists in different departments, who, by a few questions, would soon judge of his fitness for the situation, and would gladly sign a recommendation in his favour, to be inserted in your Magazine. The lovers of natural history might then be requested, through the same medium, to lay the foundation of his stock in trade, by sending up any uncommon birds, insects, dried plants, seeds, &c., their respective neighbourhoods may produce; the strongest stimulus to do which will be, that they will receive in exchange the rare or beautiful productions of other districts, otherwise unattainable, to increase and adorn their own collections. Thus all will be mutually benefited, and the cost to each will only be a little energy and skill to rise betimes, and employ their leisure in the delightful and healthy occupation of ranging the field, the mountain, and the grove, in search of subjects, and in preparing them for the cabinet. As the season is now commencing, I would say to your young readers, let it not be lost; preserve as many specimens as you can, in anticipation; they will find their value at the general mart, and will, in another shape, be return to you tenfold: for you must recollect that what you contribute is only a surplus which you do not want, and cannot use yourself, while you will receive in exchange for them what is only to be found in different and distant parts of the country.

The portion of labour in the good work I would assign to you, Mr. Conductor, is to offer your pages and advice in maturing the proposed plan, to give any private assistance and instructions to the individual, and to solicit competent persons to affix to every species of indigenous plants, insects, &c., a number expressing its value, as suggested by H. C. W. These values should be fixed, or at least revised, by several individuals in each department, to insure accuracy, and catalogues should then be printed. You will not, I am sure, think I require too much; indeed I consider we have some claim upon you; for having by your Magazine excited so general a taste for natural history, you must also enable us to gratify it. It appears to me, that the greatest service you can render the British naturalist, and second only in importance to your Magazine, will be to promote the establishment of the proposed depôt.

The simplest plan for effecting exchanges would perhaps be, to value both those sent up and those returned, by the numbered catalogue, deducting a fixed per centage or commission for trouble and profit to the

manager. For example: if I send up specimens worth 1*l.* I shall be entitled to others bearing a similar value, less by 20 or 25 per cent (or whatever is thought proper), and in this case I should receive to the value of 16*s.* or 15*s.* I might also sell or purchase by the same scale. It also occurs to me that every person sending specimens for exchange should, in addition to what he is entitled to, be required to take others, to an amount in a certain ratio, for which he shall pay in money; otherwise the master of the establishment might soon become possessed of a large stock of specimens (provided that the bulk of his contributors wanted payment for what they sent up), while but little money might be received. No doubt many admirers of nature, and even naturalists who have not opportunities of collecting, would purchase; but it would still be well to provide against the contingency I have supposed above. — *J. E. Bowman. The Court near Wrexham, March* 6. 1830.

A cheap Work on the Microscope, with lithographic plates, is much wanted. Adams is not to be had, and is too dear, as is Goring's, for general readers. Perhaps a hint in the Magazine might call the attention of the Society for the Diffusion of Useful Knowledge to the subject, or induce some one to republish Adams, with notes and plates, in octavo, at less than half its original price. — *W. S. Buckingham, May* 31. 1830.

Causes of the Scarcity of Game. —It must have occurred to every sportsman, preserver of game, and game-keepers in particular, that hundreds of eggs are yearly spoiled by being moved out. By having no hen at hand ready to take to them, all care is useless; and more game is often destroyed from this cause than any other, because it is yearly and regularly operating. If to this we add a bad season during the period of hatching; the waste committed by many gentlemen in their French mode of sporting, namely, driving the game to a focus; and also the depredations of poachers, we may well wonder that we have so much game as we have. If, however, we could save only half the eggs that are every year thrown out, what an increase should we have in seven years! The application of fire seems not to answer; but perhaps a hot-bed made of dung, and carefully attended to, would answer the purpose. We well know that by regulating the heat by a thermometer we can attain and keep up any degree that might be required; and it seems preferable to any other mode, from its easy application in every situation, and from its furnishing a moist heat, which seems to be absolutely necessary to the success of the undertaking. Prizes should be given by game preservers to those who hatch and bring up the greatest number of healthy birds, in proportion to the number of eggs. The eggs, for the convenience of turning, should be placed in a kind of frame, made of slips of wood, with wire across; the wire on one side to be fixed, but made to open on the other. In this frame the eggs would lie in order, with hay between them, and the frame painted white on one side and dark on the other, to prevent mistakes in turning them: for if all the frames are placed with the white side up one day, all must have the dark side up the other, and no mistake can happen; and if each frame held fifteen or twenty eggs, the operation would be speedily performed. Except these frames, nothing else would be required but a common cucumber frame and thermometer. A few directions, as to the quantity of heat, should be printed, and the thing tried next spring.

Another thing, as an old sportsman, I wish to add, although many may not agree with me, yet experience tells me I am right; namely, we do wrong in killing all the hawks and owls. Of this I am daily more and more convinced. These creatures, it is true, destroy some game; but the mischief is not done by any animal that lives only on animals; the great destruction proceeds from weasels, stoats, rats, &c., which suck the eggs, and in one night destroy the whole. Now hawks and owls, although they will kill a bird or two, live chiefly on these nightly poachers; and as we

destroy these, those increase upon us. My orders now are, not to destroy hawks or particularly owls, nor will I suffer it to be done, till rats and weasels are killed off. Crows and magpies, like weasels, suck the eggs; they, therefore, should be killed; but never kill an owl. — *A Sportsman. Oct.* 1830.

Improvement in Ornithological Terms. — Having observed in the *Gentleman's Magazine* the amendments proposed by Mr. Vigors, in substituting names which should express the actions of the different kinds of birds for those of Linnæus, and admiring the happy selection of terms by which he has designated each class, it may appear presumption to recommend any change. It is therefore with great diffidence that I offer the following, having a reference to the structure and habits of the birds.

The second class named by Mr. Vigors Insessòres, or Perchers, might, perhaps, with more propriety be called Perticatòres, from *pertica*, a perch; the expression *insidere perticæ*, to sit on a perch, being well authenticated. With respect to the fourth class, the Grallatòres of Mr. Vigors, and Grállæ of Linnæus, expressive of the long legs of the birds, I would denominate them Vadatòres; a much nearer approach to the English name, Waders; and in order to maintain the same number of classes as used by Linnæus, which are reduced to five by Mr. Vigors, I would suggest the combining all the birds whose feet are formed for climbing in one class, to which the name of Scansòres, or climbers, might be applied, and would consist of the parrots, toucans, woodpeckers, &c.; birds which cannot well be ranked with any of the other classes. The table of classes would then be: — 1. Raptòres, or snatchers; 2. Perticatòres, or perchers; 3. Natatòres, or swimmers; 4. Vadatòres, or waders; 5. Rasòres, or scratchers; 6. Scansòres, or climbers. Should the above observations meet your approbation, their insertion in your very instructive Magazine will very much oblige, yours, &c. — *Juvenis. Edmonton, Oct.* 9. 1830.

Hints on Local Botany. — An account of a cavern, a ruin, or a romantic spot, is more interesting to the inhabitants of the district in which such an object is situated, than to persons living in a distant quarter, who probably will never visit the locality of such scenery. To the botanist or herbalist, the enumeration of plants that grow in those places to which he has access will be more attractive than the copious catalogues of the rare and beautiful species that adorn the fields of distant climes. The places where he has gathered scarce herbs form kindred associations with the things sought after, both becoming objects of peculiar interest.

To gratify the lovers of the spontaneous productions of our soil, I beg leave to recommend that, in your Magazine, a succession of local floras should be published from time to time. That all plants known to the collector, except such as are commonly found everywhere, should be specified, with their habitations, time of flowering, size, and colour, if remarkable in any of these respects. I should not, of course, confine or restrict the lists by the arbitrary division of counties, but embrace just as much of a district as the describer has carefully explored; remarking on the nature of the soil, its exposure, and most common productions, together with as precise and clear a description of the particular habitats as he can furnish. The work of Turner and Dillwyn on this subject will often prove but a precarious guide. In it there are several localities, given by Ray 160 years ago, and not since verified by succeeding investigators. Many have been introduced on the authority of other famous botanists of the seventeenth century, though the plants have not been found in the places assigned for their growth, either by the last or the present generation. Had the commons and waste grounds remained till the present time such as they were in the days of Gerarde, Doody, and Ray, it would be a pleasant task to compare the productions of the present with those of bygone days, and to observe the effect of time in increasing or diminishing herbs of rarity. But

the march of improvement, especially in the neighbourhood of London, has so completely altered the face of the earth, that our worthy predecessors, the ancient herbalists, were they permitted to revisit once more their favourite spots, could not now recognise the scenes of their former pleasures and disappointments. Norwood and Sydenham, the famous resorts of botanists, gypsies, invalids, and hunters of the picturesque, in former years, can now barely supply a bit of green sward, by the margin of the dusty highway, to pitch the camp upon. The once delightful and extensive view over parts of nine counties is now generally bounded by the straggling fence skirting the way, or the more impervious brick wall of the retired Londoner, who has acquired a right to property once the property of the public. Shooter's Hill is covered with enclosures small and great; and actions at law for trespass threaten the rambler with a bill of pains and penalties stuck up in many a corner. Bromley and Finchley Commons exist only in name. Yearly encroachments are made on the heaths of Hounslow, Bexley, and Hayes. The lovers of fresh air and heather bells have not been without their fears that even Hampstead heath will not long rejoice in its natural asperity, strikingly contrasted with the gaudy holiday-making folks that come in crowds from the great metropolis. Among those places still accessible to the peripatetic, Shirley Common seems to have been a great favourite with the botanists of the last century, and doubtless was fertile in rather rare alpines of the families of *C*ărex, Eriŏphorum, Lycopŏdium, *S*chœ'nus, &c. Although I have found little about Shirley for which I was anxious, I do not say that it is not worth visiting; but I would advise the visitor not to have too high expectations of its productiveness. Draining, enclosing, planting, and digging have each, in turn, contributed to the diminution of nature's gifts. Duppa's Hill, about half a mile beyond Croydon on the road to Epsom, seems formerly to have been more famous for the number and rarity of its produce than it is at the present day. It is now as unfavourable for botanical pursuits as the South Downs, near Brighton. High Beech, or rather a bog near it, in Epping Forest, has, I suspect, lost much of the celebrity it acquired during the times of Warner and E. Forster, jun. I wish some indefatigable botanist would ascertain if the latter gentleman's habitat (viz. High Beech) for the rare plant Campánula *h*ederàcea be correct; also if Aspídium Oreŏpteris is still to be found on Shirley Common.

With great expectations I visited Streatham Wells, hoping and wishing to find the place in its natural state, full of pits, springs, and gullies. Such has not been the condition of these mineral waters for many years; and whosoever goes to Streatham to gather plants marked in the *Guide* will certainly be disappointed. We have often to regret a want of preciseness in describing the habitats, and the giving of designations to places not known by the people who reside about the place. I once went out in search of Chisselhurst Bog, and was, after much fruitless enquiry, directed to a boggy place enough, near St. Mary's Cray, two or three miles from Chisselhurst. I subsequently ascertained that there is no such place; I have also found that the common people know the name of the occupier better than the name of his place. If I were to ask for Captain Cross's, every person in the vicinity could direct me to his farm; but if I asked for Hayesford, perhaps I should be directed to Hayes, a mile or two farther distant.

In conclusion, I beg to request every active botanist in the kingdom to arrange a list of all plants growing in his particular district, except those that are common to every place and situation; and to describe accurately the particular habitations in which they are to be found, and whether abundant or scarce in that place. Such a list would be a rare treat to the botanist, it would increase the numbers attached to this elegant study and healthful amusement, and would increase the facilities of improvement in the science. — *A. J. Kent, Nov.* 20. 1830.

Art. VIII. *Retrospective Criticism.*

The promised Series of Introductory Papers on the different Branches of Natural History.—Sir, I need hardly apologise to you as the conductor of a public journal, for reminding you that you have held "a word of promise to the ear," which has not as yet been fulfilled. In your early Numbers you promised a series of initiatory papers upon the different branches of natural history, and you certainly gave an earnest of what might be expected: but, with the exception of one or two papers, these have not been completed. Believe me, I do not wish to complain, as I am aware that very much matter of great interest must press for insertion; but having subscribed to your Magazine from the commencement, and feeling great interest in the study of natural history not only for my own sake, but for that of my pupils, in whom I have succeeded in raising a sincere relish for the pursuit, I thought a "touch at your elbow" would be sufficient, probably, to induce you to continue those communications which have set some young people seriously to work.

I quite coincide with you in some very wise remarks which you have occasionally dropped, that the study of natural history will do much for youth: and I feel certain that the habits of attention and discrimination thereby excited will do as much more in this respect, than the study of mathematics, as a close observation of facts does more than volumes of abstract reasoning. Yours, &c.—*J. B. A. Peckham, Oct.* 6. 1830.

The introductory papers we have for the most part discontinued, because they were objected to by many readers, chiefly on the ground that they could purchase separate introductions complete for little more than the price of one of the Magazines. More experienced naturalists objected to them as superfluous.—*Cond.*

The Missel Thrush (*Túrdus viscívorus Linn.*).—Sir, I send you a few remarks on some opinions stated by your correspondent J. B. (Vol. III. p 193.); and, as he wishes any one who has heard the singing of the bird quoted to state his opinion, I shall proceed to lay before you certain facts respecting it, which have come under my notice.

I most certainly agree with J. B. that the missel thrush (*Túrdus viscívorus*) may be classed amongst our song birds, and that it is one of the most pleasing in the spring of the year. It is then without a competitor, as it makes the groves and orchards resound with its peculiarly loud notes. That it has a harsh note I acknowledge; but that is when alarmed, or when it pursues the redwing (*Túrdus Iliacus*), the fieldfare (*Túrdus pilàris*), and the blackbird (*Túrdus Mérula*), from some favourite hawthorn bush, where they all regale in severe weather. He then shows his pugnacity, by attacking them without mercy, and driving them from the repast, which he monopolises. Your correspondent states that he has never been able to approach one near enough, whilst in the act of singing, to observe it minutely. Now, I have; for my occupation, which requires me constantly to be out of doors at all times, and in almost all weathers, enables me to note the different songs, flights, and habits of birds in this quarter with facility. I have often heard him, and been close enough to be positive that it was the missel thrush. I have once in my life observed one to sing whilst in the act of flying from one side of a field to the other; but it is a solitary instance, as I neither observed it before nor since, and had they been in the habit of doing so, I should most certainly have noticed it. Its song is louder, and the notes are shorter, than those of the blackbird, which it somewhat resembles; it will sing for a long time together "as hard as it can rattle." Its music, as near as I can judge, consists of four notes repeated over and over again, without the least abatement or variation. It sings most in breeding time, and generally in the morning.

J. B. observes they are of a shy disposition; but I fancy it is only in winter; for in the spring, when they build their nests, they evince no instinct in choosing a retired place; but, on the contrary, I have known them build their nests in orchards, within ten yards of a path side which was much frequented; and, in fact, I think them either the most foolish or the most impudent birds in existence. They commonly build their large coarse nest in apple trees, generally where the branches first diverge from the stem, and about six feet from the ground, and I have often seen a piece of bast mat dangling from the nest, a sufficient indication to some young urchin of where a prize is. Usually they construct their nest of coarse dry grass, plastered with dirt, and then lined with softer grass; but, from my own experience, I should say they are not very nice in the choice of materials. They lay from four to five eggs, rather larger than those of a blackbird, of a light bluish green, with spots of two distinct shades of brown; the spots or patches are most numerous at the large end of the egg.

They are very destructive in cherry orchards; where, with the blackbird, the throstle (*Túrdus mùsicus*), and the starling (*Stúrnus vulgàris*), they make sad havoc; they show no shyness then. I have shot many in the fact; but, though dispersed by the report of the gun, they in five minutes afterwards return to the attack, and gobble away, apparently to make up for lost time. I once knew an instance of a missel thrush laying its eggs on the place from which its nest had been taken the day before.

If you think these observations of any use, in corroborating the assertions of J. B., and refuting the opinion held by the author of *The Journal of a Naturalist*, they are much at your service.

Since writing the above, I heard one of the missel birds singing, on the 15th of this month, November, 1830. The morning was fine and sunny, and I am positive as to the identity of the bird. Should these remarks meet with your approbation, I may be induced to offer a few strictures in my next on several articles connected with natural history which are contained in the *Companion to the Almanack for* 1829; printed, I suppose under the direction of the Society for Diffusing Useful Knowledge. They are certainly misrepresented; and, in my humble opinion, whoever was the author of *Observations of a Naturalist* contained in the pages of that work, must have made his observations out of books in his study, and not copied them from the page of nature. Yours, &c. — *Scólopax rustícola. Chilwell, Nov.* 1830.

This contribution from *S.* rustícola is so practical, and consequently so valuable, that, from this sample, we must say, to store the fruits of his observation into our Magazine will at all times be a most agreeable task. — *J. D. for Cond.*

The Cuckoo and the Swift (*Cúculus canòrus* and *Cýpselus Á*pus).—I beg, through the medium of your Magazine, to convey my warmest acknowledgements to the Rev. W. T. Bree, for his criticism (Vol. III. p. 450.) on my statements relative to the departure of those interesting objects of natural history, the cuckoo and the swift. On reading the remarks of that able naturalist, I instantly referred to my journal, which I am in the habit of keeping daily, and from which I beg leave to extract my entry, on the 28th of July: "Heard my favourite, *C. canòrus*, at 5 A.M." *N.B.* "The last time," was added a few days afterwards. As I was that morning seated in my arbour, writing to a friend, who had spent the latter part of June and the beginning of July with me, and who used to take great delight in hearing the cuckoo, as he generally perched on the top of a tall elm on the opposite side of the field adjoining my garden, I communicated the circumstance to him as follows: — "My favourite cuckoo still continues to charm us with his twofold note, from his lofty elm; but, poor fellow,

his song is nearly ended, for his second note is very hoarse. He made five or six efforts this morning to tell me his name, but he became, as it were, vexed with his fruitless attempts, and flew away, muttering a language which I could not understand."

With respect to the *swift*, I am very glad the circumstance has been noticed, as it affords me the opportunity of correcting a typographical error. I referred to my journal for October 27th, but found no notice of the swift. On Sept. 27th, I found the following entry; — "Saw four swifts, this morning, flying in an easterly direction, apparently taking their final leave of us." *N. B.* "The last I saw this year," was added afterwards. As I did not notice the last appearance of the main body in my journal, I ought, for the cause of science, to have been more cautious in conveying a single fact in such a manner as to be understood in a general sense. As I am at all times anxious to promote the interests of science, I feel glad when notices are made of such things as appear at variance with general facts, as they have a tendency to produce accuracy of observation, as well as correctness in communication, while, at the same time they often elucidate such facts as appear almost incredible.

I beg also to thank your correspondent J. C. N. (Vol. III. p. 474.), for his satisfactory solution of my questions on the migration and breeding of swallows. By such communications much information is given, not only to the person proposing the question, but to every other reader who may be ignorant of such facts. —*W. H. White. Bedford, Jan.* 8. 1831.

Secretion of Wax by the Hive Bee.— Sir, I cannot but feel highly honoured by the critique in your last Number on my little work on *Insect Architecture*, from the pen evidently of a writer both of sound learning, and deeply conversant with nature. Perhaps you will spare me half a page to set him right on the subject of wax, as he thinks I have "been misled by Huber," in opposition to the opinion of "experienced apiarians." "It is to be regretted," he adds, "that Mr. Rennie, too implicitly adhering to the diction of an able though fallible experimenter, should have been the means of widely propagating an error on a practical point of natural history; and that, too, under the sanction of a Society for the Diffusion of knowledge." *

I should have regretted this as much as your intelligent critic; but in revising the volume last summer for a second edition (15,000 copies of the first having been sold in nine months), I did not feel myself called upon to alter the statements in question, which, so far as I know, are opposed solely by Huish; whose knowledge of such subjects may be fairly estimated from his denial of the existence of aphides in Britain: their "not having been observed in this country," he says, "may proceed from diversity of climate, which is not congenial to the growth of the insect!" † So much for the entomological knowledge of "experienced apiarians." Did Huish never hear of such an insect as the hop-fly (A'phis hùmuli)?

I was neither led, nor "misled, by the great authority of Huber." The first author who published the opinion that wax is *secreted*, not collected by bees, was Hornbostel, a clergyman at Hamburgh. ‡ This was republished as his own discovery, by Reim, in 1769 § Without being aware, it would appear, of the experiments of Hornbostel or Reim, our distinguished physiologist, John Hunter, published it as his own discovery in 1792 ‖; and the elder Huber, assisted by the clever daughter of Professor

* Mag. of Nat. Hist., vol. iv. p. 51.

† Huish on Bees, p. 201.

‡ Hamburgische vermischte Bibliothek, vol. ii. p. 45., for 1744; and Commer. Litter. Norimbergense for 1745.

§ Œuvres de Bonnet, vol. i. p. iii. 4to edit.

‖ Phil. Trans. for 1792, p. 143.

Jurine of Geneva, made additional experiments and dissections, all confirmatory of the same views. Farther, one of the most accurate and distinguished living experimental physiologists, G. R. Treviranus, has repeated the experiments and dissections of Hunter and Huber, with whom he agrees in opinion as to the secretion of wax by the bees; while he differs from Mademoiselle Jurine as to some minutiæ of structure in the secreting organs.*

I confess I have not repeated these experiments myself; it is impossible for the most enthusiastic naturalist to verify personally every fact: I have at least in this case trusted to three of the highest authorities in preference (after weighing the matter) to those of ignorant though "experienced apiarians." No one who has seen any of my papers will be apt to accuse me of readily bending to authority however high; though I perceive your correspondent, Mr. John Murray, says that I "echo" Mr. Blackwall's theory† about spiders. In that case I most carefully repeated and re-repeated all their experiments, and succeeded in verifying Blackwall's, but uniformly failed in verifying Murray's.‡ I think that, for the interests of science, both of these gentlemen might employ a few spare minutes to advantage in experimenting upon the best modes of writing with courtesy, and of treating an opponent with liberality. In the spider controversy, a most uncourteous, illiberal, and unscientific spirit has been shown. — *J. Rennie. Lee, Kent, Jan.* 26. 1831.

The Term "Trunk" in Entomology. — Sir, That I was "bold in attacking the authority of so eminent an entomologist as Mr. Kirby" I admit; but, whether or not any one besides myself has doubts upon the question, it is neither for your correspondent J. O. W. nor me to decide. What I meant by the "unscientific term" trunk, is the proboscis by means of which the Cùlices suck the blood of other animals. This proboscis is certainly not, nor could it be, represented in Mr. Kirby's figure, owing to the position in which the insect is drawn. There is, however, another distinction, which must be evident to any one who will compare the insect (fig. 91. *a*, Vol. I. p. 227.) with that figured in pl. 91. *b*, viz., the form of the body, the position of the wings, and the length and position of the legs, which, in the *Tipula* genus appear always of a disproportionate length compared with the body. — *A. L. A. Alnwick, Jan.* 4. 1831.

Cypèrus fúscus, a British Plant. — Sir, Under the head of "*Supplement to English Botany*," in your last Number, the writer, enumerating some of the principal contents of the work, mentions, among others, *Cypèrus* fúscus, "which," says he, "*we have endeavoured to persuade ourselves may be wild*," hereby, as it should seem, casting some doubt on the fact of its being truly a native. Having been myself the person who forwarded the specimens to Mr. Sowerby, as well as to Dr. Hooker some years previously, gathered in the low marshy ground near Little Chelsea, as mentioned in the *Supplement* and in *Flòra Londinénsis*, I beg to assure the writer of the article in question that the *Cypèrus* appeared to be undoubtedly a native in that situation. I was directed and accompanied to the spot, for the express purpose of gathering specimens of the plant, by that able botanist, my friend A. H. Haworth, Esq., who was the first discoverer of it in Britain. In this situation the *Cypèrus* occurred *copiously*, growing in small depressed tufts, which are well portrayed in Mr. Sowerby's figure, far better, indeed, than in that of the *Flòra Londinénsis*, where the plant is represented as assuming an erect form. From Dr.

---

* Zeitschrift für Physiologie, vol. iii. p. 62., for 1828.
† Mag. of Nat. Hist., vol. iv. p. 84.
‡ Insect Architecture, p. 344—354.

Hooker I learned (if my memory serves me) that this species was so widely distributed on the continent of Europe, the only wonder was, that it had not long before been met with in Britain. And Mr. Haworth remarked that it was somewhat extraordinary the plant should have so long escaped his notice, who had for a number of years resided at Chelsea, and botanised, with no little assiduity, in its environs; a circumstance, I may observe, which may afford encouragement to naturalists in general, and teach them that they ought never to despair of making fresh discoveries, even in the most beaten tracks, as well as in the less explored districts. This, I recollect, was the favourite maxim of the celebrated cryptogamist the late Mr. James Dickson, that, in whatever situation he might be cast, something new was generally to be detected as a reward for diligent research. Yours, &c. — *W. T. Bree. Allesley Rectory, Jan.* 7. 1831.

Art. IX. *Queries and Answers.*

Substance found in the Stomach of a Cow.—T. W. D. (Vol. IV. p. 90.), in speaking of a substance found in the stomach of a horse, says, "Can it have been formed of hair licked by the animal off its shoulders?" In the month of August last I saw a substance of the same kind in the possession of Mr. Rattray, surgeon, Glasgow; it was presented to him by a person who found it in the stomach of a cow. The substance was about the size of a tennis ball, perfectly smooth, and nearly black. Mr. Rattray had made an incision in it, to ascertain its contents, which proved to be composed of the hair of the animal. I am, Sir, &c. — *T. Blair. Stamford Hill, Jan.* 11. 1831.

Is it certain that the Fálco Ossífragus is a yearling white-tailed Eagle? — If it be, what is the reason that we have yearly several of the young visiting our rivers, and very rarely, if ever, an old bird? I have two killed within the last four years, and there have been several others shot. — *Edward Acton, Surgeon. Grundisburgh, near Woodbridge, Nov.* 29. 1830.

Pìcus mìnor. — The bird sent [*Pìcus mìnor Lin.*], I observed for a considerable time near the spot on which I was at work, minutely examining the bark of an old chestnut tree, and apparently feeding on some insect or other substance it discovered there. What is it? — *C. Spring. Jan.* 7. 1831.

The bird above-mentioned is the lesser spotted woodpecker (*Pìcus mìnor Linn.*), and a male; a well-known British bird, but by no means so common as the green or the great spotted woodpeckers. The habits of this diminutive species are similar to those of the other woodpeckers, and the wryneck; but, unlike the latter, the lesser woodpecker with its generic companions remain in England all the year. The mode of taking their food, and the structure of the tongue and its appendages were described in Vol. III. p. 474., under the article "Wryneck." Sibbald has recorded this bird as taken in Scotland, but probably by mistake, since, according to Mr. Selby, it is rare in the north, and he has never been able to trace it in Scotland, even where fir plantations and forests abound, which M. Temminck states to be its favourite haunt. Though diffused over our southern and western counties, it is not a species that can be considered plentiful. — *S. T. P.*

Necróphorus germánicus. — Sir, Encouraged by the manner in which the remarks of the most insignificant beginners are received, I venture to transmit to you the following; hoping that you, or some of your correspondents, will have the kindness to solve my difficulties. There is an insect which I have often seen in the pools on the commons in the neighbourhood of London, of which I never could find out the name, until the other day, when I saw one in the museum at Ghent, in Holland, with a

label, on which was written, "Necróphorus germánicus." I once caught one in the gravel pits on Tooting Common, and kept it for some time in a globe of water. I used to feed it with worms, or insects, of which it was very fond. It was excessively ravenous, and appeared very quick-sighted; for it used to dart at its food the moment I dropped it in, fix its pincers in the insect, and keep hold of it until it had entirely sucked out the contents. After I had kept it for some time, I gave it a companion: when it saw the new comer, it remained stationary for a few minutes, then darted at it with incredible swiftness, and killed it almost instantaneously; nor did it scruple to satisfy its hunger on the body of its dead enemy. It lived for several weeks; at the expiration of which time it died, owing to neglect in my absence. I ought not to omit the fact that it repeatedly inflicted wounds on my finger with its pincers, which were very sharp and hard. The shell of this little animal resembles that of a shrimp, and its tail ends in a bunch of hairs. Yours, &c. — *Thomas Chapman. Oxford, Sept.* 1830.

Note by Mr. Sowerby. — The Necróphorus germánicus feeds upon carrion, in its larva state; it then bears only a slight resemblance to the water insect here spoken of, which is rather the larva of Acílius sulcàtus or *Dy*ticus marginàlis, or some similar water insect. I have seen such feeding upon small fishes, and have dried specimens. — *J. D. C. S.*

Cárabus nemoràlis. — I beg to inform your correspondent, A. L. A. of Alnwick (Vol. III. p. 477.), that the *C*árabus nemoràlis is a common insect, I believe, throughout Britain. I have frequently taken it in gardens and under moss, at all times of the year. It is more generally known by the name of *C.* horténsis *Fabr.*, and is mentioned in Marsham's work on *British Coleóptera*, in Samouelle's *Entomologist's Compendium*, in Stephens's *Illustrations of British Entomology*, &c. — *A. Wright. Askam Bryan, York, Nov.* 2. 1830.

Còlias Edùsa and Cýnthia cárdui. — I should be much obliged to any of your entomological correspondents who would inform me whether they have noticed the Còlias Edùsa or Cýnthi*a* cárdui this year. The periodical appearance of these insects, as well as of Vanéss*a* Antìope, has been the source of much fruitless conjecture among entomologists, but has never yet, I believe, been sufficiently explained. I have not heard of the Còlias Edùsa having been taken anywhere this year, nor the Cýnthi*a* cárdui indeed, except one specimen which was captured by a friend of mine while I was present, on the 13th of July last. — *A. Wright. Askam Bryan, York, Nov.* 25. 1830.

Poisonous Plants. — In Smith's *Introduction to Botany* (ed. 5. p. 317.) it is stated that no traveller, in the most unknown wilderness, need scruple to eat any fruit whose stamens are thus situated, i. e. growing from the calyx. In *Eng. Fl.* (vol. ii. p. 228.) the genus *D*áphne is represented as having its stamens growing from the calyx; which is also stated with regard to the natural order *T*hymelèæ, to which this genus belongs. (*Syn. of Br. Fl.*, p. 208.) The *Encyclopædia of Plants* gives its generic character thus: — "Cor. (cal.?) 4-cleft, like a corolla, withering, including the stamens," &c. It appears, then, that the stamens are inserted into the calyx, and yet "the berries (of *D. Mezèreum*), when swallowed, prove a powerful poison, not only to man but to many quadrupeds." (*Encyc. of Pl.*) How are these statements to be reconciled? or if, when the stamens are inserted into the calyx, the fruit is wholesome, how comes it that, in this case, the fruit is poisonous? Linnæus regarded the envelope of the *D*áphne to be composed of the calyx and corolla. (*Phil. Bot.*, 90.) Does it not seem to partake more of the nature of a corolla than of a calyx, if not truly a corolla, as it is called in *Syst. Vegetab.*? — *L. D. Sept.* 28. 1830.

A certain uncommon Plant in the Loch of Spynie. — There are many singular circumstances, interesting to the naturalist, noticed in his *History of Scotland*, by Leslie bishop of Ross, the intrepid defender of the unfor-

tunate Queen Mary. The following passage, extracted from his *History*, relates to a plant which grew in his time in the Loch of Spynie, and which, from the account given by him, in all probability is still to be found there.

" Lacum præterea dulcis aquæ Spynam nomine, oloribus quidem multum frequentem Moravia habet, in quo herba quædam rara est, qua quod olores impense delectantur olorinam eam dicimus. Ea utique hujus naturæ est, ut ubi semel radices erigerit, tam late se diffundat, ut nostra memoria quinque ipsius Spynæ milliaria, ubi prius salmones exundabunt, radice sua altius evecta penitus vadosum jam effecerit." *

The more conspicuous plants that are now to be met with in the Loch of Spynie are *T*ỳpha latifòlia, Dr. Hooker's *British Flora*, p. 386.; *Sc*írpus lacústris, p. 20.; *A*rúndo *P*hragmìtes, p. 52.; *S*pargànium ramòsum, p. 386.; *S*ium rèpens, p. 125.; and *R*anúnculus língua, p. 265. Is not the first (*T*ỳpha latifòlia) the most likely to have had the name Olorìna given to it? The Loch of Spynie was formerly much frequented by swans during the winter season. Sir Thomas Lauder, in his *Account of the Moray Floods*, p. 173., mentions that fourteen were once killed there at one shot. There are now but few that visit it, and then only as a resting place in their migrations. The swans, that were wont to remain in this lake throughout the winter, would often resort to the clumps of *T*ỳphæ, and shelter themselves among the tall stems and leaves, which are generally not overthrown and dispersed until the approach of spring; and during frost the swans would be always seen among them: for the water about them would be the part of the lake that would remain longest open; so that the birds would be allured thither by the easy, the only, access they had to their food among the roots. Then may not the circumstance of the swans thus frequenting the clumps of *T*ỳphæ have suggested the name Olorìna, or swan-herb; or is there any other property by which it merits this appellation? Is there any other author who applies this term to it, or who uses the term Olorìna as a name for any other plant? Should it be ascertained that the *T*ỳpha latifòlia and Olorìna are synonymes, ought it not to be introduced into lakes, in pleasure-grounds, where those graceful birds are kept; and the more readily, as it is " one of the handsomest aquatics of the reed kind?" (*Encyc. of Plants*, p. 774.)

The rapidity with which the Olorìna is said to have spread itself cannot be but greatly overrated; for, otherwise, it must long ere now have covered every square foot of the lake, and reduced it all to a mere puddle. It is likely that the worthy bishop has here mistaken the effect for the cause. Probably about the time when he first saw this lake, there occurred a partial subsidence of its waters: and, as the *T*ỳpha latifòlia (supposing it to be the Olorìna) will not grow in the deeper parts, this subsidence left many suitable spots for it, where it was observed to spring up and flourish in after years. — P. *Elgin*, *September* 27. 1830.

Touchwood. — Sir, I am desirous of knowing what observations have been made on decayed wood commonly known by the name of touchwood. The wood in the progress of decay has undergone in this state of it a remarkable change. Its solid texture has disappeared; it is now light and

---

* " Moreover Moray contains a lake of fresh water denominated Spynie, greatly frequented by swans, in which there is a certain uncommon herb, with which the swans are greatly allured: we call it the " the ulleriore;" it is moreover of this kind, that when it hath fully established its roots, it spreads itself so widely, that, in my memory, it hath extended its basis so far as to have rendered five miles of the lake itself of Spynie, where salmon formerly abounded, altogether shallow." (*Translation from the Agricultural Survey of the Province of Moray*, p. 2.)

friable; it easily takes fire, and is indeed used for tinder. When once kindled, it burns for hours, until the whole is consumed, without ever bursting into flame, and however small the part to which the spark of fire has been communicated; and, what is still more remarkable, the whole mass of wood, even when not ignited, gives a bright light in the dark, equal in intensity, and similar in colour, to that given out by phosphorus. How this light is produced I am at a loss to know. On examining a piece I some time ago picked up, it was evident that it contained neither phosphorus nor nitre. It is now pretty well ascertained that the glow-worm and other insects of the like kind do not produce their light by means of phosphorus.* I can find no information respecting touchwood in any books which I have at hand, and I shall be thankful if any of your readers can refer me to any experiments upon it. — *B. October*, 1830.

Apócynum androsæmifòlium. — In mentioning *The Journal of a Naturalist*, a work from which I have derived much instruction and amusement, I regret that there is any part which can afford opportunity for condemnation, but the account (p. 80. 1st edit.) and engraving of that curious plant, the *Apó*cynum androsæmifòlium (Fly-catching Dogsbane), is so very incorrect, that I cannot think the author can ever have *seen* a specimen, much less *examined* one. From having frequently examined the plant, I can recommend to the notice of your readers the description of it in *Curtis's Botanical Magazine*, vol. viii. p. 280., as being very accurate and clear. It is accompanied also with a correct representation of the flower. — *W. C. T. Jan.* 28. 1830.

Potato Stone. — Can any of your numerous readers inform me of the scientific name of the potato stone, as it is commonly called, of which such quantities are found in the Mendip Hills, and also the particulars of their composition? — *W. A. September* 18. 1830.

Ætites or Eagle-stone. — Sir, Your correspondent H. D. (Vol. III. p. 484.) has some observations on the *Æ*tites, and asks "where it may be found in this country." The *Æ*tites is the hollow reniform variety of the argillaceous iron-stone. Specimens of this mineral were formerly sold as talismans; and in some parts of this country the midwives keep them about their person, as a sort of charm to further the delivery of their patients. In Greece this is a common notion and universal practice. With respect to the eagle, it is probable that the *Æ*tites may have been found in the nest of that bird, if, as it has been said, they are useful to its digestion. Some accident of the kind may have given rise to the name; for we cannot imagine that eagles are such old women as the before-mentioned midwives. The following remarks will show that whatever may be the cause of the eagle's affection for this mineral, she need not take a voyage to the East Indies in order to gratify her taste.

Lemhard (*Handbuch der Oryktognosie*, 1826, p. 235.) places the "Adler- oder Klapper-stein," (eagle or rattle-stone) in his appendix to his *Eisenoxyd Hydrat*, as the first species of yellowish clay iron-stone, and says that they are often filled with calc spar, brown spar, selenite, or barytes; and gives the following list of localities of the species: —

Goslar, in the Harz; Quærum, near Brunswick; Tarnowiz, in Silesia; the country about Bilin and Töpliz, in Bohemia; Meggendorf and Hartenstein, in Bavaria; Colebrook Dale, in England; Dunbar, in Scotland; Egypt, on the borders of the Desert; Siberia, &c. He also states, that the eagle-stone is found in Italy, in the calcareous strata about Bettola, Torrita, and Monte Follonico in the country of Siena, and near Orbegne, Fosso del Acqua, &c., where it is known by the name of Pane del Diavolo.

Phillips (*Mineral.*, p. 237.) gives, as localities of the clay iron-stone,

---

* See an interesting paper published by Carus, Dresden, 1829: "*Ueber das Licht der italianischen Leuchtkaefer.*"

"the beds in the clay-slate belonging to the transition class of rocks (?). More abundantly in the slate-clay or shale of the independent coal-formation." He adds, that in England and Scotland it is abundant "in many, if not most of the coal deposits;" and says that "crystals of blende, galena, and yellow copper are observable in the interstices of the amorphous from Wednesbury, in Staffordshire."

H. D. will find plenty of *Ætites* in the banks of the road between Whitehaven and St. Bees in Cumberland; as well as in other vicinities of the coal measures. Also in the beds of the London clay, as at Logham in Suffolk; in the plastic clay, as at Reading in Berkshire, and Logham in Suffolk; and in the sands of the crag, as at Tattingstone, in Suffolk, where they are not only very abundant in the upper part of the formation, but of an extraordinary size. I mention these latter places from personal observation only. — *W. B. Clarke. East Bergholt, Suffolk, September* 7. 1830.

A Black Mineral Substance found in Clay. — This substance was discovered in the large excavation now being made to connect Lake Lothing with the sea at Lowestoft; being part of the plan for making Norwich a port. It was found about 8 ft. below the level of the ground; the first 6 of which are peat or decayed vegetable matter of comparatively recent formation, it is supposed, as among it we find parts of oak and chestnut trees, which retain their natural hardness; below this, about 1 ft. of an irregular stratum of sand or gravel; then a strong blue clay, thickly interspersed in places with small nodules of chalk. The stratum of clay is very irregular in this place, about 6 ft. perhaps; and, below that, sand to a greater depth than has yet been excavated. The black substance was found about 1 ft. in the aforesaid clay, in an irregular mass about the size of a man's open hand, laid horizontally. When first discovered it was in softness and elasticity resembling strong glue when first cold; breaking with a similar fracture, but more easily. When cut into slices as thin as paper, which was easily done with a sharp knife, it was semitransparent, and appeared of a rich brown colour, which it also showed when rubbed on paper. By exposure to the atmosphere it gradually hardened as it now appears; at the same time shrinking to one eighth of its former bulk; a piece cut into a cube exactly half an inch on the side, shrinking to a cube a quarter of an inch on the side. When submitted to the action of fire, it emits neither flame nor smoke, but leaves hard white ashes. Neither water, spirit, nor acids have any effect upon it. From its contiguity to the peat, it might be thought an incipient formation of coal; but the total absence of bitumen, or inflammable principle, seems to contradict that idea. — *G. M. Lynn Regis, Dec.* 1. 1830.

The substance sent is anthracite, blind coal, Kilkenny coal, or glance coal. There are three varieties; and that sent appears to be the conchoidal anthracite of Jameson. Its colour is iron-black, sometimes tarnished on the surface with a splendent metallic lustre; fracture conchoidal, with a pseudo-metallic lustre. It is brittle and light; it yields no flame, and leaves whitish ashes; it is found in the newest floetz formations at Meissner in Hesse and Walsall in Staffordshire." The other two varieties are slaty anthracite and columnar anthracite. — *Cond.*

The Weather; in reply to Mr. Main. — Sir, In reply to your very intelligent correspondent Mr. Main (Vol. III. p. 487.), I would, in the first place, beg to offer him my best acknowledgements for his very judicious remarks on my meteorological queries (Vol. II. p. 177.). With regard to the differential thermometer, it was first invented by Professor Leslie of Edinburgh, and called by some a thermometric hygrometer. Its use is to mark the difference of temperature produced by evaporation, and in its simplest form may consist of two ordinary spirit of wine thermometers, graduated on the same principle. One of the balls is covered with tissue paper, the

same colour as the spirit of wine in the other, and is kept constantly moist by some capillary substance connecting it with a vessel or phial holding water. The caloric thus abstracted from the liquid in the moistened ball by evaporation on its surface, depresses the temperature in proportion to the intensity of evaporation or capacity of the air for holding moisture in a state of vapour. The difference of temperature indicated by the thermometer with the moist ball forms only one co-efficient, along with the actual temperature of the air, force of vapour, and atmospherical pressure, in the calculation, to find the quantity of moisture in a cubic foot of air, the dew point, or, as some call it, the "point of deposition," &c. If Mr. Main wishes further information on this point, I must refer him to *Brewster's Encyclopædia* (article Hygrometry, by, I believe, Dr. Anderson of Perth), and to Professor Leslie's articles of the same nature in the *Encyclopædia Britannica*, in which he will find the instrument fully described in its original form, where the balls are filled only with air. He will also find the tables and formulæ necessary to ascertain the quantity of moisture in a given volume of air, point of deposition, &c. He will observe from what I have stated that the "dew point" is "a point in nature." He asks "which degree of increasing moisture on a body cooled down by artificial evaporation can be properly called the dew point?" which he says "begins at the second degree below the temperature of the air (whether visible or not.)" In reply, I would say that the point at which moisture becomes visible in the cooled substance is the point of temperature generally, and I think very properly, called in practice the "dew point." It may be possible, as he says, that "a solid body begins to be moistened at the second degree below the temperature of the air, whether visible or not;" but if "invisible" how is he to know it? for, in certain states of the atmosphere, we find that such moisture does not become visible at the second, at the fifteenth, or even at the twentieth degree below the temperature of the air with the best microscopes. Mr. Main is too much a lover of science not to excuse the freedom of these remarks, which my limits, in the mean time, prevent me from extending. Yours, &c. — *A. Gorrie. Annat Gardens, Dec.* 1. 1830.

Comparative Indications of Spring.—Would it not be of some use for one of your correspondents in every county of Britain and Ireland to send you a notice, in the last week of every February, on what day of that month the common snowdrop, the striped or Scotch crocus (*C.* biflorus), the aconite, the white Christmas rose, and the catkins of the hazel, came into flower? The plants must have stood undisturbed in the same spot for two years, otherwise their indication will not be accurate. — *J. Lequin. Feb.* 5. 1831.

Art. X. *Obituary.*

Died, on the 26th of December, aged 59, at his house at Tottenham, *Thomas Carpenter*, Esq., an eminent naturalist and cultivator of science. His researches and discoveries in the economy and instinctive operations of insects and microscopic animalcula were original, extensive, and curious. Many of the latter were but the ten-millionth part of an inch, yet all in life or animated motion. He improved the method of illuminating the minutest opaque objects by candle-light under the compound microscope. He published many of his observations and discoveries in the latter volumes of *Gill's Technological and Microscopical Monthly Repository*, and it may be considered a loss to science that he did not live to continue these observations. — *Anon. Jan.* 1831.

THE MAGAZINE

OF

NATURAL HISTORY.

MAY, 1831.

ART. I. *Account of an Ornithological Visit to the Islands of Shetland and Orkney, in the Summer of* 1828. By RICHARD DROSIER, Esq.

(*Continued from* Vol. III. p. 326.)

TAKING leave of Foula, I with some difficulty crossed the boisterous sea that runs between this island and the island of Valey in Shetland. The boat that is most in use is the Norway skiff. These long passages, therefore, in unsettled weather become rather hazardous.

Valey, a small island, nearly opposite to that of Foula, is divided from the mainland by a spacious and commodious harbour. The entrance to this harbour is with difficulty discerned until nearly within its mouth, owing to a huge fragment of rock that lies immediately in front of it, round which the tide runs with an astonishing velocity. The tide, being farther confined within the narrow limits of the mural cliffs that afford an entrance to the harbour, foams and boils with increased violence, as it rushes along, as if running through a funnel, until, escaping from the contracted passage, it mitigates its impetuosity, and sweeps away into a most beautiful expanse of water, uniting again with the sea by a somewhat enlarged channel, at the south-eastern extremity of the island. Valey possesses little ornithological interest. A few of the common guillemots, razor-bills, and kittiwakes, scattered thinly along the cliffs that form the western and southern sides, are the only birds observable. There are, however, a pair or two of the peregrine falcon, that repair annually to the island for the purpose of breeding; building in the most inaccessible places, which are only to be gained by the best and ablest rockmen; and even then it is very uncertain if the

nest can be discovered; the old bird always taking flight upon the first appearance of danger, and wheeling in circles over the fowler's head, uttering at intervals the peculiar cry of the falcon tribe, which she continues to do until he leaves the crags.

Passing from Valey, along the diversified shores of the western coast, there is little to attract the attention, and nothing beyond the usual appearance of these desolate isles presents itself to the view. On the island side, the barren and dark-brown heath that everywhere clothes the face of the country stretches away as far as the eye can reach, broken into the greatest irregularity of hill and dale, and variegated by blocks and slabs of sandstone and granite, that are abundantly strewed in every direction. This covering but too plainly indicates the scanty portion of soil that sparingly supplies the only vegetation of the place, and over which a few half-starved sheep and some shaggy long-coated ponies wander in pitiful misery. Wretched as these animals look, they are, however, but little inferior in appearance to the peasantry, who are altogether careless of agricultural pursuits, and merely scratch the surface of the ground with their uncouth implements of husbandry, to form a small spot around their miserable huts barely sufficient to raise a few potatoes or oats. There are, however, some resident gentlemen in the isles, that have by indefatigable exertions managed to cultivate some few acres; but the keen easterly breezes of spring, together with the saline matter that is constantly held in solution by the atmosphere, tend greatly to check vegetation, and to throw a damp upon the labours of the peasant, by too often blighting in his small portion of oats the whole efforts of his industry. Yet withal the Shetland peasant is comparatively happy and contented, perfectly indifferent to luxury, and careless of those comforts which more particularly mark the more southern climates. He passes the long dreary months of winter in ease and indolence; collecting his family and friends around the huge pile of peat that burns in the centre of his hut, where the dance and the song circulate in joyous hilarity. As soon as the fishing season commences, however, all is bustle and confusion; for on that depend his sole hopes of subsistence. Aroused from apathy, he then launches his little skiff upon the ocean, and bids farewell for a few days to his wife and family, who attend him to the shore with wishes for good fortune and success.

Papastower, a small island to the north of Melby, is in itself one of the greatest curiosities of the Shetland Isles. On its northern sides it has three peculiar inlets, which run almost

parallel to each other, and terminate about the centre of the isle. These inlets are called by the natives goe or goes, being so denominated from the perpendicular and lofty precipices that overhang them; and in the indented hollows and fissures of which the sea roars like the falling of a distant cataract. The inhabitants, during the summer season, under the direction of the proprietor, search these inlets for the purpose of killing seals, the oil of which is in requisition for various purposes. The manner of taking them is this. A net sufficiently wide and strong is stretched across the mouth of one of these inlets, being well weighted at the bottom, and fastened by its upper ends very securely to each side of the entrance. When this is properly arranged, the men, armed with old whale spears, spikes, and sticks, enter the goe, and forcing their way over the broken particles of rock, that are plentifully strewed along the margin of the water, they proceed to do dreadful execution among the alarmed animals, which usually tumble headlong into the water, from their rocky resting-places, upon the first appearance of the boats at the entrance of the inlet; but, when they find their passage to the sea prevented by the net (which they in vain attempt to dive under), return up the goe, in wild disorder and confusion, blowing, flouncing, and snorting, the noise blending with the undulating of the water against the sides of the precipices, and producing a very curious effect. At the commencement of the sport, the water, from being excessively clear and limpid, affords an easy sight of the seals, as they pass and repass at the bottom, or about mid water; but, as the moment one of them emerges for the purpose of blowing he is generally received by a blow on the nose, or a stab with a whale spear, the water, after a time, becomes so thick and bloody as entirely to prevent the possibility of seeing a foot under it. After the sport terminates, the seals are hauled away to the boats and towed on shore. This diversion can only be pursued during very calm weather, as on the slightest breeze from the sea, the water becomes so agitated, and breaks with such fury upon the entrance of the inlets, as to render it impossible to gain a landing. In fact, even to attempt it at such times would be attended with the most imminent danger, as the sweep of the surge is almost sure to dash the boat to atoms.

Leaving Papastower, I crossed the Bay of St. Magnus; in passing which, a pair or two of the eider duck (*Anas mollíssima*), or a small tribe of the long-tailed duck (*Anas glaciàlis*), (solitary loiterers from the company that have preceded them to their more northern breeding-places), are occasionally seen; and the traveller is often amused by the strenuous

and hawklike actions of the arctic gulls, that sometimes pitch *sans cérémonie* upon a wandering kittiwake, with such rapacious ferocity that both fall entangled to the very surface of the water; when the kittiwake, for the purpose of disengaging himself from his adversary, alights for a moment on the billows, and, lightly gliding over the tops of the rolling sea, with that buoyant elegance so peculiar to the gull tribe, he is safe. At such times the arctic gull wheels a short flight in an opposite direction, as if intending to leave his intimidated victim, which the kittiwake perceiving, he thinks a fair opportunity is afforded for making his escape; but no sooner does he trust himself once more upon his wing than the aquatic falcon, suddenly returning, skims the surface of the billows with the rapidity of an arrow, and quickly coming up with the harassed kittiwake, generally forces him to disgorge his half-digested fish, which the plunderer catches for himself ere it reaches the water.

Ronas Hill, the loftiest mountain in the Shetland Isles, is situated a few miles from this bay; and a pair or two of the skua gulls, in their passage from the north to Foula, for the purpose of breeding, often arrest their flight, and fix their abode upon its very summit. This pinnacle is generally so completely enveloped in the mist that almost always encircles these isles, that it is rarely visible; though its ascent is by no means difficult, and on a clear day the view from the top amply repays the labour of climbing to it. The snipe and golden plover breed plentifully at its base, while, higher up, a few pairs of the arctic gulls are observable. The remaining northern isles, Yell, Unst, and Fetlai, afford but little treat to an ornithologist; the common sea-fowl annually resort to many of their craggy sides, and are continually seen while passing Yell Sound, hanging in the bluish cast of the distance, near their favourite haunts, like clustering swarms of bees.

During a conversation that I had with Dr. Edmonston, the author of an interesting work on the Shetland birds, he stated that the wimbril (*Scolopax phæopus*), called in Shetland the waup, usually repaired to the islands of Yell, &c., for the purpose of incubation; but, although every endeavour was used by me to ascertain the truth of this statement, I was unable to discover the slightest appearance of a nest; nor did I observe that the birds alluded to were more numerous in the northern than in the southern isles. In fact, this bird is but thinly distributed over Shetland during the summer; but as autumn advanced, I occasionally discovered small flocks of six or seven searching for marine worms, &c., along the tangle at low water mark. I killed several, but all appeared to be

evidently young birds by the variegated dark colouring of their plumage. From this circumstance I was led to infer that, although a pair or two might sometimes stay and breed in Shetland, by far the greater number of those often seen in the early part of spring and latter part of summer were birds going to, or returning from, climes farther south. Dr. Edmonston thinks the contrary, and firmly believes in the truth of his statement, the validity of which, I must say, I was unable to prove.

Nothing unusual arrests the attention along the eastern coast; though the tides and coasts are somewhat dangerous, owing to the many eddies and whirlpools occasioned by the impetuosity of the current, which rushes with irresistible violence around the projecting angles or buttresses of rock that are everywhere distributed over the irregular and straggling shores of Shetland. From Unst, two days' easy sail will give the traveller sufficient time to observe the beauties of the many bays, inlets, and promontories, and bring him to Lerwick, the capital. Opposite to Lerwick, upon the eastern side of Bressa, lies the small island of Noss, which may be ranked next to Foula for ornithological interest; almost every bird that breeds in these isles, except the skua gull and Manks puffin, being found during the summer months in Noss. The island is beautiful, and, to be seen to advantage, it ought to be viewed from the sea in a boat. The eastern extremity or head, known in the island by the name of Langcliff, merits the first attention, and is certainly a grand and lofty precipice; possessing in its strata the finest and most beautiful shades of brown, dark brown, and black, which, broken and shattered into an irregular surface, or running in distorted ridges, present a variegated relief to the otherwise fractured appearance of the face. Files of razor-bills, guillemots, and puffins are ranged in regular ranks, their white breasts affording a striking contrast to the dark colour of the cliff; while, nearer to the sea, and somewhat more to the left, the ledges are occupied by kittiwakes. I invariably observed, indeed, that, to whatever crags the guillemots resorted, they were attended by more or less of these gulls; but, although this was always the case, there was still a regular line of demarcation between them, neither attempting to approach upon the precincts of the other. Upon the firing of a gun under this cliff, the birds with which it is covered tumble from the rocks in astonishing multitudes, and present a very easy mark to the sportsman. Numbers of these birds are often killed by parties of pleasure from Lerwick, and distributed among the poorer classes for eating.

A little to the south of this head is a huge isolated fragment of rock, apparently severed from the island by some powerful convulsion of nature, presenting a frightful chasm, from 300 to 400 ft. in depth, and from 90 to 100 ft. across it. This rock is about four yards in diameter, and is regularly occupied in the breeding season by the black-backed gull (*Lárus marínus*), herrier gull (*Lárus fúscus*), and lesser black-backed gull (*Lárus argentátus*), which from their quantities, almost cover the ground with their nests. To obtain the young of these birds, which are held in rather high estimation for the table, and are called scories, two ropes are stretched across the chasm, and strongly secured to a post placed on the rock for that purpose; a sort of square box is then procured, 3 ft. long and 2 ft. broad, termed a cradle, having an upright piece of wood about 4 in. square at each of its corners, projecting a few inches beyond the box, with holes sufficiently large to admit the ends of the ropes, which are passed through them, and fastened very firmly to the island. The bottom of this cradle is made by coarse rope lacing, to render the seat easy for any person passing over; and, thus suspended, the natives pass and repass very readily, without any fear of danger. This cradle was erected by a rockman from Foula who first scaled the eastern crag; a most laborious and hazardous undertaking. A considerable number of spectators attended from Lerwick to see this feat achieved, which the daring adventurer performed with apparent ease, to the great astonishment of those who were observing him from below in boats, and who expected every moment to see him fall headlong from one of the many jutting prominences that he was forced to ascend. He, however, reached the top, and, waving his hat to assure the multitude of his safety, was answered by the loud shouts of the delighted assembly. By the means of a small cord, which he had carried with him for the purpose, the post and implements necessary for sinking it in the rock were hauled up; as also the ends of the two ropes which were to support the cradle. In a short time all were securely fastened, and the cradle properly suspended; but the rockman, intoxicated with the reverberating shouts of those who saw him, and proud of his prowess as a climber, spurned the idea of passing over the chasm by his own machine, and chose rather to descend by the crags. He had, however, scarcely advanced 50 ft. from the top, when, missing his step, or being too careless, his foot slipped, and he fell headlong into the roaring surge that was lashing the base of the precipice.

The nest of the black-backed herrier and lesser black-

backed gulls very nearly resemble each other, but little difference being observable: the bottoms are composed of a very thick layer of dried sea-weed, and the insides are lined with fine dried grass; amongst which a feather or two are sparingly placed. Those of the black-backed gulls were easily distinguishable from the rest by their size and the largeness of their eggs, which are about the size of those of a turkey; they lay from three to four in number, of an obscure dirty green, blotched, and marked with spots of dark brown and black. In fact, the eggs of these birds, in their colourings and markings, so much assimilate, that it is almost impossible to know the difference between the eggs of the herrier gull and those of the lesser black-backed gull, their size being also nearly equal. From the repeated observations, however, that I have made upon the eggs of these birds, I am inclined to believe that those of the herrier gull are longer, and more pointed at the small end, than those of the lesser black-backed gull: the eggs of these last-mentioned birds are held in high estimation as a delicacy, and are in flavour very nearly equal to those of the pee-wit, or green plover. The boys and peasantry search the hills and rocks for the purpose of collecting them, and they are afterwards offered for sale at Lerwick. I am, Sir, &c.

RICH. DROSIER.

Morston, Holt, Norfolk, Nov. 28. 1830.

ART. II. *Evidences in Proof of certain Statements contained in the "Gardens and Menagerie of the Zoological Society delineated."* In a Letter to the Conductor. By E. T. BENNETT, Esq. F.L.S. Vice-Sec. Z.S.

Sir,

IN the Eighteenth Number of your Magazine, published on the 1st of this month, you have given insertion to an article by Mr. Swainson, in which certain statements contained in the *Gardens and Menagerie of the Zoological Society delineated* are attributed to Mr. Vigors, and in which also the accuracy of those statements is impugned. To correct the erroneous impressions which such representations may have produced is the object of the present communication.

The assumption that the portion of a paragraph extracted (p. 102.) is "the statement of Mr. Vigors" is wholly groundless. Although I feel much indebted to that gentleman for the pains he has taken in revising the whole of the proof

sheets, not a single sentence of the two volumes now completed was written by him, except where expressly quoted from his published works. I affixed my name, as editor, to the preface to the first volume, contained in the tenth number, and published in July last; and a statement that "the descriptions and anecdotes" (in other words, the entire text) were furnished by me, appeared on the cover of every number, from the first to the twelfth, including the eighth, "the last number," as Mr. Swainson was informed, "which has been published," and the eleventh, to which he refers. I alone am therefore responsible for the paragraph in question, as well as for the whole of the statements contained in the publication.

That paragraph I must request that you will again print (on the present occasion entire), in order that your readers may have an opportunity of judging at a glance whether the statements contained in it are or are not borne out by the evidence which I am about to produce. It is as follows: —

"The history of this transaction [the discovery of the Indian tapir] affords too striking an illustration of the injustice of certain among the French zoologists to the merits of our countrymen, to be passed over without observation.

"'The knowledge of this animal in France,' says M. Desmarest, in his *Mammalogie*, carefully shielding himself under an equivocal form of expression, 'is due to M. Diard.' But M. Lesson goes farther, and, echoing as usual the dicta of his predecessor, with a slight addition of his own, speaks of the Indian tapir as a species 'discovered by M. Diard.' Again, in the *Dictionnaire des Sciences Naturelles*, M. Desmarest, forgetful of his former caution, heightens the farce still more, by asserting, that its 'discovery in the forests of Sumatra and the peninsula of Malacca is due to MM. Duvaucel and Diard.' In none of these works is the least indication given that the animal in question had previously been even seen by an Englishman; much less is the fact suffered to transpire, that, long before M. Diard had 'discovered' it, not in the forests of Sumatra or the Malayan peninsula, but in the menagerie of the Governor-General of British India at Barrackpore, a full description, together with a figure of the animal and of its skull, had been laid before the Asiatic Society by Major Farquhar for publication in their *Researches*. This latter circumstance, it is true, was not mentioned by M. Frederic Cuvier, when he figured the tapir of Malacca in his splendid work from a drawing made by M. Diard in the Barrackpore menagerie, or by that gentleman himself in the published part of his accompanying letter; but there seems to have been no intention on their parts wilfully to mislead their

readers. That M. Diard at least could not have been actuated by any such desire, is fully proved by several passages in the note appended by him to Major Farquhar's original description, in which he speaks of the gallant officer as 'the excellent naturalist who has enriched zoology with so important a discovery,' and attributes the 'honour' to him 'alone.' Baron Cuvier, too, in the recent edition of his *Règne Animal*, silently rejects the unmerited distinction in favour of his stepson and friend, and candidly quotes, as the first describer, our, in this instance, more fortunate countryman. After this we trust that we shall hear no more of the 'discovery' of the Indian tapir by MM. Diard and Duvaucel, who have too many real claims on the consideration of zoologists to require to be tricked out in those borrowed plumes with which it has hitherto been the fashion among our neighbours to invest them."

In this extract it will at once be seen that there is no "sweeping accusation" brought against "French naturalists collectively:" on the contrary, the assumed "injustice to the merits of our countrymen" is expressly limited to "certain among the French zoologists;" and two individuals are afterwards named as the aggressors in this particular instance. Two others are (as Mr. Swainson appears to think, unjustly) exonerated from the charge; and a third, the universally acknowledged head of the school, is praised for his disinterested candour. If I were not fearful of encroaching too far upon your space, I would beg of you to transcribe for your readers the paragraphs immediately preceding and following that which I have just quoted. In the first of these they would see that no less than six other French naturalists have received their due meed of praise for their contributions to the history of the original American tapir; while, in the last, unqualified credit is given to another deserving *élève* of the same school for his discovery of a second western species. In fact, nearly every article in the work, from the beginning to the end, teems with acknowledgments to the men of science who have adorned, and still continue to adorn, the French school of zoology, and who have raised it to the height on which it now stands. Under these circumstances, it is, I must confess, altogether startling to me, to find myself involved in a charge of "national invective" against them.

"The justice or the injustice," says Mr. Swainson, "of this invective against MM. Desmarest and Lesson rests entirely upon one simple fact, which their accuser completely passes over. Is there either proof, or presumptive evidence, that these naturalists, at the time they attributed the discovery

in question to M. Diard, *knew* that such was not the fact; that Major Farquhar in reality was its discoverer; and that a description by him had been laid before the Asiatic Society?" I will not quote the expressions which follow, as applicable to MM. Desmarest and Lesson, "if they knew all this;" because they are such as I could not bring myself to apply to any one for whom I entertained even a shadow of respect; and to both these naturalists I feel grateful (as I have never failed to acknowledge when the opportunity presented itself) for the services which they have rendered to our common science. But that they did know all this, I shall not have the slightest difficulty in proving, by a simple quotation of their accounts of the animal, and of the authority on which those accounts were founded. I begin with the latter, as first in order of time, and extract verbatim from M. F. Cuvier's *Histoire Naturelle des Mammifères* the entire article, as far as it relates to the Indian tapir, omitting only the measurements, which would occupy too much of your space. It runs thus: —

"Cependant on a découvert dernièrement à Sumatra, et dans les forêts de la province de Malacca, un tapir qui ne diffère du tapir d'Amérique que par ses couleurs. C'est ce que nous apprend M. Diard, dans un fort bon dessein accompagné d'une description qu'il a addressés de Calcutta à mon frère, et dont la publication doit intéresser tous les naturalistes. M. Diard est un élève du Jardin du Roi, qui a été conduit dans l'Inde par son amour pour l'histoire naturelle, et qui, joignant à beaucoup de lumière et d'activité un esprit juste et pénétrant, doit enrichir la zoologie par d'importantes découvertes.

"Voici l'extrait de sa lettre: — Lorsque je vis, pour la première fois, à Barakpoor, le tapir de Sumatra, dont je vous envoie le dessein, je fus très-surpris qu'un si grand animal n'eût pas encore été découvert; mais je le fus bien davantage encore en voyant à la Société d'Asie une tête d'un animal semblable, originaire des forêts de Malacca, qui avait été envoyée à cette société le 29 Avril, 1806 *, par M. Farguharie †, gouverneur de cette province. 'Ce tapir,' ajoutait dans une note M. Farguharie, 'est aussi commun dans les forêts de la péninsule que le rhinocéros et l'éléphant. Les Musulmans ne mangent pas sa chair, parce qu'ils le regardent comme une espèce de cochon. Sa trompe est longue de sept à huit pouces dans les mâles adultes; il est noir partout, à l'exception des oreilles, qui sont bordées de blanc, et du dessus

* Correctly the "29th January, 1816," the date of Major Farquhar's paper and present.

† Major Farquhar. The names are printed in capitals in the original.

du corps, qui est d'un gris pâle. Le jeune est tacheté de blanc et de brun.' * 'Il est bien evident,' continue M. DIARD, 'que le tapir de M. FARGUHARIE est absolument le même que celui de Sumatra, et d'après l'inspection de la tête que j'ai vu au cabinet de la Société, qu'il ne diffère en rien pour la dentition de celui d'Amérique. Le tapir de la ménagerie du Lord MOIRA fut pris il y a deux ans par les Malais de Sumatra, auprès des montagnes qui avoisinent la côte occidentale de cette île. Il se trouvait avec sa mère, qui s'échappa. Il est très-apprivoisé, et aime beaucoup à être caressé et gratté. L'extrémité de ses oreilles est bordée de blanc; son dos, sa croupe, son ventre, et ses flancs sont également blancs. Partout ailleurs il est d'un couleur noire assez foncée. Quand il est debout, les doigts de ses pieds, qui sont comme dans le tapir d'Amérique (trois postérieurement et quatre antérieurement), s'appuient entièrement sur le sol.

"Ses proportions sont les suivantes," &c.

This article is dated "Mars, 1819." In his *Mammalogie*, published in 1822, M. Desmarest adopts the species from M. F. Cuvier, the only author whom he quotes, and from whose work his description is almost literally taken. Again omitting the measurements, it is as follows: —

"TAPIR DE L'INDE, *Tapirus indicus.* (Non figuré dans l'Encyclop.) *Maiba*, Fréd. Cuv. Mamm. lithog. fig.

CAR. ESSENT. *Corps d'un blanc sale, avec les parties antérieures et postérieures noires; point de crinière sur le cou du mâle.*

DIMENS. . . . . .

DESCRIPT. Corps gros et trapu; trompe longue de sept à huit pouces dans les individus adultes; poil court et ras; tête, cou, épaules, jambes de derrière, et queue, d'une couleur noire assez foncée; dos, croupe, ventre, flancs, et extrémité des oreilles, blancs. Le jeune est tacheté de blanc et de brun.

Nota. La connoissance de cet animal en France est due à M. Diard, qui en a envoyé au Muséum la dépouille et une tête osseuse. Cette tête, comparée à celle du tapir d'Amérique, présente des caractères tels, qu'il n'y a plus de doute sur la différence de ces deux espèces.

PATRIE. Les forêts de l'île de Sumatra et de la presqu'île de Malacca, où il est aussi commun que les éléphans et les rhinocéros."

The proof required by Mr. Swainson, that, when this was written, M. Desmarest knew that "the discovery in question"

* These passages are imperfectly abstracted from different and distant parts of Major Farquhar's original description, which occupies several quarto pages in the fifteenth volume of the *Asiatic Researches.*

was not due to M. Diard; "that Major Farquhar in reality was its discoverer; and that a description by him had been laid before the Asiatic Society;" consists in the plain fact, that all these circumstances are fairly and distinctly stated in M. Diard's published communication, from which M. Desmarest was then engaged in making extracts. Three distinct portions, indeed, of his own description, as may readily be seen by a comparison between the last two quotations, are borrowed verbatim from the notice of the animal furnished to the Asiatic Society by Major Farquhar himself, and candidly quoted from him, between inverted commas, by M. Diard. My own observation, that M. Desmarest "carefully shielded himself under an equivocal form of expression," is fully borne out by his confining himself to stating that "la connoissance de cet animal en France est due à M. Diard," at a time when he well knew that its discovery in its native country was due to another.

But M. Desmarest did not stop here. In 1828, "forgetful," as I have said, "of his former caution," he made, in the *Dictionnaire des Sciences Naturelles*, the following assertion regarding the animal in question: — "Cet animal, dont la découverte dans les forêts de Sumatra et de la presqu'île de Malacca est due à MM. Duvaucel et Diard." By this remarkable increase in the force of his expressions, M. Desmarest completely set at nought the candid statement of M. Diard himself, that he saw the tapir of Sumatra, "pour la première fois, à Barakpoor," which forms the very commencement of the extract from his letter published in the *Histoire Naturelle des Mammifères*. The reader will bear in mind that on this letter both the description in the *Mammalogie*, and the almost literal repetition of it in the *Dictionnaire*, are wholly founded. On this part of the case it is quite needless to say more.

I now turn to that portion of the charge which relates to M. Lesson. The justice of the immediate accusation made against him, of "adopting the dicta of his predecessor [M. Desmarest], with a slight addition of his own," will be at once evident, on a comparison of his description with that of M. Desmarest, quoted above. It is as follows: —

"Cette espèce nouvelle, découverte par M. Diard, a le corps gros et trapu; sa trompe a de 7 à 8 pouces; son pelage est composé de poils courts et ras, de couleur d'un blanc sale, tandis que la tête jusqu'aux épaules, les jambes, et la queue sont d'une couleur noire foncée; le mâle n'a point de crinière sur le cou. Ce tapir, très-bien figuré par M. F. Cuvier, est très-commun dans les forêts de Sumatra et de la presqu'île de Malak."

Every particular in this description, with two exceptions, is taken from M. Desmarest's *Mammalogie*. But these two "slight additions" are highly important to the elucidation of the facts of the case. The first of them (the assertion that the Indian tapir was "découverte par M. Diard") might have been charitably attributed to a careless reading of the passage in the *Mammalogie*, had not M. Lesson proceeded to say, on his own authority, that the animal had been "très-bien figuré par M. F. Cuvier." It is evident, therefore, that he had consulted the *Histoire Naturelle des Mammifères* with reference to this particular animal. This fact once established, he becomes a participator in an act of "injustice to the merits of our countryman," by concealing Major Farquhar's prior claim to the discovery, which is fully stated in that work; and, to use the words of Mr. Swainson, he, as well as M. Desmarest, "at the time he attributed the discovery in question to M. Diard, *knew* that such was not the fact; that Major Farquhar in reality was its discoverer; and that a description by him had been laid before the Asiatic Society."

After this, it may be considered a work of supererogation to add, but it is, nevertheless, worth mentioning, that M. Lesson has actually made "assurance doubly sure." I give him all the credit of being the first to quote, in his account of this animal, in addition to MM. F. Cuvier and Desmarest, the name of "Sir Raffles." But what becomes of this credit, when, on turning to Sir T. Stamford Raffles's *Descriptive Catalogue of a Zoological Collection made in Sumatra*, published in the 13th volume of the *Linnean Transactions*, the work intended by the quotation, we find the following passages under the head of *Tapirus* malayànus: —

"The first notice that I received of the existence of this animal was in the year 1805, a living specimen having been sent to Sir George Leith when lieutenant-governor of Penang. It was afterwards observed by Major Farquhar in the vicinity of Malacca. A drawing and description of it was communicated by him to the Asiatic Society in 1816, and a living subject was afterwards sent to the menagerie at Barrackpore, from Bencoolen. . . . Little can be added to Major Farquhar's original description. . . . It may be interesting to give the exact dimensions of two, one a male, described by Major Farquhar," &c. "In a subsequent communication to the Asiatic Society, Major Farquhar gave an account of a very young tapir which he had alive in his house," &c.

Such are the plain facts of the case, and such the evidence by which it is established. In laying them before your readers,

I have confined myself to a simple exposition of authorities, and of their bearing upon the point at issue; and have purposely abstained from all general comment. If either M. Desmarest or M. Lesson has felt aggrieved by what I have been compelled, in the discharge of an unpleasant duty, to say respecting them, I can assure them that no one could have regretted more than myself the necessity which existed for my original remarks. Still more do I regret that their weight and importance should have been increased by this compulsory substantiation of their correctness. I felt, however, and felt strongly, that, to every individual who has laboured in the cause of science, justice should be rendered for his efforts to extend our knowledge. On this principle, to the best of my ability, I have always acted; and I trust that I shall ever continue to give, to all without distinction, credit where credit is due. Let me add that, towards every fellow-student in the science to which both Mr. Swainson and myself are devoted, I am anxious to entertain no other feeling save that of universal good will.

I remain, Sir, yours, &c.

London, March 10. 1831. EDWARD T. BENNETT.

ART. III. *A Letter to the Editor respecting Art. I. of No. XVIII. of this Journal.* By N. A. VIGORS, Esq. M.A. F.R.S. &c.

My dear Sir,

YOUR readers will doubtlessly look for some answer to the very extraordinary observations which have appeared against me in the last Number of your Magazine. (p. 97—108.) The character of every man who aspires even to the humble rank which I hold in science belongs as much to the public as to himself; and it is due to that public not to leave unanswered any aspersion upon a reputation in which it thus shares a common interest.

But there are two sources whence such a vindication may arise; from the aggressor, as well as from the aggrieved. In the present case I should infinitely prefer that my justification should proceed from the former source. And feeling, as I do, how imperatively the interests of science demand that no sentiments of personal animosity should break out in discussions which ought to have the truths of science alone for their object, or between individuals apparently labouring in the same cause;—convinced, I must add, how disgraceful to the reputation of any country are all those internal dis-

sensions, those "plus quam civilia bella," which degrade the fields of science into an arena of contention; — in order to prevent, if possible, the continuance of such an evil, as far as I am myself concerned, I have made an appeal to the writer of the article in question, through the medium of his friends, in the hope that, when the truth is laid before him, he may of his own accord make due reparation for expressions which I am fain to believe originated in some strange and untoward misconception.

This appeal has necessarily been attended with delay; and the time has already elapsed for making any satisfactory statement in your present Number. In your next publication I pledge myself to afford such an explanation, from whatever quarter it may proceed, as, I trust, will be satisfactory to your readers.

In the mean time I have to thank you, my dear Sir, for the kind sentiments you have expressed towards me on this occasion. I required no assertions on your part to be convinced that you were in no wise mixed up with the feelings and spirit exhibited in the article referred to. No editor of a periodical like yours, I am well aware, is responsible for the sentiments contained in any paper to which the author affixes his name. It has, indeed, been an extreme gratification to me, sufficient, I may almost say, to counterbalance the regret occasioned by this unexpected act of aggression, to see so many of my friends rallying round me, and volunteering their warm-hearted sympathy in my cause. I can well conceive how, to the high-toned feelings of the cavaliers of older times, it was a source of exhilaration and triumph, even beyond what they derived from the consciousness of their own strength, to hear in the stress of war the generous cheers of their companions in arms advancing "to the rescue." I am, my dear Sir,

Chester Terrace, very faithfully yours,
Regent's Park, April 12. 1831. N. A. Vigors.

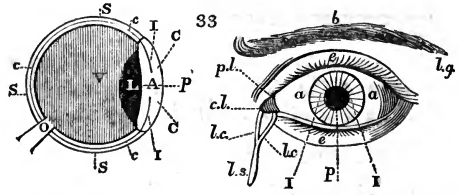
Art. IV. *A familiar Treatise on the Anatomy and Physiology of the Organs of Vision in Man and other Animals.* By B. S.

(*Continued from* p. 16.)

Although it is not the object of this treatise to record the opinions and experiments of the learned anatomists of the age regarding the minutiæ of this interesting subject, it may

not be entering too much into detail, if I point out a few of the principal varieties which obtain in the *tunics* in different animals, before we pass on to the humours. As to size, the eyeball is very irregular, and seems not at all to depend upon the bulk of the animal; for instance, the whale has a very small one in proportion. The mole was supposed, until very recently, to be blind, the eyeball being scarcely perceptible.* Birds, again, have a very large one for the size of the body. The extent of the cornea is equally various in proportion to the relative size of the sclerotica. In birds, the sclerotica, at its junction with the cornea, is armed with a bony rim, scaly and flexible, by which the axis or depth of the eyeball is lengthened or diminished *pro re natâ*. In another class the same object is effected by one part of the sclerotica being thinner than another, and a muscular apparatus is furnished to press upon the yielding surface at pleasure. The choroid (about the subdivision of which so much has been said) presents a very striking feature in some animals, such as are called night animals. A part of the choroid, instead of being covered with black paint, is in these animals of a shining greenish blue, and thus the light is not absorbed, but reflected on to the retina at the other corner of the eyeball; this *tapètum lùcidum* (shining carpet) being spread on the side of the globe nearer the temples than the nose. The skate is the only fish, I believe, in which it has been observed. Whales have this apparatus in common with other mammiferous animals, such as the dog, cat, cow, &c. In albinoes, which are to be found in all classes of warm-blooded animals (Mr. W. Lawrence states they are not existing in any cold-blooded animals), the black paint is altogether wanting, and hence the individuals are impatient of light. The shape of the iris is different in different animals, being in some oblong instead of round; and placed vertically in some cases, as in the cat; or horizontally, as in the horse, in others.

Within the tunics are contained the *humours*. 1st, The *aqueous* (*fig.* 33. *a*), which is very clear and fluid like water (in Latin, *aqua*). It fills the space between the cornea and crystalline lens (L). The iris floats in this liquid, and divides it into two compartments, called the



* See *Edinburgh New Philosophical Journal*, vol. vii., p. 340. on this subject.

posterior and anterior chambers. The aqueous humour, when lost by an accident or operation, is newly secreted in 24 hours. The next humour behind this is the *crystalline humour* or *lens* (L), represented very dark in the diagram, it being more consistent than the other two; but it is, in fact, as its name implies, beautifully clear; it is embedded in the *vitreous humour* (V), which occupies the larger portion of the ball of the eye. It is as clear as the purest glass (*vitrum*), more consistent than the aqueous (A), and less so than the crystalline humour (L). It is covered with a fine membranous bag, called the *hyaloid membrane* (*hyalos*, glass, and *eidos*, likeness), and it is upon this humour that the retina is expanded.

Thus much for the chief parts of the eyeball. Of their uses we shall speak hereafter. It impossible, even from this faint sketch, not to see that it is an organ of the most delicate make, and every body has, without doubt, often experienced how exquisitely sensitive it is: the smallest particle of dust, or even a drop of rain suddenly touching the eyeball, causes a sensation of uneasiness almost incredible, had not every individual been in the course of his life an *eye-witness* of the fact, in more senses than one. With a view to its defence, Providence has placed it in a round bony hollow, plentifully lined with a soft cushion of fat, to guard it from violence, and to break the jars which it would otherwise experience from the daily motion of the body, or from accidental falls. The effects of friction are likewise thus obviated, which the constant motion of the eyeball would produce. To keep the front or cornea of the eye clear, a constant lotion is provided by the *lacrymal gland* (*l g*), situated in a hollow of the orbit or bony case. This fluid is known by the name of the tears, and is constantly, though (under ordinary circumstances) insensibly, passing over; it is carried off, through two small orifices at the inner corner of the eye, into the *lacrymal canals* (*l c*), which unite and form the *lacrymal sac* (*l s*), and thence into the nostril. Under ordinary circumstances, as it has been already observed, the moisture passes along unperceived; but when the gland is over-excited, either by moral or physical causes, the tears flow too rapidly to be absorbed by the *puncta lacrymàlia*, and fall in copious drops down the cheek, "æquore fervido" [in a warm stream]. But, besides the emotions of the mind, or any stimulus applied immediately to the eye, other causes produce the same effect, such as snuff taken in at the nose, or when a small sponge "perfusus liquidis urguet odoribus" [imbued with liquid odours excites it]. The cause of this is easily understood: — the nerve which supplies the lacrymal gland is a branch of the fifth

pair; another branch of this fifth pair is distributed on the Schneiderian membrane, which lines the nostril; but the first pair, or olfactory (*oleo*, to smell, and *facio*, to make) nerve, is spread upon this membrane; hence the sympathy above noticed. And again, a branch of the fifth pair unites with a branch of the sixth, and these by their union form the great intercostal nerve (*inter*, between, *costa*, rib); but some twigs of this join the eighth pair, which is spread on the lungs and adjoining parts; and hence a strong odour will cause coughing also. The other defences of the eye are the lids (*e*), which by their quick motion protect the organ, without impeding the pencils of light from entering the pupil, and spread the secretion from the lacrymal gland over the cornea. Each lid is armed with a row of hairs, which, when the eyes are closed in sleep, form an impenetrable palisade against the most minute dust or insect. The lids are lined with a very delicate membrane, which is reflected over the front of the eyeball, and is named the *conjunctìva* (*conjungo*, to unite).

In man there may be seen a little crescent-shaped fold of the conjunctìva in the inner corner of the eye, called the *plìca lunàris* (a *fold*, in shape like a half *moon*): in birds and horses this is more fully developed, and is of essential benefit to those animals. This seems to be one of those highly interesting phenomena in the works of nature, where in one race of beings there are only rudiments of organs, to all appearance totally useless, unless it be to show a beautiful uniformity of design pervading all her works; whilst in others of opposite habits they are more complete, and indispensable to the health of the creature. Thus, in our own species, the male has the rudiments of mammæ, totally unserviceable to himself or others, whilst in the female they are positively necessary to the nourishment of her offspring. In human beings, again, the cœcum (or *blind* gut) is extremely small; in horses it is more developed, and also in other graminivorous animals; and in fishes the cœca are often seen very numerous and long, being collected together in a cluster, and wearing the appearance of a thick tassel. Analogous to these is the plìca lunàris, which in man seems merely an unserviceable rudiment of the tùnica níctitans in birds and horses. To them it serves as a third eyelid, which can be drawn over and relaxed at the will of the animal by a simple but elegant mechanism, not to be found in the human subject.* Lastly, the little red tubercle in the inner corner of the eyelid, termed

* For a more exact description and diagram of this apparatus, see a "Discourse on the Objects, Advantages, and Pleasures of Science, with Engravings," 8vo, Baldwin, London; by Mr. (now Lord) Brougham.

the *carúncula lacrymàlis* (*caruncula*, diminutive from *caro*, flesh, and *lacrymalis*, from *lacryma*, a tear), secretes a lubricating liquor, and serves to direct the tears into the lacrymal canals. The various changes effected on the rays of light, by the humours, will be discussed in a future paper.

B. S.

(*To be continued.*)

ART. V. *Observations on the Hyacinthine Maccaw.* By E. T. BENNETT, Esq. F.L.S.

Sir,

ON the subject of the Hyacinthine Maccaw, my account of which in the *Gardens and Menagerie of the Zoological Society delineated*, is criticised at p. 104. of your last Number, allow me to offer a few observations. I freely admit my previous ignorance of the facts stated by Mr. Swainson. I knew not, nor could I be expected to know, that he had sent to the Linnean Society an account of its habits and locality, for that account was not published by the Society; and the same circumstance of non-publication also accounts for my not having been aware that on his return to Europe he had brought with him four specimens of the bird. With respect, as it should seem, to one of these, it is certainly recorded among the "Donations" at the end of the 14th volume of the *Linnean Transactions*, that "a preserved specimen of the *Psíttacus* augústus of Shaw, from Brazil," was presented by Mr. Swainson to the Society. But as little scientific information is usually to be derived from these lists of donations, I trust I may be excused for not having consulted the one referred to, the entry in which, quoted entire above, adds not in the slightest degree to the knowledge we already possessed concerning the bird in question.

My object, however, on the present occasion, is not to answer a charge which refutes itself, but rather to correct an error into which M. Spix has fallen with respect to this magnificent bird; and, with this view, I propose giving a brief history of the species up to the time when his work was published.

The bird was first described in 1790, by Dr. Latham, in his *Index Ornithológicus*, under the name of *Psíttacus* hyacínthinus, from a specimen in Parkinson's, otherwise the Leverian, Museum. In the *Musèum Leveriànum*, under the date of 1792, and afterwards in his *Zoological Miscellany*, Dr. Shaw described and figured it as the *Psíttacus* augústus,

quoting Dr. Latham's synonyme, and preserving it in the English name. Subsequently, the bird was fully characterised, with an interesting account of its habits, under the name of Guacamayo azul, by another observer of the close of the last century, M. d'Azara; in the French translation of whose work, M. Sonnini added a note pointing out the resemblance between D'Azara's bird and that of Dr. Latham. In the second edition of the *Nouveau Dictionnaire d'Histoire Naturelle*, M. Vieillot considered the former as a distinct species, and named it Macrocércus glaùcus; but in his *Galerie des Oiseaux* he corrected this error, and united the two birds under the name of Macrocércus hyacínthinus, which the species now bears. In his *Conspéctus Psittacòrum*, published in 1820, M. Kuhl quotes to the *P*síttacus hyacínthinus of Latham no other synonyme but that of Shaw.

This species is figured in M. Spix's work as the Anodorhýnchus Maximiliàn*i*, but, as far as I have been able to discover, entirely without description. A second bird, differing from it not only in its comparatively diminutive size, but also in having its cheeks bare, as in the typical maccaws, although not quite to the same extent, is figured and described by the same author as the *Aràra* hyacínthinus. To the latter, M. Spix refers the Guacamayo bleu (azul) of D'Azara, and states that it has been improperly confounded by Sonnini and Dr. Latham with the Anodorhýnchus Maximiliàn*i* Augúst*i*. That the *Aràra* hyacínthinus of Spix is not Dr. Latham's *P*síttacus hyacínthinus is clear from the characters given of the latter, which is described to have its chin and orbits only naked, in opposition to the other maccaws, which are characterised as having naked cheeks. The identity of Shaw's bird with that of Dr. Latham is proved by its being figured, with the same characters, and from the same museum, at a time when the specimen was said to be "perhaps the only one known to exist at present in Europe." A comparison of the characters given by D'Azara with those of Dr. Latham and Dr. Shaw, and with the figure of the latter, will at once remove any doubt of the fact that the Guacamayo azul is the same bird; and its size and feathered cheeks immediately distinguish the latter from the *Aràra* hyacínthinus of Spix. In fact, the *P*síttacus hyacínthinus of Dr. Latham, the *P.* augústus of Shaw, the Guacamayo azul of D'Azara, the Macrocércus glaúcus of Vieillot, the M. hyacínthinus of the same author, and the Anodorhýnchus Maximiliàn*i* of Spix, are one and the same species. The *Aràra* hyacínthinus is totally distinct, but forms, by its near approach in colouring, and by the smaller extent of its naked cheeks, an evident link between the hyacinthine and the common maccaws.

These details I had reserved for another occasion; but, as the subject has been mentioned, I may as well publish them at once.

I regret, however, that I cannot subscribe to Mr. Swainson's claim to be considered as "the first to discover the true locality" of the hyacinthine maccaw, inasmuch as a different and much more extensive one had been long previously indicated by another observer, M. d'Azara. Mr. Swainson procured it in "the Campos and Catingas of the interior of Bahia, between the forests of Urupie and the banks of the Rio St. Francesco;" and states this to be "that part of Brazil where alone this magnificent species is supposed to be found." But M. d'Azara had, at least thirty years ago, met with several pairs of this species between the 27th and 29th degrees of latitude; and he had been assured that it was found as far south as 33½°, nesting not only in the hollows of trees, but also, and that more frequently, in those which it digs for itself on the perpendicular banks of the rivers Parana and Uruguay.

I remain, Sir, yours, &c.

March 9. 1831. EDWARD T. BENNETT.

ART. VI. *On the Solitary Thrush* (*Túrdus solitàrius*). By J. COUCH, Esq.

THE most ancient author to whom I have access, that mentions this bird, is Gesner, who speaks of it as unknown in Germany in a wild state, but that it was not unfrequently sent thither from Italy, and sold at an high rate. He quotes Aristotle and Albertus Magnus for their accounts of this bird. Ruysch (*Theat. Anim.*, folio, vol. i. p. 73.) quotes Varro as being acquainted with it; and gives a description of the male and female, which differ more than is common with the *Túrdi* in their plumage, together with some remarks on its history. In this country it has fallen into the hands of Montagu and Bewick, who have given figures and descriptions: in addition to this, it is noticed by the author of the *Journal of a Naturalist* (printed for Murray, but without the author's name). After such numerous and important testimony in favour of its being a separate species, I was much surprised, in looking over Dr. Fleming's *History of British Animals* (p. 86.), to find him affirming, without hesitation, "that the *Passer* solitàrius of Willoughby and Solitary Thrush of Montagu" are no other than the young of the common starling. If such were

the case, we might well wonder at the rarity of a bird, tens of thousands of which are bred every year in the British Islands; and which therefore could not fail of being well known to all our naturalists, who on this supposition have displayed a degree of ignorance altogether inexplicable. It is true Dr. Fleming condemns only Willoughby and Montagu, as if they alone had mentioned the bird, or that the species mentioned by them was different from that spoken of by Aristotle, Pliny, Varro, Gesner, and Ruysch; but the description by Ray (who must be considered as a joint author of Willoughby's work, and whose description, *Syn. Av.*, p. 66., is that alone to which I am able to refer) corresponds generally with that in Ruysch, except that it is more brief; and, consequently, little doubt remains of their having all spoken of one species. The specimens of Montagu and Bewick were both female, as was proved, in the case of the former, by dissection; for an egg was found in the body in the month of June, another proof that the specimen could not have been a young bird of that year. On the history of a bird so little known, the notes of Ruysch are interesting; though it is probable that they were not obtained by him from personal observation, but rather from books and private correspondence. It keeps in elevated and rocky places, and is always solitary, except in the breeding season; it rarely descends into the plains or valleys but when compelled by the weather. Its song is delightful, and, when confined in a cage, is indulged in also by night, if a candle be lighted. It is worthy of remark, and perhaps affords some apology for Dr. Fleming, that in the *Synopsis of the Contents of the British Museum* (1823) are the following words: — "In the fourth order are placed the starling, showing its change of plumage (amongst which the solitary thrush of Montagu is included)." It is true there is some obscurity of expression here: and whether the writer intended to express his opinion that this bird is not a *T*úrdus, but a *S*túrnus; or that Montagu's bird (the identical specimen in the museum) differs from the solitary thrush of other authors; or, finally, that all the birds that have borne the name are mere varieties of the starling, is not clear. But the latter idea receives corroboration from the fact that, in the alphabetical list of the English names of birds in the room (*Catalogue*, p. 74.), that of the solitary thrush is omitted.

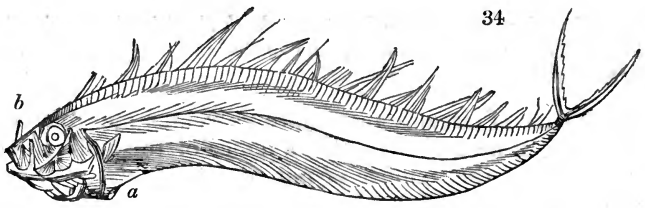
Yours, &c.

Polperro, Nov. 20. 1830. JONATHAN COUCH.

ART. VII. *Observations tending to establish the Identity of the Deal Fish of Orkney with the Vaagmaer of Iceland.* By the Rev. Dr. FLEMING.

A VARIETY of circumstances have prevented me from communicating, at an earlier period, a notice of the addition of a new species to the number of our British fishes, especially the hope of obtaining more satisfactory information on the subject. In this, however, I have been disappointed; and must seek for consolation from the hope that the present notice of the occurrence of a fish resembling the Vaagmaer on our northern shores may induce those who enjoy suitable opportunities to exert themselves in procuring entire specimens, in order that more perfect descriptions of the peculiar characters of the species may be gained for science than have hitherto appeared.

Nearly two years ago, I received a communication from a zealous observer of nature, Dr. Alexander S. Duguid, physician in Kirkwall, Orkney, dated April 8. 1829. It contained the description of a fish which had been taken alive in Sanday, in Orkney; and sent to him by Mr. Strang, an enterprising agriculturist of that island. The following is an extract from the letter of my intelligent correspondent. "It was caught alive in the island of Sanday, and was sent to me by Mr. Strang; but some time having elapsed, it was not in so perfect a state as I could have wished, particularly about the head. Length 3 ft.; body excessively compressed, particularly towards the back, where it does not exceed a table-knife in thickness; breadth nearly five inches, tapering to the tail. Colour silvery, with minute scales; the dorsal fin of an orange colour, occupying the whole ridge from the head to the tail, with the rays of unequal sizes. Caudal fin forked, the rays of each fork about 4 in. long. Pectoral fins very minute. No ventral nor anal fins whatever. Vent immediately under the pectoral fins, and close to the gill openings. Head about 4½ in. long, compressed like the body, with a groove in the top. Gill lids formed of transparent porous plates. Eyes an inch and a quarter in diameter. Both jaws armed with small teeth. Lateral line rough; and, towards the tail, armed with minute spines pointing forwards, and these are the only spines on the body. I have subjoined a sketch (*fig.* 34.), which may perhaps afford some idea of the appearance of the fish. *a* is the position of the vent, and *b* the spinous process of the snout. Mr. Strang tells me that two or three specimens have been found on the shores of the Island of Sanday this winter, as



well as on former occasions; and that he has seen some of double the size of the one sent me. On the whole, however, they are of rare occurrence. There appears to me to be some singularity also in the structure of the head; but, as that part was a good deal decayed, I cannot speak with much certainty. There is a process connected with the upper jaw, about $2\frac{1}{2}$ in. long, which appears to lie in the groove in the top of the head, before mentioned; but when the mouth is shut it is elevated at an angle represented in the pencil sketch. The skeleton is cartilaginous."

In reply to this communication, I stated it as my opinion that the fish referred to was the Vaagmaer, or Gymnogáster árcticus of Brunich and the *Règne Animal* of Cuvier, 1st edit. ii. 246.; and requested, at the same time, additional illustrations of several of the particulars mentioned in the preceding description. I was favoured with another letter, dated October 19. 1829, containing the following particulars: —

"Since receiving your obliging letter of the 8th of May, my exertions have been used to procure a specimen of the fish which was the subject of my last communication; and, through the kindness of Mr. Strang of Sanday, I have at length succeeded in getting a dried one; which, though somewhat imperfect, may be of use to you in clearing up any doubt which you may have as to its nature. I have no doubt that the dorsal fin had originally been continuous from head to tail, though it was broken into fragments when I saw it; but I thought it unsafe to deviate from its then existing state. The bony process, however, attached to the snout, had assuredly no connection with the dorsal fin; but the head being in a mutilated state, my account of this rested in some measure on the authority of Mr. Strang, who had seen the animal alive. I am afraid the present specimen will not contribute much to the elucidation of this point. The triangular cavity or furrow, however, on the top of the head may still be seen. I have no doubt my statement was erroneous as to the bones being cartilaginous, having used the term in reference merely to their appearance, and to the fact of their being easily cut with the knife. I may mention, also,

on the supposition that the identity is established, that the man who caught it alive, on a sandy beach, expressed to Mr. Strang his intention of eating it; which, as our natives are not very prone to experiments of that sort, probably implied previous experience on the subject. Mr. Strang tells me that he remembers at least a dozen of specimens driven on shore by bad weather, varying in size from 1 to 6 ft., and that the country people call it, not unaptly, the deal fish. I add the description of one found on the beach of Sanday, Dec. 2. 1817, by Mr. Lindsay, tutor to Mr. Strang's family: — 'Length 4½ ft.; breadth 8 in.; thickness 1 in., thin at the edges, viz. back and belly. Length of the head 5 in., terminating gradually in a short snout. Tail consists of eight or nine fin bones or rays, the third ray 7 in. long, the rest 4 in. The dorsal fin reaching from the neck to the tail, rays 4 in. long. On each side of the fish, from head to tail, a row of prickles pointing forward, distance between each ½ in. Under edge fortified by a thick ridge of blunt prickles. Pectoral fins 1 in. long, lying upwards. Skin rough, without scales (?). Colour a leaden or silvery lustre; dorsal fin and tail blood-colour. The skin or covering of the head like that of a herring; several small teeth; gills red, consisting of four layers. Heart ½ in. and red; liver 2½ in.; stomach 4½ in., full of a gelatinous substance; flesh perfectly white. Spine in the middle of the fish; dorsal fin connected with the spine by bones, as in a flounder. Thin towards the back and belly, and wears very small towards the tail. Eyes and brain out.'"

Though the preceding descriptions do not embrace all the particulars in the history of this fish which the systematical zoologist may desire, there is, nevertheless, as much information communicated as could reasonably be expected in the peculiar circumstances of the case. The remarkable thinness and pliancy of the fish, the absence of ventral and anal fins, the small pectoral fins, the extended dorsal fin, the forked tail fin, and the red colour of the two latter fins, together with the silvery hue of the body, leave little room to doubt that it is the Vaagmaer of Olafsen's *Voyage to Iceland*, p. 592. s. 43. A translation of the description of the fish by that author, with a copy of the figure (kindly furnished by a friend, for I have not had an opportunity of consulting the original) has indeed furnished materials for removing all suspicion on the subject. Olafsen states that it is rare even in Iceland; it seems to approach shore at flood tide in those places where the bottom is sandy and the shore not steep, and where it remains until left dry. The inhabitants, he adds, consider the fish as poisonous, because the ravens will not

eat it. The Icelandic traveller, however, has suffered himself, somewhat incautiously, and in opposition to satisfactory proof, to consider his fish as identical with the Leptùrus of Artedi. Even were there no other distinguishing characters, the absence of the caudal fin in the latter fish might of itself have been deemed sufficient to justify its separation from the Vaagmaer.

Baron Cuvier, in the first edition of his *Règne Animal*, published in 1817, vol. ii. p. 246. adopted the genus Gymnogáster, which Brunich had appropriated for the reception of the Vaagmaer. This genus depended on the following characters of the fish: — the dorsal fin single, and extending the whole length of the back; a distinct caudal fin; small pectoral fins; and without anal or ventral fins. In a note, however, he seems to intimate his suspicion that the absence of the ventrals may have been occasioned by accident, in the mutilated specimens examined by the two northern observers. In the second edition of the *Règne Animal*, published in 1829, vol. ii. p. 219., the learned author, apparently under the influence of his former suspicions, has restored ventral fins to the Vaagmaer, inserted it in the genus Gymnètrus, and thus suppressed the genus Gymnogáster of Brunich. The propriety of this change appears to me to be more than doubtful. The evidence of Olafsen, Brunich, and Dr. Duguid being of a positive kind, seems sufficient to justify the belief that the fish under consideration had no ventral fins, nor is there even a shadow of proof that it exhibited any remarkable elongation of the anterior rays of the dorsal fin, or that the caudal fin was elevated vertically on the tail. Yet the three characters now referred to are those assigned by Cuvier to his genus Gymnètrus. In the belief that in this instance he has been misled, doubtless by an anxiety to avoid the multiplication of useless synonymes, I feel disposed to restore the genus Gymnogáster of Brunich, and to consider the evidence here produced as sufficient to justify the insertion of the Vaagmaer of Iceland among British animals.

The specimen which Dr. Duguid had the kindness to transmit to me was in a dried state, and so mutilated in head and tail as to prevent me gleaning any additional information. It had apparently been in the sea for some time after death, as several examples of the Lobátula vulgàris adhered to the opercular bones, and even to the disjoined rays of the dorsal fin. The specimen was about 22 in. in length. From the back bone to the base of the dorsal fin 2½ in.; length of the filaments of the dorsal fin nearly 2 in. Vertebræ towards the head scarcely two tenths of an inch in length, but increasing

to nearly half an inch towards the tail. The oral surface of the gill-arches were covered by rather lengthened conical tubercles. A portion of the groove on the head was distinctly visible, but no trace of the bony process on the snout referred to in Dr. Duguid's description.

In recurring to the description which Mr. Hoy has given (*Linnean Transactions*, vol. xl. p. 210.) of a fish which he considered as the Trichiùrus Leptùrus of Linnæus, and which was cast ashore in the Moray Frith after high wind from the north, Nov. 2. 1810, I feel disposed to refer it to the deal fish of the Orcadians. The remains of the tail existed, consisting of three or four soft spines or bristles of different lengths, not exceeding 2 in. Now, while these spines or bristles may have been the remains of a caudal fin, they could not have been produced even from the decomposed simple tail of the Trichiùrus. The position assigned to the vent, the absence of ventral fins, and the white colour of the sides, all accord with the deal fish. The colour of the dorsal fin, however, which was of a blackish green, seems to oppose this view, though the dead state of the fish may probably serve to explain this difference, if duly considered.

While noticing this fish of the Moray Frith, in my *History of British Animals*, p. 204., along with the description of another specimen from the same estuary, and likewise referred by the same observer to the Trichiùrus Leptùrus of Linnæus, I offered the following remarks: — "From the preceding descriptions, which I have been induced to give in detail, it appears probable that the two fishes examined by Mr. Hoy belonged to different species. The differences in the position of the vent, the structure of the tail, and the condition of the edge of the belly, seem too great to justify the inference of their being only varieties. The latter fish appears identical with the Leptùrus of Artedi, and consequently of Linnæus."

The deal fish belongs to a singular group, remarkable for a lengthened compressed form, and the skin covered with small scales. By Cuvier they are not unappropriately termed riband fish, but to which he has unfortunately added the family term *t*ænioìdes, conveying thereby an idea of relationship to the tapeworm. Of the British species of this family we may be said to possess the following: —

1. Cépola rubéscens, the band fish. Found on the south coast of England.
2. Gymnogáster árcticus, the deal fish. North-east coast of Scotland.
3. Gymnètrus Hawkènii. Coast of Cornwall.
4. Trichiùrus Leptùrus, the blade fish. North-east coast of Scotland.
5. Lepídopus tétradens, the scale-foot. South coast of England.

In the preceding list, the Gymnètrus Hawkèn*ii* occupies its station on very doubtful authority; while the blade fish, as yet, can be viewed only as a straggler. The latter term may with truth be applied to several other species of reputed British fishes. Those kinds of fish which are sought after as food come frequently under the eye of the ichthyologist. Their haunts are eagerly investigated, and ingenuity is occupied in devising means for their capture; but those which are deemed useless are permitted to roam about unmolested by the net of the fisher, and at a distance from the temptation of his bait. Such species seldom come under the notice of the naturalist, unless when the weakness of age and other calamities have rendered them the sport of the waves, and consigned them to the beach; and few are the portions of the coast where the eye of the naturalist habitually examines that store-house of novelties, the rejectamenta of the sea. In the present instance, the scientific zeal of Dr. Duguid has been rewarded by a contribution of no small value to the British fauna, the earnest, it may be hoped, of other rarities from the Orkney seas.

Manse of Flisk, Feb. 1. 1831.

ART. VIII. *An Account of the Discoveries of Müller and others in the Organs of Vision of Insects and the Crustàcea.* By GEORGE PARSONS, Esq.

(*Continued from* p. 134.)

Compound Eyes of the Crustaceous Animals and Insects.

THE compound eyes are found in all the Crustàcea, and in all winged insects in their perfect state. Amongst the apterous insects they are observed also in the two genera Machìlis and Lepísma. They do not exist in the larvæ of coleopterous, hymenopterous, dipterous, lepidopterous, nor in most of the neuropterous insects. They occur, however, in some aquatic larvæ of the Neuróptera, as the Libellulìnæ and *E*phemèridæ; and in the larvæ of the orders Orthóptera and Hemíptera.

Some insects seem to be blind. In the order Coleóptera, all the species of Cláviger appear to be so; amongst the Díptera, the genus Braúla, a parasite living on bees, and some parasitic species of Pupípara, Nycteríbia, and Melóphagus have no eyes, or else these organs are very indistinct; and the neuters of some species of ant are in the same state.

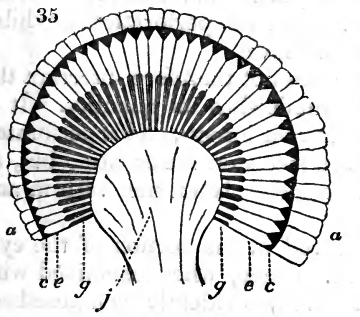
Of the Crustàcea very few, if any, are without eyes. In insects these organs are almost always immovable; and although in the genera A'chias and Diópsis, dipterous insects

of hot climates, the eyes are fixed upon filaments, yet even here they invariably maintain the same position in relation to each other. In crabs, and some others of the Crustàcea, the eyes are movable, being placed upon footstalks.

The compound eyes are two in number, but the males of some *E*phemèridæ possess four. The two eyes are rarely united together, so as to form one mass: this, however, is the case in the males of some hymenopterous and dipterous insects; as in the genera Cyclops, Polyphèmus, &c. More frequently they are placed very near to each other; as in some dipterous insects, especially in the males of the genera *C*ùlex and *T*abànus.

As the structure of the compound eyes of the articulated animals has hitherto been either disregarded or misunderstood, it will, I think, be best to select for description a few of the insects and Crustàcea whose eyes appear to have been most carefully investigated by Müller and others. This will, it is presumed, render much more intelligible the succeeding remarks on the diversities of form, &c., observed in the several parts which enter into the construction of these compound organs of vision. The compound eyes of the grey dragon-fly have been very recently examined, apparently with great care, by M. A. Dugès; and my own observations, as far as I have been able to carry them, confirm the accuracy of his description: I shall begin, therefore, with the eyes of this insect.

Compound Eyes with Facets. — The compound eye of the common, or grey, dragon-fly (Libéllula vulgàris), when examined externally, may be divided into two parts; one superior and posterior, of an obscure red colour, and provided with facets at least twice as broad as those of the other part, which is anterior and below, and of a greyish tint. When a section of the eye is made, we see behind the cornea (*fig. 35. a*) a layer of black pigment (*c*); then a broad zone (*e*), orange-coloured posteriorly, and black in front; and a second zone (*g*), situated within the first, and appearing to be nearly wholly of a somewhat deep black hue. This latter immediately surrounds the white swelling or ganglion of the optic nerve (*j*). Each of these parts shall now be described more in detail.



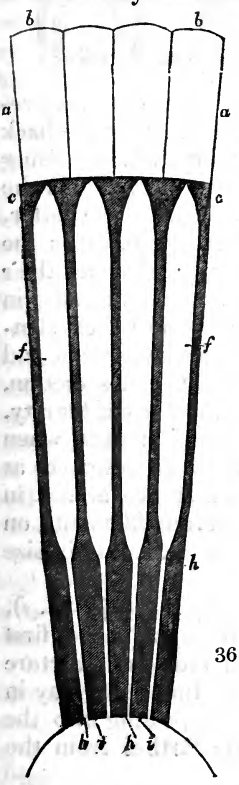
The cornea (*a*) is thickest at the posterior part of the eye; the facets there being about four times as thick as they are broad; in that part also it may be readily seen that each facet is separated from the adjoining ones by an opaque line, a kind of suture, which gives to the whole of this transparent layer a bluish tinge, and thus softens, when the eye is examined externally, the intense colour of the pigment beneath.

The black pigment (*c*) forms a layer of a very dark colour; but its thickness is not so great as that of the cornea. Müller very justly regards it as identical with the pigment situated more deeply in the eye, and which will be mentioned hereafter. At a first and cursory examination it might very readily be supposed that this layer is perfectly continuous beneath the cornea, so as to intercept completely the passage of light to the parts within it; but a careful removal of the internal structures of the eye, leaving this pigment untouched, will show that, although very thick at the sutures of the facets, where it is continuous with the pigment of the more internal textures, it becomes, towards the centre of each facet, exceedingly thin, and at the very centre no pigment can be seen; a minute perforation, as it were, in the layer being there observed. If a cornea, with its layer of pigment still attached to it, be put in water, and its internal surface be then examined at different angles, and with a powerful magnifier, a position will be soon found in which the light will be seen to traverse, without obstruction, the centre of each facet. This position, of course, varies very much, because the internal prolongations or septa, which the pigment forms in its course towards the centre of the eye, are necessarily cut and torn in exposing the internal surface of the cornea; and consequently they float and waver about in all directions. If the cornea is examined out of water, these septa lie flat upon its internal surface, and, masking in this manner the perforations, exhibit the appearance of one continuous layer.

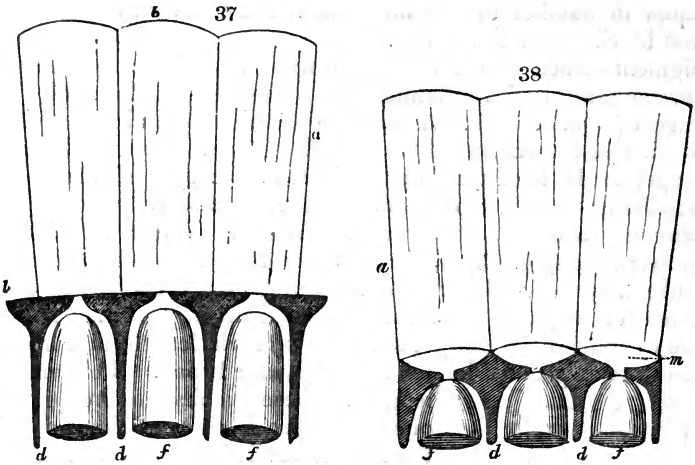
The presence of this layer does not therefore intercept the passage of light, but merely diminishes its quantity. It is found in many, if not all, the diurnal insects, and is perforated with as many holes as there are facets on the cornea; but, as might indeed, *à priori*, be expected, it is not met with in any of the nocturnal insects.

The zone (*e*) which is observed in the section of the eye, within the layer just described, is seen, when examined with a powerful magnifier, to be very evidently composed of straight and transparent cylinders, smaller at the lower and anterior part of the eye, where the facets have the least dimensions, than at the upper and posterior part. They are

equal in number to the facets of the cornea. The orange and black tints already mentioned are owing to the coloured pigment which extends between these crystalline cylinders, surrounding and insulating them throughout their whole length (*fig.* 36.*f*, *fig.* 37. *d*). Besides the general difference in size just mentioned, the cylinders are found to be much longer at the back than in the front of the eye; all are perpendicular to the surface of the cornea, and they converge regularly towards the centre of the eye. When examined individually (*fig.* 36.*f*), they are seen to be exactly rectilinear and parallel to each other, except, of course, the slight divergence consequent upon their radiated arrangement. They are cylindrical in the greater part of their length, and from ten to twenty times longer than they are broad. This great length of these diaphanous bodies is one of the peculiarities of the eyes of the Libéllulæ: it is much less in most other insects, in which also they are conical. Their perfect transparency has caused them to be mistaken for bundles of tracheæ mixed with nervous filaments; but the absence of all lines, whether spiral or otherwise, in their structure, ought to have prevented this error. They refract light in the same manner as it is done by glass cylinders. When torn and emptied, they appear as membranous sheaths, which, in the perfect state, contain a viscid humour, requiring some pressure for its expulsion. The contained humour is coagulated by alcohol; is of greater density than water, in which it sinks; and the perfect cylinders themselves very evidently refract light when they are immersed in water. The extremity of each cylinder, towards the cornea, terminates in an obtuse point (*figs.* 37, 38.*f*), which is inserted in the perforations of the superficial pigment already noticed. At their opposite extremity, these bodies become suddenly very slender, and are then continuous with the nervous filaments (*fig.* 36. *h*), which constitute part of the deeper zone mentioned in the general description of the parts seen in a section of the eye of the Libéllula.



36



This zone (*fig.* 35. *g*), of a deeper black colour than the preceding, and of greater thickness at the front than at the back part of the eye, contains the nervous filaments, which, arising from the bulb or ganglion of the optic nerve, terminate in the transparent cylinders already described. Like these latter, the filaments converge from the circumference towards the centre, are linear, straight, and as nearly parallel as their radiated disposition will permit; but they are much smaller in diameter than the cylinders, and, notwithstanding their slenderness, appear, under the microscope, somewhat opaque and of a fibrous texture. Surrounded by a dark choroid secretion, (*fig.* 36. *i*), these filaments, on account of their great tenuity, cause the pigment to appear much thicker and darker, when regarded *en masse*, than that portion of it represented as passing between the cylinders. These latter are almost in immediate contact with each other: the nervous filaments, on the contrary, are separated by spaces much exceeding in size their own diameter.

In the centre of the eye is the optic ganglion (*fig.* 35. *j*), which, however pulpy and homogeneous it may appear at first sight, exhibits nevertheless a fibrous and radiated structure when submitted to moderate compression. Indeed, it may in some degree be regarded as the optic nerve passing into the filamentary arrangement observed a little farther from the centre.

Such are the anatomical details exhibited in the eye of the grey Libéllula and of other insects, with some modifications to be hereafter noticed. In examining each of these parts, we may, to a certain extent, refer them hypothetically to the

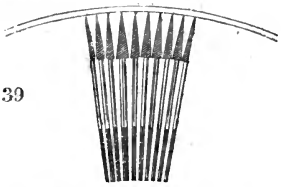
structures forming the simple eye of the vertebrated animals. In fact, we find in these compound eyes a nervous filament attached to the extremity of a transparent body representing the vitreous humour and crystalline lens; a transparent cornea covering externally this apparatus; and a choroid membrane, represented here by a coloured pigment, which surrounds, as in the vertebrated animals, these minute organs of refraction and sensation. We may still further remark that the pigment, continuous in all parts, although varying in thickness, forms between the cornea and the transparent or crystalline cylinder an iris (*fig.* 37. *l*), or at least a uvea, which allows the light to pass only through the centre of the apparatus. There is also a perforation, a true pupil, which appears black, as in man, when examined with a powerful magnifier. The whole of these pupils, whose axes correspond to that of the eye of the observer, form the black and mobile spot which has often been a source of embarrassment to those examining these parts.

M. A. Dugès states that he has frequently thought that this black spot underwent changes of magnitude, like the pupils of the mammiferous animals. Is there, as in these latter, a contractile diaphragm? If such be the fact, we must suppose that the superficial pigment, which forms these innumerable irides, adheres to the cornea only at the circumference of each facet; that it has elsewhere throughout a perfect freedom; and consequently that there exists a minute space between these two organs. This, indeed, M. Dugès believes he has seen in a very clear section of a compound eye. It appeared that, behind each facet, there existed a little cavity (*fig.* 38. *m*), a kind of anterior chamber, filled with an aqueous fluid. But it is very certain that the minute size and extreme softness of these parts, the violence to which they must necessarily be exposed in their preparation for examination, however carefully we may proceed, and also the high magnifying power required for such observations, must always render the result of these investigations somewhat doubtful and confused.

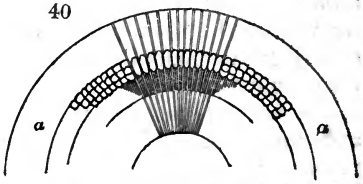
In the Dytíscus marginàlis, the vitreous or crystalline bodies beneath the cornea are conical; which is their form also in nearly all the articulated animals provided with compound eyes. In the Libéllulæ, as already noticed, they are cylindrical. In the Dytíscus marginàlis, the lateral surfaces of these cones are coated with dark and opaque pigment, which, however, does not appear to extend quite to the cornea: it ceases also at the apices of the cones; so that the nervous filaments, for the greater part of their course, are without

this covering. Towards the bulb of the optic nerve it again appears. (*fig.* 39.)

39



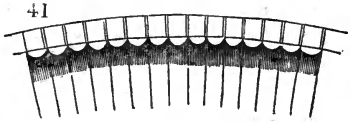
40



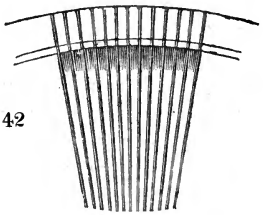
In the *L*ucànus *C*érvus, the cornea (*fig.* 40. *a*) is of extraordinary thickness, and its facets are accordingly so much elongated as to appear like prisms. The cones have their bases nearly in contact with the cornea, and at that part are apparently without pigment; towards their apices, where they are attached to the nervous filaments, they are surrounded with pigment of a violet colour. The nervous filaments, also, in the greater part of their course from the optic nerve, are without any investiture of coloured matter.

In the Méloë majàlis, the cornea is thick, and provided with a small number of large facets. Its inner surface is covered with very convex and almost parabolic eminences, which appear to be the crystalline bodies; and in contact with them are the nervous filaments, which are coated with a dark brown pigment (*fig.* 41.). In the *Æschna* grándis, the crystalline bodies, if they can be said to be present, are extremely small (*fig.* 42.); and such also seems to be the case with a few other insects.

41

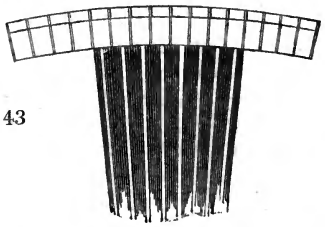


42



In the Pèneus sulcàtus, the eyes are very large. Behind the very thin cornea, which has quadrangular facets, is a layer of short crystalline bodies, placed close to each other, with their lateral surfaces covered with a whitish or whitish green and opaque pigment. They are quadrangular, and only about as long again as they are wide. The filaments of the optic nerve are invested throughout their whole length with dark-coloured pigment. (*fig.* 43.) In many of the other Crustàcea, the facets of the

43



cornea are hexagonal; but in some of the lower tribes the cornea is quite smooth and without facets: this latter circumstance, however, will be noticed again hereafter.

I shall now point out such diversities of form, &c., in these several parts of the compound eyes, as seem to be most deserving of notice.

The Cornea. In insects, the facets of the cornea are hexagonal; in the Crustàcea, they are sometimes hexagonal, sometimes quadrangular. The number of facets, according to the observations of Swammerdam, Leuwenhoek, and others, is here given; but, of course, these numbers ought to be regarded, for the most part, merely as approximations.

Formìca - -	50	*Bómbyx mòri* -	6236
Límulus Polyphèmus -	1000	*Cóssus lignipérda* -	11300
Sphínx convólvuli -	1300	*Libéllula* - -	12544
Cáncer Gámmarus -	2500	*Papílio* - -	17355
Músca doméstica -	4000	*Mordélla* - -	25088

The size of the facets, as it might from the above be expected, varies extremely in the different animals; and in the Libéllula vulgàris, as already noticed, those of the upper segment of the same eye are much larger than those of the other parts.

In a few insects, hairs are seen in the interstices of the facets; this is observed in the orders Hymenóptera and Díptera. When these hairs are met with, they are most numerous at the lower part of the circumference of the eye. The structure of the cornea, and of its facets, varies much in different insects; in many, each facet is a double convex lens, as may be seen by examining the section of the cornea under a microscope. In the *Sphínges*, the axis of the facet is to its diameter as 1 to 2. In many others, and apparently in all those which several times renew their cornea during their incomplete metamorphosis, as in the orders Orthóptera and Heníptera, the facets are much less convex, and generally flat on the internal surface. In the order Orthóptera the thickness of the cornea, in relation to the diameter of the facets, is commonly very great: thus, the diameter of each facet, in the *Gryllus hieroglyphicus*, is to its thickness as 1 to 7. The quadrangular facets in oysters are flat at their internal surface.

The Crystalline Bodies or Cones. These bodies probably belong to the compound eyes with facets of all insects and crustaceous animals. If these eyes are examined in a fresh state, the cones, although completely separated from each other by being individually invested with a layer of choroid pigment, are yet so soft and gelatinous that it is difficult to make a section of the parts without mingling and confounding together the greater portion of the substance of the cones

with the surrounding pigment. In order to examine the form of the organs under consideration, the eyes should be immersed for some time in concentrated alcohol, which hardens without affecting, in general, the transparency of the cones, and so renders them easily distinguishable from the opaque filaments of the optic nerve.

The form of these crystalline or vitreous cones varies considerably in the different articulated animals provided with them. It depends, to a certain extent, but not absolutely, on the form of the facets. In the Crustàcea with regular quadrangular facets, the cones are also quadrangular: in the insects the facets are always hexagonal, but in the *P*halæ`næ the cones are rounded. Their base, which is in contact, or nearly so, with the corresponding facet of the cornea, is sometimes flat, as in the oyster, sometimes concave; and generally accords with the internal surface of the facet. The internal extremity of the cone, which is attached to the extremity of the corresponding filament of the optic nerve, is generally pointed; the point being formed in some abruptly, in others gradually. Their lateral surfaces are separated merely by the interposed pigment which invests each individually.

The dimensions of the cones also vary very much even in the same eyes. In insects whose eyes deviate from the spherical form, the cones are commonly longer in proportion as the surface of the eye is more flattened, and shorter as the eye is more convex or parabolic. In the different species of the genus *S*phínx the diameter of each cone, at its base, is to its longitudinal axis as 1 to 5. The length, in most insects, is very small in proportion to the diameter. In the common oyster it is as 1 to 10.

If we keep the eyes of a *S*phínx for some time in alcohol, the cones, retaining their transparency, become at length so hard, that they may be detached from each other, and the greater part or the whole of their pigment may be removed by agitating them in water. In taking off the cornea of an eye so hardened, ranges or groups of cones will often be separated from their nervous filaments, and remain adherent to the cornea; for the texture of these bodies in such cases rarely gives way. Sometimes the filaments of the nerves are torn, portions remaining attached to the points of the cones.

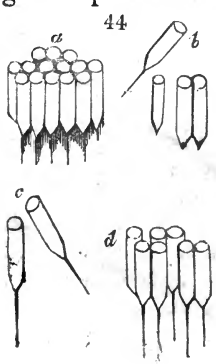


Fig. 44. represents cones insulated and in groups, taken from the eye of a *S*phínx, and magnified. *a* exhibits a group of

cones deprived of the cornea, and separated from the filaments of the optic nerve. The pigment is in part removed, but fragments are still seen in the spaces between the pointed extremities. *b* shows some single cones, either with some pigment still adhering, or altogether deprived of it. In this latter state they are nearly as transparent as glass. *c* represents some cones deprived of their pigment, but with portions of nervous filaments still attached to them. *d* is a group of cones slightly connected together by means of the pigment.

When the cornea is carefully removed from the surface of the cones, this latter exhibits the appearance of a network of rounded and whitish spaces, the boundaries being formed by the pigment penetrating between the sides of the cones.

The Filaments of the Optic Nerve. If, together with the cornea, we remove all the crystalline or vitreous cones, by detaching them at their junction with the nervous filaments, the extremities of these filaments will become visible in the mass of investing pigment; the whole appearing under the form of a convex surface, generally concentric with the convexity of the eye. On account of the very small size of these filaments, they will appear like minute white points regularly distributed through a dark-coloured velvety mass.

The filaments extend from the bulb of the nerve in a radiating direction, preserving throughout their whole length the same thickness. In their course they traverse the deeper pigment, and are united to the corresponding points of the transparent cones; so that the number of filaments, of cones, and of facets, is always the same. The length of the filaments, in relation to that of the cones, varies considerably. In the *Sphínges*, the filaments are nearly four times as long as the cones. The soft texture of these prolongations of the optic nerve prevents our being able to divest them completely of their investing pigment.

The Pigment of the Eyes. The interstices of the cones and of the nervous filaments are filled with pigment and extremely minute tracheal branches, which latter in general communicate with a larger trachea forming a circle round the eye. This tissue of tracheæ and pigment may be designated as the choroid membrane of the eyes of insects.

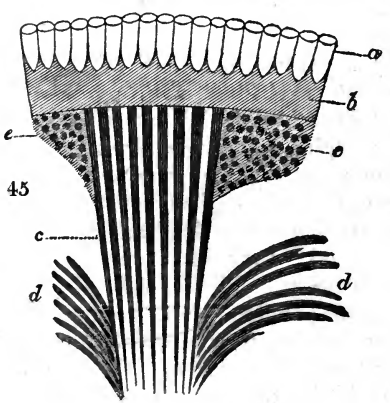
In most insects, an external or superficial and an internal pigment are usually described; they are, however, in all cases, continuous with each other. The superficial layer or portion gives to the eye its proper colour; it is often distinguishable from the deeper portion by a clearer, more vivid, and varying hue. It is red in the species of *O'scinis*; clear yellow in the *Apis retùsa*; bluish orange, brown, red brown,

or green, in the Orthóptera; brownish yellow, brown, red brown, or green, in the Coleóptera; and in both these orders it partakes of the general colour of the skin of the insects. It is golden yellow in the Hemeròbius pérla, and in many dipterous insects. In some of the Díptera and Orthóptera, it is also marked with points and bands of different colours; a circumstance which will be again noticed. Occasionally its hue varies even in the same genus.

The deeper or more internal pigment, lying between the apices of the cones, and between the nervous filaments, exhibits much fewer diversities of tint in different insects. It differs also from the superficial layer, in its colour being altogether uninfluenced by that of the general covering of the body. Its most remarkable colours are the following: a clear red, in that portion near the apices of the cones in the Mántides; a red purple in many of the Díptera, as in the common fly; a violet in the *B*látta orientàlis; a violet blue in the *P*halæ`næ, and in the more internal parts of the eye of the Mántides; a blue black and black in the bees, and in most of the Coleóptera and Lepidóptera.

In general the colour becomes darker in proceeding from the exterior to the interior of the eye; sometimes also brighter tints, or different colours, are observed in this internal portion of the pigment; this is seen in many of the Orthóptera, but especially in the Mántides.

In the Mántis religiòsa, the cones near the cornea are invested with a clear yellow brown pigment (*fig.* 45. *a*); more internally they are provided with a pigment of a reddish violet hue, which extends beyond the apices of the cones (*b*). In this section of the eye the cones apparently do not extend to the optic filaments, and the interval seems to be filled with this second layer of pigment. Whether any other transparent structure connects the cones with their corresponding nervous filaments, is at present unknown; but, if such be not the case, it must be inferred that this red pigment occupying the space between these two sets of organs, is itself transparent in the living



insect; for, otherwise, the light would be intercepted in its passage to the optic nerve. This second layer of pigment terminates abruptly at the extremities of the nervous filaments; the interstices of these latter being filled with a third layer of a deep blue violet colour (*c*). At *d* a bundle of filaments with the adherent pigment is seen partly detached and bent aside; and at *e* the under surface of the second layer is represented, marked with dark violet spots, the traces of its union with the third and more deeply coloured layer. Of course, as the interstices of the optic filaments become narrower in their approach to the bulb of the nerve, the colour of the pigment becomes also, in appearance, of a fainter hue.

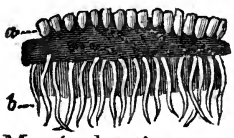
In the Gryllus hieroglyphicus, three distinct layers of pigment are found; and in the common oyster, the variation of colour is still greater.

The surface of the superficial layer also occasionally exhibits diversities of colour. In the Gryllus linèola, the pigment beneath the cornea, or, more correctly, between the bases of the cones, is radiated with greenish brown tints, giving to the eye, when examined externally, a striated aspect. This is observed also in the Gryllus vittàtus *Fabr.*, whose very large, slightly convex, and elliptical eye is radiated with yellowish brown, in a direction from above and in front, downwards and backwards. It is remarkable, however, that this diversity of the superficial colours is commonly met with only in the orthopterous insects, whose metamorphosis is incomplete, and which, during the growth of their eyes, several times renew the cornea, or its outer layer. In addition to the Orthóptera, this organisation is only met with in some of the Díptera, in the species of Chrysops whose eyes are marked with red purple points, and in the species of Tabànus which have green eyes marked with red purple stripes. In the orthopterous insects, it will be observed, also, that the pigment nearest the cornea corresponds very closely in hue, &c., with the colour of the common integuments of the body; the eye, in general, displaying the most brilliant tints when the body is most vividly coloured.

Compound Eyes without Facets. — *Schäffer* (in his *Naturgeschichte des Krebsartigen Kiefenfusses*, Regensburg, 1756, sect. 68.) gave the first accurate description of the compound eye of the Monóculus àpus. The cornea, which is continuous with the common integument of the body, and with it may be removed, is smooth and without facets. After the removal of the cornea, there is seen a dark-coloured mass, presenting on its convex surface a dense aggregate of very small semi-

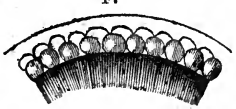
circular eminences, terminating internally in points which are embedded in the dark-coloured pigment, and there attached to the extremities of the white tuft-like filaments of the optic nerve. These transparent cones have, however, only their internal and more slender extremities inserted in the dark violet-coloured pigment, their upper and larger end extending above and out of the layer of coloured matter. *Fig.* 46. represents a section of the eye of the Monóculus àpus, as seen under the microscope. *a*, the uncovered and rounded ends of the crystalline bodies, their apices being concealed in the dark pigment; *b*, the white tuft-like filaments of the optic nerve, which are attached to the apices of the crystalline bodies.

46

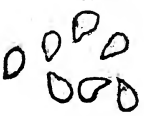


The cornea is without any trace of facets, and is thrown off and reproduced with the skin. A similar structure of the eye probably exists in all the Monóculi and inferior Crustàcea. In the Dáphniæ, the crystalline bodies are pear-shaped, very short, and few in number; their smaller extremities only are inserted in the dark pigment. The cornea is without facets. The same kind of organisation is observed in the genus Limnàdia of Brongniart; and, according to Dalman's representation, the surface of the eyes of Trilobìtes is similar to what is seen in the Monóculus àpus. In the *G*ámmarus *P*ùlex there is this difference, that the eye is immovable. *Fig.* 47. represents a section of the whole eye of the *G*ámmarus *P*ùlex. *Fig.* 48. represents some of the crystalline bodies detached.

47



48



The eyes of the C*y*amus *C*èti, or whale louse, appear at first sight to be simple, on account of their extraordinary minuteness; but, under the microscope, there can be seen an aggregation of semicircular and transparent crystalline bodies lying beneath a smooth cornea, and projecting through a stratum of dark pigment. The eye, however, is so small as to prevent any accurate examination of its several parts being made.

From this statement it becomes tolerably certain that the crystalline bodies, sometimes conical, at others pyriform, are organs corresponding to those commonly found in the compound eyes of the other Crustàcea and of insects, with this difference, that here the cornea has no facets, and that

the exterior end of these transparent bodies is always rounded; in which latter respect, and in the circumstance of these ends not being covered with pigment, an approximation is seen to what is observed in the simple eyes. In some other points of view the pyriform bodies in the eyes of the Dáphniæ and *G*ámmarus *P*ùlex resemble more the lenses of the simple eyes, as they are found aggregated together in the *O*nísci, &c. These latter, however, (the aggregated simple eyes) always possess, besides the spherical lens, a convex projection of the cornea, and a round vitreous humour, but never these transparent conical bodies. The eyes of the Monóculus àpus differ most from the aggregated simple eyes; for in them the conical bodies are long, slender, and very numerous. It is certainly best at present to separate the compound eyes without facets of the lower crustaceous animals, on account of their peculiarities, both from the compound eyes with facets of insects and the Crustàcea, and from the aggregates of simple eyes of the *O*nísci, &c.

In the Dáphniæ and Bránchipus the eyes are movable, like those placed on pedicles in the Crustàcea; in the Monóculus àpus, *G*ámmarus *P*ùlex, and *C*ỳamus *C*ẽti, they are immovable.

I shall conclude this descriptive part with a general survey of the four chief forms exhibited by the eyes of the articulated animals.

1. *Simple Eyes provided with a Lens.*—They contain a lens and a cup-shaped expansion of the retina, the latter being covered externally with a layer of pigment. The lens is round, elliptical, or cylindrical, according to the form of the eye.

i. A lens and a vitreous body, with a circular band of pigment between the two. Examples of this structure are found in the scorpions and spiders; and, among insects, in the simple eyes of the larva of the Dytíscus marginàlis; probably also in the Mántis religiòsa and *G*rýllus hieroglýphicus.

ii. A lens without any evident vitreous body. Of this kind are the simple eyes of the *T*ettigònia týmpanum, the Libéllula quadrimaculàta, and a few others, together with those of the *S*colopéndræ.

2. *Aggregated Simple Eyes provided with Lenses.*—The simple eyes with lenses are commonly aggregated together into a mass containing from twenty to forty. Each eye corresponds to a special convexity of the cornea, but there are no true facets. The genera *I*ùlus, Lepísma, Cymóthoa, *O*níscus, &c., afford examples.

3. *Compound Eyes with Facets.*—These contain, behind thin or prismatic facets, transparent bodies connected with the filaments of the optic nerve, and having their lateral surfaces coated with a pale or dark-coloured, but in all cases opaque, pigment. They are found in the perfect Crustàcea and insects.

In most insects and Crustàcea the transparent bodies are longer than they are broad; forming, in the direction of their axes, transparent cones or cylinders, of variable length. There are, however, a few instances in which these transparent bodies behind the cornea are of extremely small extent in the direction of their axes, less so indeed than in the transverse direction; as in the *V*éspa *C*ràbro, Libéllula quadrimaculàta, *Æ*schna grándis, and in different species of fly.

4. *Compound Eyes without Facets.*—To this division belong the eyes of the Monóculi, and of a few others of the inferior Crustàcea.

These eyes contain, behind a common and transparent cornea without facets, certain crystalline bodies, rounded above and pointed below; the apices or points being inserted in a stratum of dark pigment, above which the rounded heads project. The apices are connected with the filaments of the optic nerve. These crystalline bodies are either long and conical, as in the Monóculus àpus; or short and pyriform, as in the Dáphniæ and *G*ámmarus *P*ùlex. Their number is very considerable in the Monóculus àpus, approximating in this respect to the cones in the compound eyes of insects; smaller in the *G*ámmarus, and still less in the other Monóculi and in the whale louse (*C*yamus *C*èti).

(*To be continued.*)

ART. IX. *On the Natural History of the Bee.*
By W. L., of Selkirkshire.

Sir,

IT seems to have been ascertained that every bee that leaves the hive in the morning gathers honey and pollen from only one species of flower throughout the day, adhering closely to the species.

From my own observations I have been constrained to acquiesce in this curious fact. But we always find that every habit of insect, bird, or beast, has a positive use, or corresponds to some law of its existence, and there appeared nothing to induce us to suppose this habit of bees to be ano-

malous. I was puzzled in seeking for the reasons; chiefly because all the honey and pollen brought home by the bees, except the very small quantity appropriated for the queen, is stored in the cells indiscriminately. Although we would naturally be led to suppose that the pollen from the crocus, which we know they are eager to obtain, and which is identically the same and has similar medicinal qualities with saffron, would hardly answer the same purpose as that extracted from the flowers of the cabbage, turnip, or gooseberry bush, it yet seems that nature has rendered the constitution of these insects, though perhaps the most tender and delicate in existence, equal and fit for the digestion of them all. To-day, however, I observed a circumstance which seems to throw some light upon the subject. A bee was ranging among the flowers of a hollyhock, all hoary with the peculiar ash-coloured pollen of the plant, and I was greatly interested (while continuing to follow it with my eye) to notice that it went quickly round the bottom of the cup at the junction of the petals, and made a brief stop between each, showing a precise and intimate knowledge of the plant, and of where the honey was only to be found. This suggested the great use and economy of every species of plant having a certain and arranged division of bees employed for its particular spoliation; which, I make no doubt, there is: for it requires only a single thought on the matter, to lead any one to this conclusion, who has at all considered the prodigious effect that constant habit and practice have, in the rapid acquirement of unhesitating facility and correctness of execution in whatever is done by the instrumentality of mind or muscle. We can be at no loss to imagine the embarrassment of the spirited little creature, which has, for the first time of its busy life, been employed in foraging among the aromatic branches of a willow, where it has been rioting, in gay and glorious luxury, during the ten days of vernal beauty and delight that the Sàlix pentándria continues bespangled with her golden and odoriferous palms; and we can think, only for a moment, of its surprise and mortification, if it were to be ordered off some morning, with a party destined to collect their burden from a bank of whins. * There every thing is different. The catkins of the willow hang open to the sun, and vibrating in the noon tide breeze; but the close-pent inner flower of the gorse is a box or case opening with a spring, into which the bee

* It is very seldom that bees collect the pollen of the broom, but they do collect this narcotic material in small quantities. One at a time may be observed, at long intervals, dropping upon the resting-board of the hive, where it is quite easy to distinguish them, as they are totally covered with the bright yellow powder which they have brought away. What do they want it for?

must enter by an effort to obtain the pollen; the position of which on the anthers, and the form of the stamens and anthers themselves, are such that her former experience would avail her little. If from the gorse she were to be sent to the daisy, from the daisy to the hawthorn, and so on; such a jack of all trades would do little good. But, no question, things are better ordered among bees; for we find throughout all nature a beautiful adaptation and most wonderful economy; one single operation often tending to several effects.

Selkirk, Nov. 1831. W. L.

ART. X. *On a beautiful Nidus of a Spider, and a Hymenopterous Parasite found within it.* By A. H. DAVIS, Esq. F.L.S.

Sir,

DURING a stay of some weeks at Wanstead, in Essex, last summer, I met with four specimens of the beautiful nidus described and figured in your Magazine. (Vol. II. p. 104.) In every instance, however, mine were attached to the trunks of trees, full 6 ft. from the ground. The first I took about the middle of June, and the remaining three towards the close of that month, or very early in July. They were pendulous, and firmly fixed to the bark by silken cords, which extended a considerable distance from the narrow neck of the nests. I placed them near to the fire, to destroy the inhabitants, being anxious to secure the nests without injury. They are certainly of most exquisite workmanship; their colour the purest white, and their texture resembling tough silver or tissue paper, but of a more silky character.

Being anxious to ascertain whether the opinions of your correspondents were correct *, in considering them as the work of spiders, sanctioned, too, as they were, by the communication of so able an entomologist as the Rev. Mr. Kirby †, I resolved on opening one of the nests. A few days since, I accordingly divided one longitudinally, and, to my great surprise, I found, in the broadest portion of the cavity, a hymenopterous insect, at first somewhat resembling Cynips áptera, but not one fourth its size, and, like that, destitute of wings; but, on subsequent examination, it appeared more nearly allied to the *I*chneumónidæ. Whether, in separating the nidus, I had the misfortune to sever the head, I know not; but on afterwards placing the insect on card, that important portion was missing. I deeply regret that its decapitation prevents my referring it with certainty to any genus. The

* Vol. II. p. 104. Vol. III. p. 458. † Vol. II. p. 405.

narrow portion of the nidus, in which the eggs were deposited, was divided from the broader by a silken curtain of the same material as the external portion; within this were the remains, apparently, of some larvæ, one or two of which were also in the superior cavity; but of the nature of these, even with the aid of a high magnifier, I could form no satisfactory opinion.

I opened another nest, but in that there was no occupant; and the nest of eggs at the upper end was firmly agglutinated together, having a convex surface; whereas, in the former, the shapeless masses which I observed were scattered. On holding the other specimens to a strong light, they appear perfectly transparent at the broad, and opaque at the narrow, end, exhibiting no appearance of any inmate.

At first I was disposed to think I had discovered a new fact in entomology, and began to adjudge the merits of the construction of so beautiful a piece of architecture to the hymenopterous insect. Doubts, however, sprang up in my mind, which were confirmed on turning to your pages, where I found Mr. Kirby decidedly of opinion that the nidus was the work of a spider, and that your correspondent W. B. B. W. (Vol. III. p. 458.) asserted his having reared spiders from analogous nests. On consideration, it was obvious that, if the hymenopterous insect were the architect, and the nest had been finished on the internal side, each would have been inhabited; I therefore came to the conclusion that the insect I found was a parasite.

Till I had commenced this paper, it did not occur to me to refer to *Kirby and Spence;* but, on doing so, I find those authors allude to the subject in the chapter on the diseases of insects, wherein they describe the attacks of those *I*chneumónidæ which are parasitical on eggs. They state, "Though the animals we are speaking of usually destroy only a single egg, yet some appear not so to confine themselves. Geoffroy informs us that the larva of one of the ichneumons whose females are without wings (Crýptus *Fab.*) devours the eggs of the nests of spiders, and from its size (it is nearly a quarter of an inch long) it must require several of them to bring it to maturity." (*Geoff. Hist. Ins.*, par. ii. 361. *Kirby and Spence*, vol. iv. p. 218.) That the insect so mentioned by Geoffroy is the same, or at least congenerous, with the one I have discovered, I do not doubt; more especially as he refers to the female being apterous: but I am inclined to believe that, in the nidus I have described, the larvæ have been hatched, and that the loose and light portions in the inferior cavity are

simply the skins of the young spiders, something resembling many legs being apparent.

Under any circumstances, I apprehend the fact of such a parasite occurring in our own country has never been recorded, and you will probably deem it of sufficient interest to allow the present article to appear in your useful miscellany.

I am, Sir, yours, &c.

London, Feb. 7. 1831. A. H. Davis.

Art. XI. *Description of a beautiful Tree.* By John F. M. Dovaston, Esq. A.M., of Westfelton, near Shrewsbury.

> " *Hamlet.* Do you see nothing there?
> *Queen.* Nothing at all; yet all that is, I see." *Hamlet.*
>
> " You cannot see the wood for trees." *Ray's Proverbs.*

It was now the middle of May; the trees had fully put forth their bright fresh leaves, and the green fields were luxuriant in a profusion of flowers. We had travelled through a fine country; when, descending the slope of a wooded valley, we were struck with delight and admiration at a tree of extraordinary appearance. There were several of the sort, dispersed singly, and in groups, over the plains and grassy knolls. One we shall attempt to describe, though well aware how feeble is the most florid description to depict an idea of so magnificent an object. In height it exceeded 50 ft., the diameter of its shade was nearly 90 ft., and the circumference of the bole 15 ft.: it was in full leaf and flower, and in appearance at once united the features of strength, majesty, and beauty; having the stateliness of the oak, in its trunk and arms; the density of the sycamore, in its dark, deep, massy foliage; and the graceful featheriness of the ash, in its waving branches, that dangled in rich tresses almost to the ground. Its general character as a tree was rich and varied, nor were its parts less attractive by their extreme beauty when separately considered. Each leaf was about 18 in. in length; but nature, always attentive to elegance, to obviate heaviness, had at the end of a very strong leaf-stalk divided it into five, and sometimes seven, leafits, of unequal length, and very long oval shape, finely serrated. These leafits were disposed in a circular form, radiating from the centre, like the leaves of the fan palm, though placed in a contrary plane to those of that magnificent ornament of the tropical forests. The central, or lower, leafits were the largest, each of them being 10 in. in length and 4 in. in breadth, and the whole exterior of the foliage being disposed in an imbricated form, having a beautifully

light and palmated appearance. The flowers, in which the tree was profuse, demand our deep admiration and attention: each group of them rose perpendicularly from the end of the young shoot, and was in length 14 in., like a gigantic hyacinth, and quite as beautiful, spiked to a point, exhibiting a cone or pyramid of flowers, widely separate on all sides, and all expanded together, principally white, finely tinted with various colours, as red, pink, yellow, and buff, the stamina forming a most elegant fringe amid the modest tints of the large and copious petals. These feathery blossoms, lovely in colours and stately in shape, stood upright on every branch all over the tree, like flowery minarets on innumerable verdant turrets. We had thus the opportunity of ascertaining that it belonged to that class of Linnæus consisting entirely of rare plants, the Heptándria, and the order Monogýnia; the natural order Trihilàtæ; and the *Á*cera of Jussieu.

The natives informed us that the fruit ripens early in autumn, and consists of bunches of apples, thinly beset with sharp thorns, each when broken producing one or two large kernels, about 2 in. in circumference, of the finest bright mahogany colour without, and white within; that the tree is deciduous, and just before its fall changes to the finest tints of red, yellow, orange, and brown. When divested of its luxuriant foliage, the buds of the next year appear like little spears, which through the winter are covered with a fine glutinous gum, evidently designed to protect the embryo shoots within, as an hybernaculum, from the severe frosts of the climate, and which glisten in the cold sunshine like diamonds. It has the strange property of performing the whole of its vigorous shoot, nearly a yard long, in the short space of three weeks, employing all the rest of the year in converting it into wood, adding to its strength, and varying its beauty. The wood when sawn is of the finest snowy whiteness. The tree is easily raised; indifferent as to soil, climate, or situation; removed with safety, of quick growth, thrives to a vast age and size; subject to no blight or disease; in the earliest spring bursting its immense buds into that vigour, exuberance, and beauty, which we have here feebly attempted to describe. The natives said it was originally brought from the east of Asia, but grows freely in any climate, and in their tongue its name is designated by a combination of three words, signifying separately, a noble animal, an elegant game, and a luscious kernel. Had Linnæus seen this tree, he would have assuredly contemplated it with delightful ecstasy, and named it the *Æ*sculus Hippocástanum.

Westfelton, near Shrewsbury,
April 1. 1830.

JOHN F. M. DOVASTON.

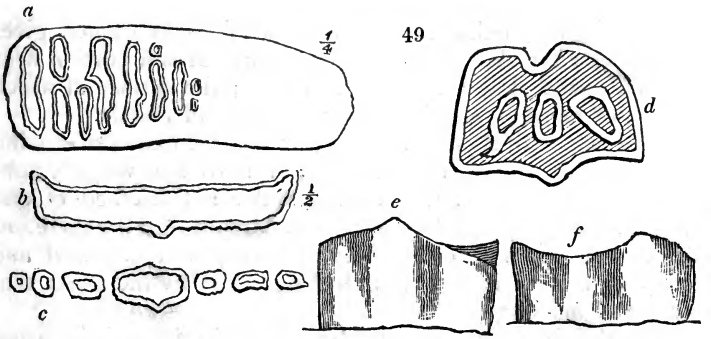
ART. XII. *Description of the Jaw and Teeth of a Mammoth, and of some other Fossils, found in a Flint Quarry in the Neighbourhood of Chatham;* being the Substance of a Lecture delivered to the Philosophical and Literary Society of that Town by ROBERT DADD, Esq. Communicated by Mr. DADD.

SEVERAL months since I received information that an enormous jaw, with teeth in it, had been discovered in a flint quarry at Luton, a village in the neighbourhood of this town, situate in the midst of the transverse valley of the chalk formation, at the mouth of which, and where it opens into the river Medway, this town is seated. I lost no time in proceeding to the spot, and securing these interesting relics; when I also effected an arrangement with the proprietor of the quarry for receiving whatever else of the kind he should in future discover there. Several portions of bones, and several teeth of different genera, have since been obtained.

1. The jaw, which, before I arrived at the spot, had been reduced to fragments and dispersed, measured 2 ft. from the front to the angles: its figure is described to be like that formed by the arms of a man stretched out horizontally before him; making the tips of the fingers of each hand to touch, and giving, at the same time, a slight curve to the arms and fingers. At the thickest part, that which included the teeth, it was, as near as I could ascertain, 8 in. through; but, in consequence of its fragmentary state when I obtained it, I am unable to give a fuller account of it, except that its structure was cancellated, and indicated that the animal was young at the time of its destruction.

2. The teeth, two in number, occupied the opposite sides of the jaw: they measure, from front to back, 7 in.; across the centre of the crown, $2\frac{3}{8}$ in.; from the crown to the radical processes (which are broken off), $5\frac{5}{8}$ in. The plates, made apparent on the crown by attrition in mastication, are eight in number in each, and are perfectly divided from each other by the intervention of the crusta petrosa; the average thickness of the plates is $\frac{4}{10}$ in.; the thickness of the crusta petrosa is rather less than that of the plates; three, or perhaps four, of the back plates are missing: taking these into account, seven plates have not yet appeared on the crown. The crusta petrosa was soft when the specimens were first discovered, but it has now become hard; it is very greedy of water, and adheres strongly to the tongue. (*fig.* 49. *a.*)

3. A tooth of an animal of the same genus as the last, but of a different species, and an older animal: the general form is the same as of them, but it differs, I think, specifically. It measures, from front to back, 9 in.; the width across the centre



a, Crown of mammoth tooth. *b*, Plate of tooth completely worn.
c, Plate of tooth partly worn. *d*, Crown. *e*, Outside of jaw. *f*, Inside of jaw

of the crown is 3 in.; length, from the top of the crown to the extremity of the radical processes, 4½ in. The plates are fourteen in number, and are perfectly divided from each other by the crusta petrosa; one of the front plates is missing; two of the back plates have not appeared on the crown: the thickness of the plates is three tenths of an inch; the crusta petrosa is of the same thickness, and was in nearly the same state as the preceding two. (For the specific difference in the teeth see *b*, *c*.)

4. A number of loose plates of teeth of the above description.

5. Bones. The lower articulating portion of the radius, with about two thirds of the shaft. Numerous cancellæ make up the greater part of the epiphysis of this bone; and the porous texture of the whole indicates youth. The longest diameter of the epiphysis is 6 in.; the shortest, 4 in.; circumference of the shaft at its largest part, 12 in.; at its smallest, 9½ in.; length of the fragment, 10 in.; supposed entire length of the bone, 16 in.

Portion of a tibia. Its structure is cancellated, and the epiphyses are broken away. Length of this fragment, 8 in.; the entire breadth was probably not less than 22 in.; circumference at the largest part, 10 in.; at the smallest, 7¼ in. There is no cavity for marrow, its place being occupied by cancellæ.

Portions of vertebræ, heads of ribs, the scapulæ, and heads of the greater limb bones. These are all so much broken as to prevent their appropriation to any one in particular.

Three of the bones of the foot, the articulating surfaces much worn and broken.

6. Fragments of the tusks. One of them measures 12 in.

in length, and, being about one third of the substance, gives a diameter for the entire tusk of 18 in. It is a portion near the base, and shows the alveolar cavity; the surface of which is full of canals and tubes for the passage of vessels.

The whole of these remains bear evident marks of having been exposed to the violent action of hard and weighty substances; and being found buried under a thick bed of displaced and transported flints leaves no doubt that the skeletons of the animals were crushed by the falling of these hard and weighty masses upon them, and scattered by the flood that drove them along.

Tooth of deer, a grinder. The size of this tooth indicates the animal to which it belonged to have been gigantic. The radical processes are broken off. Its length, from the crown to the radical processes, $1\frac{7}{8}$ in.; from front to back, $1\frac{1}{4}$ in.; thickness at the base, three quarters of an inch.

Part of grinder of *Hippopótamus*. This is of the size usually found in diluvial deposits, and answers to Professor Buckland's figure very correctly.

Grinding tooth of tapir? with a portion of the jaw attached. The thickness of the jaw including it is $1\frac{1}{4}$ in.; length from front to back seven eighths of an inch; thickness five eighths of an inch. (*d*, *e*, *f*.)

An account of the geological situation of the remains of a former world may prove interesting. I have mentioned that they were found in a transverse valley of the chalk formation. This valley opens into the valley of the river (Medway), between Chatham church and Fort Pitt. Its northern side is bounded by a steep ridge, being the basset edge of the upper chalk: its southern side is formed of sloping chalk hills, between which small vales open into it; these are rather numerous. The length of the valley, from the mouth to its termination, is about three miles; its width from half a mile to one eighth of a mile. The precipitous side is scarcely covered with soil; the slope is covered over with diluvial deposits, being the ruins of the chalk and plastic clay; the whole bottom or drift of the valley is covered with a diluvial deposit also, consisting of fragmentary rolled chalk, flints, clay, and sand, of the thickness of from 2 ft. to 12 ft. When this deposit is removed, the chalk upon which it reposes is found to have been much worn and gullied by a powerful stream of water. In the centre of the valley, lying upon the chalk in these gullies, the remains in question were found, embedded in a mixed mass of rolled chalk, displaced flints, and clay, of about 2 ft. in thickness:

this was covered over by a deposit of flints and clay, 6 ft. thick, over which the alluvial and vegetable soil is placed. The bones, &c., are not found contiguously, but scattered at distances of from 2 ft. to 50 ft., battered, and a little water-worn; and afford one proof among a multitude of others of a great revolution or catastrophe having completely altered the face of the earth in this part. A description of that part of the chalk formation which I have had opportunities of observing frequently, and a brief account of the deposits that lie upon it, may enable us to appreciate the nature, and perhaps go some way towards ascertaining the cause, of that convulsion which has modified this small portion of country; and, I presume, the whole of that portion also which is now, or has been, covered by the chalk. From the river at Durham to the hill above Detling is a distance of five miles, and it is occupied by a ridge of chalk hills, in height from 500 ft. to 600 ft.; it is a portion of the southern edge of the London basin. Following the river downwards, these hills gradually decrease in height till we arrive at Rochester, below which the chalk dips northerly under the river, and reappears on its opposite bank. On the north-east of the town of Chatham the chalk forms a long ridge, being the basset of the valley before mentioned; it gradually slopes in a northerly direction to, and dips finally under, the river at the extremity of the dockyard: this is a distance altogether of five miles. From Detling Hill to Upchurch, in a north-east direction, the distance is also five miles. This tract, for about half a mile's distance, is overspread with a stiff red clay, mingled with great quantities of displaced flints, broken, but not rounded. The remainder of it is occupied by the sands and clay of the plastic clay formation, the thickness of the beds of which at and near Upchurch is more than 100 ft. From Upchurch to the dockyard is a distance of 4¼ miles: this line is along the river and its marshes, and is all occupied by the plastic clay, sands, and gravel. The depth of the deposits thus covering the water-worn surface of the chalk does not generally exceed 4 or 5 ft., except where the members of the plastic clay occur *in situ*, which is towards the banks of the river, when their thickness sometimes equals what has been mentioned.

The first thing which strikes a geological observer in this district is the destruction of the continuity of the chalk range, and the passage of the river through the deep valley formed by that act. The next phenomena are the formation of transverse valleys, exhibiting on one side a basset of the chalk,

and on the other slopes (interrupted by vales of similar construction to the transverse valleys) covered by diluvial deposits; and the fact that these transverse valleys turn into the river valley, forming, altogether, a complete system of drainage to this portion of country, namely, that lying to the south-west of the great transverse valley of Chatham. The remainder of it, included within the limits above-mentioned, has a gentle inclination towards the river, and is consequently drained into it in another way.

It is evident, from the nature of its organic remains, that the chalk was deposited at the bottom of a former ocean; and also, from its stratification, that its original position was perfectly horizontal: it has emerged from beneath the waters, and the horizontality of its strata is changed to a dip varying from 10 to 30 degrees. The repetition of the usual phenomena of nature for a thousand centuries would not have produced these effects; except volcanic phenomena on a great scale, we know of no existing power capable of producing such effects. The present geological appearances are such as indicate the action of an enormous and sudden power, operating as great and as sudden changes. Let us look at the river valley, the transverse valleys, and their small vales, and we shall perceive evidence of a great alteration of the original position of the mass of chalk; its upper beds have suffered very great disruption and waste. The river valley, and the others connected with it, have originated, I believe, in the bursting asunder of the upper chalk beds, to the depth of from 60 to 600 ft.; the fracture which produced them also loosened great portions, and caused the shattering, fissuring, and slipping of the neighbouring portions, so evident to all who diligently observe the chalk. The main edge, or basset, to the south, is indented by numerous bays and promontories regularly alternating, the angles of which are worn round and smooth; the feet and hollows are covered by a talus of water-worn fragments, among which many flints are found irregularly dispersed; and this is the case with the basset edges in all the valleys and vales. The mouths of the transverse valleys, where they open into the river valley, are more or less choked by an accumulation of gravel, flints, sand, and rolled chalk fragments; which have evidently been placed there by an active current of water, which has flowed from the older and lower over the younger and higher strata, with great force, and evidently occupying the river valley to the tops of the hills: consequently the same waters covered the whole district, and flooded even to the tops of the ridge of the great or

southern basset. The rush of these waters was in the direction of the river, the course of which is east. The mouths of the transverse valleys are deflected by the current. This flood, it appears to me, took its direction from the Weald to the east; and we consequently find the remains of the chalk and plastic clay distributed far in that direction, spreading over Essex and Suffolk, and into the North Sea. The order in which the ruins lie are, first, from the basset for from four to six miles over the slopes, in the bottoms of the vales, transverse valleys, and river valleys, we find displaced flints, stiff red clay, and sands; secondly, great accumulations of flint, pebbles, sand, and some rolled chalk, lying in cavities and on the surfaces of the plastic and London clays; lastly, sand, pebbles, and rounded chalk and clay. In these diluvial beds many remains of the larger animals, such as those of which the fragments I have above described are portions, are buried, with several others.

The cause of the phenomena I have noticed above, I believe to be the same which effected the Weald denudation; namely, a power acting from the central regions of the globe towards its circumference, elevating the strata, and in the focus of its action not only raising but shattering and loosening them; thus rendering them a prey to the flood occasioned by the convulsion.

It would be beyond the limit of a notice of this kind, to enter fully into the discussion of the connection of the chalk of Kent with that of Sussex; but that they were originally connected I have no doubt, nor that that connection covered what we now call the Wealds of Kent and Sussex.

ART. XIII. *On the Temperature of the Atmosphere on different Parts of the Earth's Surface.* By Mr. W. H. WHITE, H.M.C.S.

MAN, the rational inhabitant of the earth, does not depend alone upon the extent, soil, and position of any portion of the earth's surface for his comforts, but also upon its climate or temperature. The atmosphere is composed of a thin fluid mass of matter, which gravitates towards the earth, and revolves with it both in its diurnal and annual motions; a knowledge of which serves to throw much light on the history and functions both of the animal and vegetable creation, for it is through this great medium that heat, light, electricity, oxygen, and the great springs of vital phenomena are conveyed to

all classes of organised matter. It is by the means of this wonderful agent that we gain the theory of respiration in all classes of creatures possessing animal life; it is by this agent that we become acquainted with the migrations of animals, as well as of many of their peculiar instincts and habits. It is the atmosphere that enables us to account for the periodical changes in the plumage of birds, and the furs of animals, and also the variety of colours to be found amongst them. It is by means of the elasticity of the atmosphere, too, that sounds and odours are transmitted to sensitive beings. As this fluid, therefore, is the most essential of all the elements to the support and continuance both of animal and vegetable life, it certainly deserves the most serious attention of every rational being.

The atmosphere, agreeably to certain laws of nature, and the benevolent skill which the Author of nature has displayed in the formation of so surprising a fluid, varies in its temperature in different regions of the earth; and this variation is attributable to various causes, which cannot fail to attract the serious attention of every lover of nature; and the enquiry becomes still more interesting when its effects upon the animal and vegetable kingdoms are considered, as they lie dispersed over every part of the globe. Had a uniform climate been established over the face of the whole earth, we should have been deprived of that beautiful variety of plants and animals which now strikes us with astonishment at every step.

As the word *climate*, according to its Greek import, signifies to incline, or to slope, it was probably first adopted by the ancient geographers to denote the different inclination at which the rays of the sun fell upon the surface of the earth, and which they restricted to certain belts of the earth's surface, beginning at the equator, and proceeding towards the poles. The distinction between one of these belts and another, or one climate and another, was a difference of half an hour in the length of the longest day. According to this division of the earth's surface into climates, the difference of temperature and the difference of the length of the longest days lost all proportion, for it was soon discovered that the breadth of the first climate, i. e. the one nearest to the equator, measured 295 miles, while the twenty-second climate, or that in the northern part of England, measured less than 70 miles. However satisfactory this division of the earth's surface might be, to show the inclination of the solar rays; it did not in any degree point out how far the climates of these different latitudes were favourable or unfavourable to animal and vegetable existence.

These ancients considered the sun to be the only source of the variation of temperature, except some small influence which Hippocrates attributed to the winds in Greece and some of the neighbouring countries, where a few local observations had been made. But, as nations became civilised and enlightened, travellers were despatched to every part of the habitable globe, and observations have been successfully made not only upon every thing that affected science in general, but particularly upon atmospheric temperature; and it is from a comparison of these patient and laborious investigations that the science of climatology has kept pace with every other science. Climate, therefore, in its present sense, serves to denote that admirable combination of circumstances, which everywhere exhibits the most striking scenes of omnipotence and divine skill, and which so essentially tends to make the earth desirable for the habitation of man.

When we speak of climate in general terms, we say either a good or a bad climate; but, when we particularise, we speak of hot, cold, dry, moist, healthy, unhealthy, &c., according to varying circumstances; hence climatology may be denominated one of the most amusing and instructive studies, that can occupy the attention of a lover of nature.

It is an amusing study, because it brings to a small focus, viz. to our own imaginations, the results of different observers upon the surrounding atmosphere; and the various and beautiful changes that we see there daily exhibited to our view, fill us with astonishment. Sometimes we behold the sky covered with sable clouds, at other times we see it tinged with every hue which fancy could suggest, by the rays of the rising or the setting sun. At one time we behold the rainbow raise its majestic arch, and at another the aurora borealis illuminate the nocturnal sky with fantastic and varied coruscations; sometimes the heavens appear like a boundless and frightful desert, and at other times they exhibit an innumerable host of stars, and the moon "walking in brightness."

It is an amusing study, also, because it makes us acquainted with many of the characteristics of the various nations on the globe, and the produce of the climates which they inhabit. Thus, we see the rays of a perpendicular sun in the torrid zone darken the complexion of the inhabitants, enervate their bodily powers, and enfeeble the nobler faculties of the mind. Nor is the extreme of cold more congenial to human nature; for the nearer we approach the cold and barren region of the pole, we find man sinking under the opposite extreme to that which relaxed his powers in torrid regions; in fact, he

becomes more feeble and helpless, and the faculties of his mind even less developed, than in hot climates; while the vegetable tribes not only diminish in number, but also in size and beauty. Hence we may reasonably conclude that the range of climates from one pole to the other furnishes us with a correct guide to the several degrees of human comfort and intelligence; while we must infer that the more temperate climes are better suited to the human constitution than either very hot or very cold climates, and also that the more energetic and intellectual part of the human race are the inhabitants of those climes that are comparatively temperate.

Climatology is also an instructive study, as it extends the mental faculties, and excites in man a desire for intellectual and moral improvement. To gratify this principle, the Creator has adorned our globe with an endless combination of beauties, strewed in a never-ending variety over every region of the globe, which affords so many stimuli to rouse this principle into active exertion, and to direct the mind to the study not merely of created beings, but of the Creator himself; for every natural science has a tendency to expand the conceptions of the incessant agency of a divine power. Again, does not a knowledge of the different plants and animals render the earth, as the habitation of man, far more delightful than the mere gratification of sensual and animal pleasures? Is it not in a correct knowledge of the different climates of the globe and of their varied and multiplied productions, that the very foundation of commerce is laid? Has not experience taught us that one country abounds with that which is desirable, but which is not producible, in another climate? And hence that mutual intercourse is established among all nations, which is conducive to the highest interests of the whole human race, and which firmly binds them together by the ties of common interest as one great family.

ART. XIV. *Data and Observations towards establishing Rules for the Guidance of Agriculturists and Botanists, as to the Quantity of Rain which falls in different Months of the Year in different Places.* By JAMES G. TATEM, Esq., Member of the Meteorological Society.

Sir,

FULLY aware that little reliance can be placed upon any theory founded on data so uncertain as the quantities of rain

that fall in different years, yet convinced that something might be done towards establishing rules for the guidance of agriculturists and botanists, if observations were made at the same places for a series of years, and the results reported in your interesting and instructive Magazine, I have, for the purpose of furthering so desirable an object, and in the hope of inducing others, subjoined tables showing the average quantities of rain that fell at Wycombe, Edmonton, and Epping, in each month during the last seven years; the greatest and least quantities in each month, stating the years in which they occurred. I have also added another table, formed on the same principle, of the rain at Carlisle for the years 1819 to 1826, both inclusive. From these it appears that the greatest quantities of rain have fallen at Wycombe, Edmonton, and Epping, in September; while, at Carlisle, November has been distinguished for the excess of rain. This last is so much in accordance with the general opinion of the character of that month, that no surprise can be excited; but it may cause some astonishment that September should be found so wet a month. On the other hand, January was the driest month at Edmonton and Epping in the years referred to; but the smallest quantity of rain fell at Wycombe in the month of March, and at Carlisle in April. It would give me much pleasure if some of your meteorological readers would take the subject into their consideration, and make such improvements on these crude suggestions as may effect the object in view; my humble efforts shall not be wanting.

I remain, Sir, &c.

Wycombe, Jan. 18. 1831. JAMES G. TATEM.

Wycombe, Bucks, lat. 51° 37′ 44″ N.; long. 34′ 45″ W.

Months.	Average quantity of rain.	Greatest quantity of rain.	Year in which it fell.	Least quantity of rain.	Year in which it fell.
January	1·80107	4·675	1828	0·5375	1826
February	1·95353	3·45625	1824	1·05	1827
March	1·70285	3·395	1827	0·575	1829
April	2·71607	4·45625	1829	1·01875	1826
May	2·29373	3·1875	1824	0·50625	1829
June	2·62338	4·11875	1830	0·7875	1826
July	2·4096	4·7625	1829	0·10625	1825
August	3·2135	5·3	1828	1·45	1826
September	3·94466	4·6	1826	3·25637	1828
October	2·68392	4·31875	1827	1·1375	1830
November	2·62824	4·28745	1824	1·28625	1828
December	2·84839	4·85	1827	0·33125	1829

Edmonton, Middlesex, lat. 51° 37′ 32″ N.; long. 3′ 51″ W.

Months.	Average quantity of rain.	Greatest quantity of rain.	Year in which it fell.	Least quantity of rain.	Year in which it fell.
January	1·2125	3·725	1828	0·2	1826
February	1·325	1·9	1824	0·225	1827
March	1·31071	2·625	1827	0·225	1830
April	2·06214	3·8	1829	0·85	1827
May	2·49678	4·0025	1824	0·575	1829
June	2·01857	4·35	1824	0·8	1826
July	2·34857	4·85	1829	0·1625	1825
August	2·56787	5·0	1829	1·275	1824
September	3·07142	4·2	1829	2·0	1828
October	2·18035	3·375	1827	0·65	1830
November	2·67142	3·675	1824	1·45	1827
December	2·48214	4·325	1824	0·15	1829

Epping, Essex, lat. 51° 41′ 42″ N.; long. 25″ E.

Months.	Average quantity of rain.	Greatest quantity of rain.	Year in which it fell.	Least quantity of rain.	Year in which it fell.
January	1·38571	3·728	1828	0·91	1824
February	1·47957	2·468	1824	0·727	1827
March	1·519	2·844	1824	0·458	1829
April	2·29585	4·862	1829	1·02	1827
May	2·337	3·775	1824	0·595	1829
June	2·41428	5·765	1824	0·410	1826
July	2·53271	5·571	1828	0·008	1825
August	3·23342	6·827	1829	1·638	1826
September	3·66271	4·228	1829	3·321	1828
October	2·30414	3·711	1825	0·645	1830
November	2·61871	3·902	1824	1·227	1829
December	2·41057	3·471	1825	0·351	1829

Carlisle, Cumberland, lat. 54° 50′ 50″ N.; long. 2° 58′ W.

Months.	Average quantity of rain.	Greatest quantity of rain.	Year in which it fell.	Least quantity of rain.	Year in which it fell.
January	2·15571	3·62	1819	1·53	1822
February	1·90571	3·1	1819	0·75	1821
March	2·50142	4·01	1822	1·31	1825
April	1·59285	2·74	1821	0·85	1824
May	2·41714	4·61	1823	1·23	1824
June	2·06285	3·64	1820	1·05	1822
July	2·95428	5·33	1822	0·45	1825
August	3·65428	5·3	1822	1·6	1821
September	3·05142	3·85	1824	1·33	1822
October	3·74	5·15	1819	2·45	1820
November	3·75428	5·53	1824	1·6	1820
December	3·30714	5·63	1824	2·31	1825

PART II.

REVIEWS.

ART. I. *Bulletin de la Société Impériale des Naturalistes de Moscou.* Moscow. 8vo, Plates. Vol. I. for 1829, and No. I. for 1830.

THE Society of Naturalists of Moscow was founded in 1805, by Professor Fischer. It was encouraged and fostered by the countenance of the late Emperor Alexander, who not only conferred a title calculated to command respect, but ordered that the letters of the Society to and from its members should traverse the empire free of postage; and gave an annual grant of money to forward its objects. By this means the Society had succeeded in forming large collections in natural history, the greater part of which were unfortunately destroyed in the conflagration of 1812. This misfortune, however, has been in a great measure repaired, and the successor of Alexander continues the patron, and has increased the annual pecuniary allowance necessary to defray the expenses attending the publication of their proceedings and the formation of their collections.

To communicate to non-resident members the operations of the Society, and thus to stimulate their zeal, and keep alive their interest in its success, and to secure their proper discoveries by an early publication, are stated to be the reasons for the printing of this bulletin, which is gratuitously distributed. The plan is, in our opinion, admirably calculated to fulfil its object, and is one which might be beneficially adopted by some learned bodies in our own country.

The numbers for the years 1829 and 1830 are now before us. They contain many interesting notices of the journeys and discoveries of the naturalists in Russia; descriptions of new genera and species in every kingdom of nature; abstracts of every paper communicated to the Society; and, occasionally, directions for collecting natural objects, and notices of new publications. The zeal and knowledge of the director are conspicuous in every page, and he seems to be indefatigable in his work of promoting natural sciences. In No. iii., however,

he is guilty of some degree of injustice to our distinguished countryman Mac Leay. The latter, in 1819, had described a new coleopterous insect, and named the genus Leucothyrèus; but Professor Fischer, in giving some additional account of the beetle, prefers to call it Aulacòdus, a name conferred by Eschscholtz *two* years subsequently to the publication of the English naturalist. The only reason given for this preference is, that the latter appellation appears more characteristic than the former; a reason utterly insufficient to set aside the paramount claim of priority.

In the same number there is a notice of the museum of Barnaoul, in Siberia!, founded in 1823, by the care of the superintendent of the mines of Kolywano, Woskresensk, and of the civil government of Tomsk. This museum is intended for the use of the school attached to these mines, and of all native lovers of natural science; and, notwithstanding many circumstances unfavourable to its increase, it contains 49 species of quadrupeds, of which 43 are Siberian and 6 exotic; 223 species of birds, of which 166 are native and 57 exotic; four tables covered with beautiful marine shells, some of which are rare; 1403 species of insects; and a table covered with corals and other marine zoophytes. The botanical department appears to be poor, but it possesses specimens of almost all the plants collected by Professor Ledebour and his companions, in their journey in the Altaï in 1826, a great number of which are new species, described for the first time in the *Flòra Altàica.* The museum, from the late period of its institution, does not possess any of the rich pieces of minerals which were formerly found in the beautiful mine of Zméïnogorsk, but several chambers contain a considerable number of the minerals of Europe, and of the Oural Mountains. In another department are deposited the clothes, ornaments, arms, instruments, utensils, and idols of the different races of Siberia and of Northern America; while a third contains, in three large saloons, a rich collection of models illustrative of the explorations of the mines of Zméïnogorsk and of Talair, and of the methods necessary to reduce the minerals. We have read the notice, of which the above is a brief outline, with great interest, for it is pleasing to follow the march of science into remote regions, and to reflect on what incalculable advantages, even in a moral view, such an institution may be of, in a country with which we have been wont to associate something melancholy and disagreeable.

No. v. contains a description of a phosphorescent larva; and we shall give a condensed translation of the paper, since no similar fact is noticed in Kirby and Spence's *Introduction*

to Entomology, and it may be new to some of our readers. The larva appears to be that of *Noctua occulta*. It has 14 feet, is about $1\frac{1}{2}$ in. long, and $1\frac{1}{2}$ line in breadth. The back is reddish brown, the sides and abdomen yellowish green. A reddish brown ray passes along the back, and two along the sides. M. Gimmerthal found this caterpillar near Riga, upon a plant, about 9 o'clock P. M. when it appeared entirely covered with a bright phosphorescent flame. The head and the legs were equally luminous, the brown spots of the former part and the rays of the body only appearing somewhat obscure. When placed on a printed leaf, the light was sufficient to permit the adjoining lines to be distinctly read. It was preserved alive for eight days, during the last four of which the light became less intense. On the 5th of September it began to dry, but still preserved a little phosphorescence, which at this period became stronger by friction. Two days after this, the process of drying was complete, and the light disappeared.

In No. vii. there is a letter from M. Hedenström, to whom the Russian Government had intrusted an expedition for the purpose of tracing geometrically the coasts of the Icy Sea from Lena to Colyma, and of making a description of the isles of the north. He was three years in these remarkable countries, and discovered a new island, which he named *New Siberia*, because its general appearance is much more savage than that of the Old Siberia. In the unchangeable icy crusts of these countries there were found buried thousands of the mammoth (mammout), rhinoceros, buffalo, and other antediluvian animals. New Siberia is indeed a country full of wonders, but which naturalists can only admire, for it is impossible to study nature there. The ground, frozen, and hard as the rock, cannot be dug into; and the summer is too short for the necessary researches.

No. viii. is wholly occupied with an elaborate synopsis of the genus *Absinthium* by Dr. Besser, a part of a monograph of the *Armoisies* of Linné, in preparation by the same botanist.

Some notices of the mammoth and fossil rhinoceros, from the pen of the director Fischer, occupy the greater portion of No. ix. The mammoth, or more properly the mammout, is, as most of our readers may know, a fossil elephant, the bones of which occur buried in profusion in the soil of Siberia. The first notice of it appears in the *Grammática Rússica* of Ludolph, printed at Oxford in 1696. He says, "but the mammoutovoi is a thing of great curiosity, which is dug out of the ground in Siberia. The vulgar tell wonderful stories about it; for they say that the bones be those of an animal

which burrows in the ground, and in size surpasses all the creatures living on earth's surface. They administer them medicinally for the same purposes as they do that which is called the horn of the unicorn. A piece given to me by a friend, who said he had received it from a certain Russian prince returned from Siberia, appears to me to be genuine ivory; and the more skilful tell me that these mammoutovoi are elephants' teeth. So that it appears necessary that they were brought thither by the universal deluge, and in the lapse of time have been more and more covered with earth." The grammarian was right in pronouncing the teeth good ivory, but he erred in presuming them to have belonged to an alien elephant; for the mammout was certainly a native of Siberia at one time, and differs in many particulars from either of the living elephants. It was more nearly allied to the Indian than to the African species, but was of a grosser or more clumsy shape and larger than it, and was covered with hairs of considerable length, as is proved by the portions of skin of an individual discovered by Mr. Adams in the icy banks of the Lena, and preserved in the museum of the Imperial Academy of Sciences in St. Petersburgh. There are likewise many remarkable differences between them in the form of the teeth and jaw. The tusks also were very long, more or less bent in a spiral and directed outwards, fixed in sockets of such a great length as would indicate a singular difference in the shape and structure of the proboscis. Of this enormous creature one species only has been generally recognised; but from a careful examination of the various specimens of the teeth deposited in the museum of the university of Moscow, M. Fischer is induced to suspect that several have been confounded under one common name. The differences observed in the curvature of the branches of the lower jaw, and in the form and direction of the layers of the crown of the teeth, gave rise to these suspicions; and, in this notice, we have six species characterised, although, it must be remarked, the professor is aware that the differences indicated may not be really specific. Age has a great influence even on the form of the teeth, particularly in an animal whose dentition is so singular as that of the elephant; and before the species enumerated below can be considered as established, it will be necessary to contrast perfect jaws, or at least to possess of each species a superior and an inferior molar tooth.

1. *E*'lephas *mammoúteus.* The molar teeth straight, the laminæ numerous, narrow, a little raised, narrowly scalloped.

2. *E.* pánicus. Straight molar teeth, the laminæ broad, raised, a little scalloped, 'latere longe distinctis.'

3. *E.* probolètes. The molar teeth straight, the laminæ raised, deeply scalloped, projected obliquely.

4. *E.* pygmæ'us. The molar teeth similar to those of *E. mammoûteus*, but more than one half less in size.

5. *E.* campylòtes. The molar teeth somewhat arched, the laminæ narrow, numerous, arched, a little raised.

6. *E.* Kaménskii. The molar teeth somewhat arched, narrowed at each side, laminæ a little raised, numerous, ringed in the middle.

No. x. contains the proceedings of the Society at a meeting held on October 26. 1829, in honour of the visit of Humboldt. It is on the whole very interesting, but we can only notice the observations made by Ehrenberg, a fellow-traveller with Humboldt, on infusory animalcules. He has observed that similar forms of these microscopic beings are to be found in very different and remote parts of the world, as in Africa and Europe; but there are several which are peculiar to each or every country. During his travels in Siberia he found 113 different species, of which exact measurements were taken, and drawings made. Of this number 85 perfectly resemble those which he had previously observed near Berlin. Four amongst them, however, form the types of as many new genera, which, so far as is known, are peculiar to Siberia; but all the others are referable to genera already characterised. Ehrenberg was shown a red clot of blood which was found in a marsh of the steppes Platowsky, situated between Barnaoul and Colyvan, and which, he says, is a coagulated mass of red Infusòria, here named Trachèlium desertòrum; a name, we may remark, which cannot be allowed, since Trachèlium is preoccupied in botany. He had observed a somewhat similar phenomenon of water tinted red near the Red Sea, in the bay Tor, at the foot of Sinaï, whence perhaps its name; but the colouring substance (called Trichodésmium erythræ'um) of the Red Sea resembles an *A*'lga, or glutinous aquatic filaments; whilst the colouring matter of the marsh in Siberia is derived from animalcules.

Of the remaining numbers our limits permit us only to say, that they will afford many observations of importance to the scientific naturalist, and contain ample proof of the zeal of the naturalists of Russia.

N.

ART. II. *Zoological Researches and Illustrations in Natural History.* By John V. Thompson, Esq. F.L.S. Cork. Nos. I. and II. 8vo.

WE have, on former occasions, made some mention of this work; but, from a conviction that our notices were too brief to give a proper idea of its interest and importance, we again desire to call the attention of our readers to it; and we do not hesitate to say that, of all the periodicals in British zoology at present pouring from the press, there is no one which more deserves the support of the scientific naturalist. The memoirs are original, in the true sense of that much misused word, and relate to topics of considerable interest even in a popular view: the objects of them are well described, their economy traced with minute accuracy, and the descriptions everywhere illustrated with figures etched by the author himself. Fortunately, too, for the practical naturalist, these plates are not coloured and expensive; a circumstance, however, which may operate somewhat in limiting their circulation; for this is no book for the drawing-room table, and, in this country, the fitness of the work to illustrate that theatre of household display is often more favourable to success than literary merit.

The first memoir is on the metamorphoses of the Crustàcea; in which it is proved, or attempted to be proved, that the greater number of the subjects of this class are not merely developed, during their growth, in size and proportion, but do, indeed, undergo changes, in their progress to maturity, as complete as insects are known to do, and little less surprising. That the discovery of this law in their history is peculiarly our author's own, no one at all conversant with the writings of previous naturalists will question; and that it is a discovery important in its bearings on zoology, both systematic and physiological, is equally undeniable. It is for these very reasons, however, that the proofs of the fact should be multiplied; and, to secure for himself its undivided merit, Mr. Thompson should lose no time in laying before the public those "further instances" of its proof, with which, he tells us, his note-book is stored.

The genus Zoèa of modern systems has, in its large eyes, anomalous processes, and odd and disproportioned figure, something like indications of an imperfect being; and it now appears that it is really so, being (according to Mr. Thompson) the larva of the crab. In the spring of 1822, our author met with the Zoèæ in the harbour of Cove; and, in the following spring, having preserved a large individual for experiment, "it died in the act of changing its skin, and of passing

into a new form:" a form in which its members were changed in number as well as in proportion and figure; for they had lost the structure which fitted them for swimming in the bosom of the sea, and had assumed that of the crab, destined to creep henceforth on its bottom. In May, 1827, a similar experiment was made with similar results; and, soon afterwards, the zeal of this excellent naturalist was rewarded by a satisfactory proof of his discovery, he having, after numerous fruitless attempts, succeeded in hatching the ova of the common crab; and witnessed issuing from them the fœtal young, in the similitude and guise of Zoèa *Taúrus*, with the addition only of lateral spines to the corselet. We think the inference a fair one which extends a similar metamorphosis to all the similar Decapodous Crustàcea; which, consequently, in their first and tender stage, must be "essentially and purely *natatory* animals, and, no doubt, possessed of corresponding habits, swimming about freely, and without intermission, in search of appropriate food. In their perfect state, the greater number can no longer avail themselves of the power of swimming, but are furnished with pincers and feet almost solely adapted to crawling; so that they are now under the necessity of confining their excursions in pursuit of prey within more narrow limits. This curious piece of economy explains what has ever appeared paradoxical to naturalists, viz. the annual peregrinations of the land crabs to the sea-side; which, although acknowledged to be true by several competent observers, could never before be satisfactorily accounted for." (p. 9.)

The opossum shrimp (Mỳsis *Latr.*) forms the subject of the next memoir, which is full of interest. These Crustàcea abound in the arctic seas, where they afford much food to the whale; and we are told that they are the most common of their class on our own coasts, where, in estuaries particularly, they may be observed forming an almost continuous band or column of some feet in breadth, extending along either margin of the tide, from the sea up to where the water becomes almost fresh. In appearance they are not unlike a small shrimp, but the Mỳses have four rows of legs, eight in each row; or, more properly speaking, each leg is divided to its very origin into two parts or limbs, the inner limb being constructed for progression and the seizing of their prey, and the outer one for swimming and the giving of that motion to the water which is essential to the respiratory organs, which are, as it were, wrapped around the base of this limb, and fully exposed to the action of the ambient fluid. The little creatures swim easily, with a curved back and drooping tail;

they are extremely quicksighted and wary, darting away or descending, tail foremost, when any attempt is made to capture them; they are omnivorous, seizing and eating every animal substance which the current or the tide carries along with it, and contending like vultures for the possession of the larger masses. When confined together in a vessel of sea water, they will even act the cannibal, killing and devouring one another; a fact in their history to which the writer of this notice has been a witness. As they generally swim near the surface, they there enact the part of nature's scavengers, and remove thence all extraneous matters fitted to their digestion; while their allies, the true shrimps, are performing a similar office at the bottom, or in the sand.

The most singular part of the economy of the Mysis, however, is its mode of generation. The female is provided with a pouch placed beneath and just behind the thorax, and covered by valves of curious workmanship to shut and open. Into this pouch the eggs are received when excluded from the ovarium; where, enveloped in a mucous or glairy secretion, they are hatched and gradually matured, without any visible attachment to their parent. The developement of the embryo appears to be quick, for each female has several broods in the season; and the evolution of the fœtus is "simply a gradual developement of parts:" a proof that all Crustàcea do not undergo a metamorphosis; and a fact worth remembrance, were it only as a caution to the naturalist when he feels disposed to carry his generalisations beyond actual observation. The period of gestation being elapsed, the parent spreads open the valves of its pouch, "when the whole brood emerge at once into the ambient element, and, in most of the species, continue associated with the community from which they sprang. This curious and extraordinary piece of economy can hardly fail to be regarded by the physiologist as equally interesting with that of the opossums and other marsupial quadrupeds, and of a much more unaccountable nature; for in these last, although the object of the Creator is not obvious, yet we can understand the manner in which it is carried into effect: the young being excluded from the uterus when they have scarcely attained a fourth part of the growth of the embryos of other animals, naked, helpless, and blind, they are received into the abdominal pouch of the mother, and, by some wonderful instinct, or by the mother's agency, attached each to one of the teats which are situated within it; from whence, when sufficiently grown, they make occasional sallies, until able entirely to provide for themselves. In the opossum shrimp, on the contrary, we comprehend the

object, but are completely at a loss to account for the manner in which it is brought about; for these animals have nothing analogous to teats, the embryos have no visible attachment to the mother, appear to be in no capacity to take food, nor to carry on the respiratory function. It is, nevertheless, probable, that the secretion in which they are immersed constitutes the source of their nutrition, whether taken in by suction or by absorption; yet, if we admit this, what are we to think of the function of respiration, thought to be equally necessary with nutrition to the continuance of life and the evolution of the fœtus, as the subgelatinous secretion appears to exclude the direct influence of the ocean upon the respiratory organ, which, moreover, does not appear to be developed until the moment prior to their exclusion from the pouch. This circumstance, taken in conjunction with the suspicions of some physiologists as to the oxygenation of the fœtal blood, may lead to such further observations as may tend to throw some new light upon this still obscure function in the fœtus." (p. 18, 19.) The author, in this comparison, may seem to have forgot that the opossum is a *viviparous* animal, while his shrimp is *oviparous*. But this is an error on the part of the reader; for, in an appendix to the memoir contained in No. ii., he tells us, that, when he speaks of the gradual developement of the embryo of the shrimp, it is not the *egg* of which he speaks, but the *embryo* divested of the tunics which envelope the ovum on its first exclusion. In the other Crustàcea with a pouch analogous to that of the Mysis, it serves merely as a protection to the eggs, which hatch all at once, and exclude the young in a perfect state, as we see in most oviparous animals.

The third memoir is occupied with the discussion of one of the most remarkable phenomena in nature, the luminosity of the ocean; but as there has already appeared in our journal an able paper on the subject by Mr. Baird, we will confine ourselves at present within narrow limits. There are five principal varieties of luminosity (we adopt our author's word, although it is an awkward one): the first shows itself in scattered sparkles in the spray of the sea, and in the foam created by the way of the ship, when the water is slightly agitated by the winds or currents; the second is a flash of a pale light, of momentary duration, but often intense enough to illuminate the water to an extent of several feet; the third, of rare occurrence, and peculiar to gulfs, bays, and shallows, in warm climates, is a diffused pale phosphorescence, resembling sometimes a sea of milk, or of some metal in a state of igneous liquefaction; the fourth presents itself to the astonished

voyager under the appearance of thick bars of metal of about half a foot in length, ignited to whiteness, scattered over the surface of the ocean, some rising up and continuing luminous as long as they remain in view, while others decline and disappear; and the fifth variety is in distinct spots on the surface, of great beauty and brilliancy. The light of the first variety is more brilliant and condensed than that of any of the others, and very much resembles, every way, the red gold and silver rain of the pyrotechnist. It and the third kind are produced by myriads of various minute crustaceous animals, the smaller Medùsæ and Mollúsca, and, perhaps, some Annélides; the second appears to proceed from the gelatinous Medùsæ of a large size; the Pyrosòmæ (of which we have figured a species in Vol. III. p. 534.) are the cause of the fourth kind, which may often be witnessed by vessels bound to India or the eastward of the Cape of Good Hope, occurring in the calm latitudes near to the line. The Sapphirìna indicàtor, an insect somewhat resembling in appearance the woodlouse (*Oníscus*), and about one third of an inch in length, emits the last variety enumerated, which appears to be limited to the seas situated to the north and west of a line drawn from the Cape of Good Hope to the southern extremity of the Island of Ceylon. All these heads Mr. Thompson has illustrated with a detail of very interesting facts, drawn from the writings of travellers and from personal observation; and at the end of his elaborate memoir he describes some previously unknown luminous animals of the same family as the opossum shrimp, and much like it in general appearance.

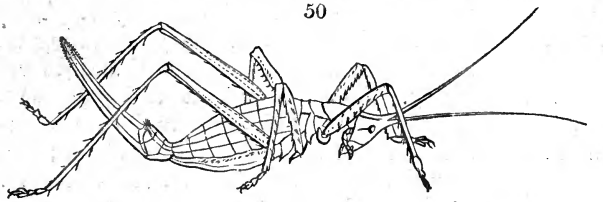
We conclude this imperfect notice of these *Researches* by an earnest appeal on their behalf to our zoological readers; for, in our opinion, they are indispensable to such of them as are practically engaged in the study of the invertebrate tribes. To Mr. Thompson himself we would say a word, soliciting some greater attention to his language; the sense of which is occasionally obscured by slight inaccuracies in grammar (proceeding from inadvertency), and by a carelessness in punctuation which is inexcusable. We will, moreover, recommend it to him to consider, whether it is not akin to quackery for an author to endeavour to arrest attention by marks of wonder (! !), and by continual boasts of the importance of his own discoveries. The value of these it would be better to leave to the sense and judgment of his readers.

N.

ART. III. *Notice sur le Tettigópsis, nouveau genre d'Orthoptères de la Russie.* Par G. Fischer de Waldheim. Moscow, 1830. 4to. One Plate.

THIS notice appears to have been read to the Imperial Society of Naturalists in Moscow, at its sitting immediately following the election of its new president, Prince Galitzin; and is published principally, perhaps, as a specimen of a large work on the orthopterous insects of Russia, preparing by M. Fischer de Waldheim, the learned director of that Society. The memoir contains the announcement of a new genus (Tettigópsis) belonging to the family of locusts, the characters of which are given in detail, and four species described.

50



Of these, one, brought from the steppes near Sarpa, is considered new and rare. The annexed outline, reduced one half from the original figure, will convey a distinct idea of the general appearance of the insect to our readers. (*fig.* 50.)

N.

ART. IV. *Illustrations of Zoology.* By James Wilson, F.R.S.E. Nos. VIII. and IX. Large 4to.

THESE numbers complete the first volume of this work, which, in our estimation, is too splendid and costly to have much, we had almost said any, influence in forwarding the study of natural history. Mr. Wilson writes so well and agreeably, that it is to be wished he would undertake to compose a book of size and price moderate enough to permit of its circulation among those lovers of nature who (happily circumstanced) have to labour for their luxuries, and have no notion to barter their moderate gains merely for fine paper and print, and pretty engravings. The approbation of the class of readers alluded to is, perhaps, as gratifying as the praises of the saloon.

No. viii. commences with a spirited and excellent figure of the grey American wolf, the finest plate, with one only exception, in the whole collection; and it is explained by eleven

large pages of letter-press, written in Mr. Wilson's best manner. This variety of wolf is very common on the American continent north of Canada, and is found as far northwards as man has been able to penetrate; varying somewhat in size, according to the latitude of its localities. The two following plates are devoted to the male and female of Richardson's grouse (*Tétrao Richardsònii*), discovered by Mr. David Douglas among the mountainous districts of the river Columbia, and other parts of the Rocky Mountains, in North America. The scarlet ibis, in the plumage of the first year, forms the subject of the other plate.

The two first plates in No. ix. are really out of place in a work like this, destined for the drawing-room, and into which ladies may be presumed to look without danger. They are pictures of the fore and hind feet of the great orang outang of Sumatra; faithful to nature we are assured and do believe, and abominably ugly. The great auk (*Alca impénnis*) forms a good subject for plate 35. This large and rare water-bird is found along the shores of Iceland and Greenland; it occurs occasionally among the Feroes, and has been once or twice observed in the Orkney Islands. Two instances are recorded of its being driven on the British coast. Its "true sphere of action is the water, through which it swims and dives with extraordinary power and rapidity; and where its short wings, entirely useless for the purposes of flight, become efficient locomotive organs when used as oars or fins beneath the surface. Its powers of swimming and diving exceed, indeed, those of almost any other species of the feathered tribe. It has been seen cresting the waves during the prevalence of the most fearful storms, or shooting through the raging surf with the rapidity of an arrow." The last plate in the number we do not like: it presents a very large cone, which is described for the first time, and named Cònus Nicóll*ii*.

N.

Art. V. *Literary Notices.*

The Utility of the Knowledge of Nature considered; with reference to the Introduction of Instruction in the Physical Sciences into the general Education of Youth; comprising, with many Additions, the Details of a Public Lecture on that Subject, delivered at Hazelwood School, near Birmingham, on the 26th of October, 1830. By E. W. Brayley, Jun. A.L.S., Lecturer on Natural Philosophy and Natural History, and Teacher of the Physical Sciences in Hazelwood School. This excellent pamphlet is just published.

A Grammar of Natural History, for the Use of Young Persons, is in preparation, and will appear, illustrated with numerous cuts, in the course of the season.

PART III.

MISCELLANEOUS INTELLIGENCE.

ART. I. *Natural History in Foreign Countries.*

ITALY.

WEATHER at Pisa. — Last year I sent you a summary of my memoranda on the weather at Florence for the winter of 1829–30; and, having kept a similar rough and imperfect register at Pisa for the winter just passed, I have transcribed its results, which it may interest some of your readers to compare with their English meteorological journals, adding, as before, a few observations under different heads. My departure for Rome and Naples in a few days prevents my remarks extending farther than the month of February; but, as the winter might be considered ended on the 1st of that month, this incompleteness is of less moment.

	Nov. 1830.	Dec.	Jan. 1831.	Feb.
Mean height of thermometer at 8 A. M.	50°	45°	40°	43°
Highest point	(10.) 63°	(1.) 54°	(1.) 51°	(28.) 54°
Lowest	(28.) 42°	(23.) 36°	(28.) 28°	(1.) 30°
Days of bright sunshine	12	4	11	17
partially sunny	5	5	4	1
cloudy, but fair	10	2	9	7
rainy	3	20	7	3
Wind, north — number of days	—	—	1	2
north-east	3	—	5	3
east	9	6	8	—
south-east	1	5	4	9
south	9	3	—	—
south-west	1	17	11	6
west	—	—	—	2
north-west	9	—	2	6

Frost. With the exception of occasional hoar frosts, especially from the 12th to the 15th of January, the only period of frost was for six days, from the 27th of January to the 1st of February, when the ice on ditches was $\frac{3}{4}$ in. thick. This short frost did no injury to the great numbers of unprotected orange and lemon trees trained against the walls of gardens at Pisa, and laden with fruit. No snow fell the whole winter. The higher range of the Apennines acquired its cap about the 1st of November.

Rain. Vast quantities of rain, so as to keep the Arno almost constantly full to the level of its banks, fell during the month of December; in which there were twenty rainy days, and only four of bright sunshine. During the prevalence of rainy weather, and indeed at other times, the air is much more moist at Pisa than at Florence, judging from the far more copious condensation after cool nights on the interior of windows, which is often as

considerable as in England, and the much greater difficulty of preserving grapes, &c., from becoming mouldy. Though the atmosphere was, of course, thick and hazy during the rain, yet there has been nothing that could be strictly called fog the whole winter.

Progress of Vegetation, &c. *Hyacínthus* racemòsus in flower, Jan. 18; *Cròcus vérnus* var.? January 20.; Ficària *ranunculöides*, January 26.; Violets, February 5.; *Oxalis* corniculàta, February 12.; *Verónica* Cymbalària and *Fumària* officinàlis, February 15.; almond trees in blossom, February 10.; box, Feburary 24.; blackthorn, February 28.; leaves of hawthorn one fourth expanded, February 27.; horse-beans (of which a considerable extent is cultivated on the farms near Pisa), sown the beginning of December, 3 to 4 in. high, February 10.; flax, 8 in. high, Feb. 15. Vine-pruning mostly finished by the middle of February. This is not, as in France and Germany, a simple affair, as of trimming so many currant bushes, but requires no small share both of skill and judgment to separate from the thick entanglement of the scores of last year's shoots the eight or ten which alone are to be suffered to remain for the next, as well as to decide which of the branches of the pollard willows and poplars that support the vines, and to which their shoots are tied, so as to form festoons from one to the other, are to be cut out, and which left, in order to insure the required support without too much shade. The due pruning of one tree, and of the two or three vines attached to it, often requires the labour of a man for half a day.

Vanéssa Atalánta on the wing, January 12.; Pièris rhámni, and other common butterflies, February 12.; Macroglóssa stellatàrum very frequent towards the end of the month; Bíbio hortulànus in great numbers, Feb. 4.; ants and various coleopterous insects running on the footpaths, and Armídius díspar on the wing on fine mild days the whole winter; lizards, of which not a single one visible in December or January, began to appear occasionally early in February, and by the middle of the month swarmed on every sunny wall.

General Remarks. The Pisans have a saying, "If the weather be open on the 2d of February (the feast of the Purification of the Virgin), the winter is over; if severe, it is only beginning." I know not how far this proverb may (with some latitude as to time), like that in England relative to St. Swithin's day, and other popular meteorological sayings, have some foundation in fact and long-continued observation. A Pisan, however, might have appealed to the present winter in proof of its accuracy; for the slight and only frost, after lasting six days, broke up on February 1., and after that time, for a fortnight, the weather would in England have been called that of May rather than of February; the thermometer, at 8 A.M., being generally from 45° to 50°; often 60° at 2 P.M. in the shade, and 84° in the full sun. The latter half of the month, however, was a good deal cooler; the wind being generally from the north, and high. The weather of Pisa is influenced by the quarters from which the wind blows, much as in England: a south and south-west wind bring a damp, cloudy, and mild atmosphere, and often rain; and a north or east wind usually a clear sky and cool temperature. The south wind, though disliked by the Pisans, who transfer their old summer associations of the oppressiveness of the *scirocco* even to winter, is not disagreeable at that season to the feelings of such English invalids as chiefly require mildness of temperature; but the most delightful winter weather at Pisa is, doubtless, when a bright sun is tempered by the *tramontana*, or north wind, blowing in a very moderate degree. If it blow strongly, it is sometimes almost as cutting as an English March wind. I am, &c. — *W. Spence.* *Pisa, March* 4. 1831.

Art. II. *Natural History in the English Counties.*

An Entomological Tour in Wiltshire, Hampshire, Oxfordshire, &c. — On the 10th of February last, one of the most delightful summer-like days that perhaps ever occurred at this early period of the year, it was my lot to travel from Salisbury to Southampton, by way of Ringwood, Christchurch, and Lymington. To one fond of entomology, you can scarcely conceive a greater treat. I was passing through the head-quarters of the insect world. I had from the top of the coach captured several species of Coleóptera (principally Staphylínidæ), also Micrópeplus porcàtus, and a species of Cryptóphagus. Before we reached the New Forest, very much to my astonishment, I had the pleasure of seeing the brimstone butterfly (Gonépteryx rhámni) apparently strong on the wing, enjoying itself in the sun.

Two days afterwards (February 12.) I was at Oxford, and took about thirty species of Coleóptera. The Thames had flooded the adjoining grounds, and some posts surrounded by the water were literally covered with insects. Amongst these Staphylínidæ were most prevalent, and especially the genus Stènus, of which there were many hundreds. In company with these, I took Dyschírius gíbbus, Pœ'cilus cùpreus, Chrysomèla staphylæ'a and marginélla, Helòdes phellándrii, Háltica némorum and flexuòsa, Scydmæ'nus thorácicus, and two or three speçies of E'ngidæ, *C*urculiónidæ, &c. &c. I mention these not as rarities in general, but as rarities in the month of February.

At this time the gossamer spiders were floating through the air in myriads; the water was destroying thousands which had fallen on its surface, and every thing around was covered with their webs. I observed several beetles which had just before escaped a watery grave now become the captives of this minute animal: it had passed so frequently over the rails on which they had taken refuge as to form a very closely meshed net, from which it was impossible for them to escape; indeed, so thickly was it woven, that I could with difficulty distinguish the prisoners underneath. — *William C. Hewitson. London, March* 8. 1831.

Insects captured by J. C. Dale, Esq., in Hampshire, Dorsetshire, Devonshire, Cornwall, &c., in 1829 *and* 1830. — 1829. June 9th. The New Forest. Coleóptera: *B*upréstis nitídula, *O*rsodáchna humeràlis. Neuróptera: Cordùlia æ'nea, Raphídia ophiópsis. Lepidóptera: Anthóphila punctòsa, Geómetra punctària. Díptera: Milèsia speciòsa and n. s., Mícrodon *a*pifórmis. *B*látta Panzèri. — 10th, 11th, and 12th. New Forest. Coleóptera: Leptùra nìgra, præústa, sexguttàta, and abdominàlis, E'later fùgax and sanguíneus. Díptera: saw Stratiomys strigàta. — 14th. Christchurch; rushes on sandhills. Lepidóptera: Crámbus marísci *Curtis*, Fùmea nítida, Crámbus trístis, bárba, and pygmæ'a, Lycæ'n*a* A'rgus, Pteróphorus tridáctylus, Geómetra galiàta, and Pyraústa angulàlis and porphyriàlis. — 17th. Isle of Portland, Dorsetshire. Coleóptera: Masòreus luxàtus, Hárpalus vernàlis, &c.

1830. April 8th. New Forest, Hampshire. Coleóptera: E'later sanguíneus in plenty, and in larva and pupa, on rotten oak stumps: Býrrhus dorsàlis. Hymenóptera: Dólerus ?, abdomen partly orange: Halíctus 4-guttàtus ?, styloped. — 15th. New Forest. Neuróptera: Hemeròbius n. s. ? — 17th. Coleóptera (*C*urcùlio): Platyrhìnus latiróstris, under bark of beech. Lepidóptera: Cleò*r*a cinctària ♂, on body of an oak tree.

May 6th. New Forest. Coleóptera: Thymalus limbàtus, in a *B*olètus. Lepidóptera: Cleò*r*a cinctària ♂, on body of an oak tree. Díptera: *C*ùlex concínnus ♀ ?, Milèsia speciòsa. — 7th. Neuróptera: Hemeròbius ?, dark, on alder. Lepidóptera: Platýpteryx unguícula, flying like *B.* antìqua.

— 8th. Coleóptera: larva of Tíllus ámbulans, in rotten oak, bred on the 11th; Leptùra præústa. —12th. Glanville's Wootton, Dorsetshire. Coleóptera: Œdémera podagràriæ. — 15th. Lepidóptera (Geom.) insulàta. Díptera: Criorhìna floccósa, ♂ and ♀. — 20th. Lepidóptera: bred (*N*óctua) verbásci, two years in pupa. Díptera: Hílara cílipes ♂.

June 2d. Glanville's Wootton. Coleóptera: Teléphorus fúscus. — 11th. Coleóptera: Malthìnus brevicóllis. Hymenóptera: *C*èphus pusíllus ?, on oak. Lepidóptera: (*T*ínea) hesperidélla. Díptera: Cecidomỳia trítici. Strepsíptera: Stỳlops? or n. g.? Walkèri?: I cannot find any bee about likely to produce a Stỳlops now; it might come from some *V*éspa, and then would probably be a Xènos ?. *E*'mpis pénnipes, a Sémblis with very smooth wings. *C*èphus minùtus ?. —12th. Fùmea plumístrea ?, bred; larva found in a case on an oak in the New Forest. — 18th. Oxýcera anàlis, terminàta, formòsa, and trilineàta, in Mullet's Copse; the first three, I believe, are new to Britain. — 19th. Rhàphium ? ♂ and ♀. Phycìta bístriga, Pedícia rivòsa, Panórpa germánica, Lycæ'n*a* C*y*m*on*, only three and bad, and one I'da*s*. — 30th. Near Weymouth. Tetanócera marginàta, Crámbus bárbus, Forfícula boreàlis, in plenty under stones. Isthmus of Portland. Hárpalus stýgius, Cryptocéphalus pusíllus, &c.

July 2d. (A flower) *S*eràpi*as* palústris, at Charmouth. — 3d. *C*icindèla germánica, in plenty in wet situations on the Liasa Sea. — 5th. Pachygáster Leách*ii*, Tephrìtis cárdui, *O*'rtalis crassipénnis, and A'lcis conversària and (Geom.) ambadàta, by Mr. Morris. — 7th. At Teignmouth (Captain Blomer had larvæ of Thècl*a* bétulæ). Pteróphorus lunædáctylus, in tolerable plumage. — 8th. Scópula *a*sinàlis ♂ and ♀. — 9th. Larvæ of (*N*óctua) Achàtea sprèta. ♀ A'lcis (fine) conversària, Andrèna hæmorrhoidàlis. — 10th. Bradley Woods, near Newton Bushell. E'later 4-pustulàtus and vars. ? Geom. ♂ var. B. piniàrius. G. procellàta. Bombýlius. — 12th. (A flower) *C*ístus perfòlius, near Torquay. Scópula longipedàlis, figured by Curtis (*British Entomology*); Phytómetra lusòria, Phósphuga subrotundàta, Ophònus azùreus, *T*abànus rústicus or alpìnus ?, (Curtis's *British Entomology*); a rare Helóphilus ? — 14th. On the Dart near Ashburton. Chimárra marginàta; A'therix maculàta, which I took from a *C*ràbro; saw Pérla grándis? on some fern, and crossed the river. (A flower) Campánula *h*ederàcea. (A bird) Mr. Hale shot two young Lànii? — 15th. At Islington, and High Tor Rocks, borders of Dartmoor. Leptùra 8-maculàta, and Chrysomèla vàrians only. — 20th. Near Bideford. Medéterus? ♂ and ♀.; Acánthia, n. s.?; Sýrphus ornàtus, Andrèna ròsæ?, and a rare bee?. — 21st. At Sandhills, near Appledore. (A rare rush) Hemeròbius n. s.?; Chrysòpa víridis, pupæ of *P*úlex *t*álpæ, Perilámpus?, and *Ph*ỳcis marísci of Curtis; Collètes succíncta (Pharàlias *e*uphorbièæ). — 24th. Near Barnstable. Two or three species of Nemótelus. — 26th. Branston Burrows. *A*'nthrax flàva; Pteróphorus n. s. ? not in *Haw. Lep. Brit.* Mr. Cocks took there Cordùlia compréssa. — 27th. At Ilfracombe. Tórtrix inficiliàna, or n. s. ?, and saw *T*ínea barbatélla ?. — 28th. At and near Valley of Rocks. Scópula *a*sinàlis and flammeàlis, Eudòrea muràna, (Geom.) incanàta, Crámbus pinèti, and Ornithomỳia víridis. — 29th. Colymbètes subnebulòsus?, under dry stones near the sea, no fresh water near; Collètes succíncta, in places near the sea on ragwort. — 30th. Charíssa obscurària ?, on a wall on Mendip Hills, no heath near; Múscai pyrástri, from Appledore; Phycìta dilùta. — 31st. Notonécta maculàta, in a pond without weeds at Cheddar Cliffs; Phycìta nebulòsa, Lycæ'n*a* Argìolus, Argýnnis Aglài*a*, Hippárchi*a* Sémele, (Geom.) bipunctàta, *M*úsca péndula [?].

August 2. Larva of M. stellatàrum, Pyraústra cingulàlis and ostrinàlis [?], or its ally. — 16th. Tórtrix emargàna and excavàna, &c., near Glanville's Wootton; Galerùca vibúrni?, pale under side. — 19th. A fine *T*ípula in

Lewel Plantation, near Dorchester; A'grion rùfipes and sanguínea! Acánthia rare. — 20th. Stafford, near Dorchester. Peltástes necatòrius; A'crida Kírbii; A'crida áptera, which has a transparent ocellus, although lately asserted to the contrary; but it is not seen without lifting up the left elytron. (See Curtis's *British Entomology*. A'crida.) — 25th. Plumley Wood. *Bómbyx* córyli! and also the larvæ, by D. Senel, Esq.; Póntia (remarkably small) ràpæ, by one or two persons considered distinct.

September 1st. Calépteryx vírgo!!! Corixa affìnis, plentiful in Glanville's Wootton, &c. &c. I never saw Corixa affìnis before, and I have often tried our pond.

Lyméxylon navàle is confirmed as a British insect, also taken in Windsor Forest by Mr. Griesbach. I once had a specimen of *Bómbyx* menthrásti, and six of *O'phion* vínulæ, hatched from the pupæ of *Bómbyx* vínulus, which is certainly a curious fact. I had of Mr. Latham a Penthóphera, somewhat similar to nígricans, but with a thinner body, which he said he took himself; but, as he had it not in his own cabinet, I think he may be mistaken. The Stylops is certainly a new genus, and the only one in the order I took this year. I am, &c. — *J. C. Dale. Glanville's Wootton, Sept.* 19. 1830.

Buckinghamshire.

The Kingfisher. — There appearing to be some disagreement between the author of *Ornithològia* and other of your correspondents as to the rarity of the kingfisher (*Alcèdo I'spida*), or the frequency with which it makes its appearance, I beg to state, that on the small stream which takes its rise near West Wycombe, and, running through this place (Landwater and Woodburn), falls into the river Thames near the latter village, the kingfisher is almost a constant visiter. From the summer-house at the end of my own garden, not quite 150 yards from the main street of this town, the bird has been frequently, very frequently, seen by myself flying up and down the river. On the banks of the river Lea, in the neighbourhood of Wheathampstead in Hertfordshire, this beautiful bird was also often seen when I resided in that vicinity; and a stuffed specimen, shot near that place, now ornaments my hall. I remain, Sir, &c. — *James G. Tatem. Wycombe, Jan.* 31. 1831.

Cornwall.

The Cornwall Literary and Philosophical Institution was established in the year 1818, for the diffusion of scientific information and the excitement of literary emulation in this county; which, from its peculiar character, depends more on science for its prosperity than any other part of the kingdom, and at the same time affords greater facilities for the acquirement of scientific knowledge, were these facilities rendered generally available. The antiquities and history of Cornwall opened also a wide field for literary research, and it was hoped that this Institution might prove a nucleus around which the literati of the county might concentrate. A Society, embracing in part the objects of this Institution, had been established a short time previously under very flattering auspices; but, its field of operation being restricted to geology and mineralogy, there appeared ample space for another Society in the wide scope of chemistry, mechanics, natural and experimental philosophy, and natural history in its various branches, both indigenous and exotic. A considerable sum was raised for the purposes thus contemplated, by proprietary subscriptions of 10*l.* 10*s.*, and also by annual subscriptions; and with this the foundation of the present museum was laid, and an extensive collection of chemical and philosophical apparatus purchased; which was, for several years, used by various gentlemen in elucidating different branches of science and literature by

public lectures during the winter months. In 1821, the Society, with a view of increasing its influence with the oligarchy, took the title of Royal; but, as it still continues poor, the title does not seem to have done it much good. In 1828, the Society purchased and fitted up two spacious and convenient rooms as a museum. A theatre for lectures, and a laboratory for metallurgic researches, are in contemplation. The museum contains specimens of nearly all the birds of that part of the country, whether natives or visitants; presented by Mr. C. Jackson, chemist, of East Looe. A collection of shells has lately received large additions from Sir Charles Lemon, bart. The mineralogical collection contains numerous valuable and interesting specimens. The collection of rock specimens is so arranged as to give a general idea of the outlines of geology; but the detail belongs to another Society, with which this desires always to cooperate in their common object, the diffusion of science. There are some fossil organic remains, ancient coins, specimens of manufactures of foreign and uncivilised countries; Buffon's works in 74 vols., and 150 vols. of French scientific journals, presented by John Forster, Esq., of London, well known for his liberality. This Institution is always ready to exchange duplicates with any similar Society, or with individuals. The objects and laws of the Institution are printed at Truro, and the secretaries are Mr. W. M. Tweedy, and Mr. J. T. Nankivell there. — *A. B. B. Truro, Jan.* 1831.

Essex.

An Adder and its Eggs. — In the beginning of the month of August, 1830, I resided for some weeks on the coast of Essex. I had repeatedly observed, in a little grove, an adder coiled up among some brushwood at the foot of a tree. It always managed to elude my pursuit, until one day, having very cautiously approached its haunt, I succeeded in placing my foot on its tail. In the hurry of the moment I mistook it for a snake, or I should not have hazarded the experiment: fortunately, however, instead of turning to inflict a venomed wound, it endeavoured to regain its hole, and I was thus allowed time to seize it firmly by the throat, and to hold it, until my brother, with a pair of scissors, had cut out its poisoned fangs, and had separated the spinal marrow with a penknife. On performing the former operation, a few drops of the deadly fluid were ejected upon his hand. Life soon appeared to be extinct, and I stretched the creature on the ground, in order to measure it: in length it was 2 ft. 5 in., and its bulk was very extraordinary, which led me to suppose that it was a female about to bring forth a noxious progeny. On opening it some hours afterwards, I discovered a string of eggs, fourteen in number, in each of which was a young adder, perfectly formed, and enveloped in a glutinous fluid. These little creatures, although they had never seen the light, were lively, and I thought they even evinced an inclination to bite, which made me cautious not to bring my fingers into contact with their mouths. I took some of them out of the eggs, and they soon died, but those which were laid on a piece of paper, with their envelope unbroken, were alive and active many hours afterwards, and would probably have lived a long time had they been left undisturbed. As may be supposed, the parent animal was now in nearly an empty state; but on examining its heart, I perceived that it was still strongly convulsed. I removed it with a penknife, and laying it on a piece of white paper, was much interested in watching its motions. It continued to beat, with little abatement of force, for an hour, when its palpitations, though still strong, became less rapid, and ceased in half an hour more, apparently less from want of energy in the organ than because it had begun to dry and adhere to the paper. I stuffed the parent, and preserved the young ones in spirits; and both preparations now form part of my little museum. — *Anon. Jan.* 1831.

Norfolk.

Norfolk and Norwich Museum. — The Sixth Annual Meeting was held on the 28th of November, 1830, Thomas Brightwell, Esq., in the chair. The chairman congratulated the Meeting on the increased and increasing interest generally taken in scientific pursuits, and especially in the prosperity of this Society, clearly evinced by the very large donations of specimens which had been made in the past year. He expressed, at the same time, his earnest hope that pecuniary as well as scientific support would much more largely be afforded to it. His desire was to see the Society not only freed from debts, but possessed of sufficient funds to enable the committee at least to preserve and display specimens presented, if not to purchase occasionally desirable additions to their collection. The report of the committee noticed a number of donations received, and gave a favourable account of the Society's funds. — *S. W. Norwich, Jan.* 1831.

Art. III. *Natural History in Scotland.*

Birds either resident or occasional Visiters of Renfrew and its Neighbourhood, from November to February 1. 1831. — Our situation is low, not many feet above the water level of the river Clyde; the surface consists of small plantations, cultivated fields, and marshy meadows. The names are Linnean, and taken from Montagu's *Ornithological Dictionary*. Those marked with a star are visiters.

Tringa Vanéllus, Lapwing, Peeseweep.
Córvus glandàrius, Jay, Jay-pyet.
Monédula, Jackdaw, Kay.
Ardea màjor, Heron.
Fálco Nisus, Sparrowhawk.
Lóxia Chlòris, Green linnet.
**Fálco palumbàrius*, Goshawk.
Túrdus pilàris, Fieldfare.
**Anas Bóschas*, Wild duck.
Colúmba Palúmbus, Cushat Woodpigeon.
Córvus Corone, Carrion crow.
Certhia familiàris, Tree-climber.
Túrdus Mérula, Blackbird.
Motacílla Régulus, Golden-crested wren.
Troglódytes, Common wren.
**Scólopax rustícola*, Woodcock.
**Anas Penélope*, Widgeon.
Motacílla modulàris, Hedge sparrow.
álbida, Water-wagtail.
**Pàrus caudàtus*, Long-tailed titmouse.
Pàrus màjor, Greater titmouse.
àter, Cole titmouse.
cærùleus, Small blue titmouse.
Túrdus viscívorus, Missel-thrush.
**mùsicus*, Mavis.
Fringilla doméstica, House sparrow.
**Scólopax Gallinàgo*, Common mire snipe.
Córvus frugílegus, Rook, Crow, Craw.
**Córax*, Raven, Croupy craw.
Motacílla Rubécola, Robin redbreast.
Phasiànus cólchicus, Pheasant.
Tétrao Pérdix, Partridge, Paitrick.
Strix Otus, Horned owl, Houlat.
Córvus Pica, Magpie, Pyat.
Alauda arvénsis, Skylark, Laverock.
**Anas Bernicula*, Wild goose.
**Motacílla Atricapílla*, Black-cap, Coal-hood.
Fringílla cœlebs (*males only*), Chaffinch.
Emberiza Citrinélla, Yellowhammer, Yeldrock.

Besides these, there have been some species of gulls that I cannot name. I intend, at some future time, to send you a list of our summer birds. — *X. Y. Z. Near Renfrew, Feb.* 16. 1831.

Art. IV. *Natural History in Ireland.*

Birds at and near Londonderry. — Sir, As I perceive from your interesting Magazine that you do not despise small things, I send you the following account of a few birds which I observed in a district of this county, Londonderry, twenty miles south of the Giants' Causeway. The figure given of the lesser pettychaps, in a late Number, is very like it. This pleasing little bird arrives here about the 10th of April, and departs in September. I found a nest of it on the ground, apparently laid on its side, among some small hawthorn twigs that had been cut from a hedge; it was made of dry grass outside, then moss, and then feathers, some of them those of poultry.

The bird is a great singer, and flies from tree to tree in search of insects; it is distributed over the whole country, wherever trees or bushes are to be found: the young are of a brighter yellow than the old birds; the nests, I think, are always on the ground; the eggs are seven or eight, or perhaps more, and their colour is white, spotted with red. The whitethroat sings jerking up in the air, it erects the feathers on its head, swells out its throat, and makes a peculiar noise when you approach its nest, which it forms of dry stalks of grass and long hairs, in a low bush. I have found the bags of spiders in its nest. No others of this interesting group, as far as I can judge, pay this district a visit, which, I assure you, I consider a very great loss. The cuckoo is very common in this district; I have seen six or seven on one tree at a time. It makes a variety of changes in its note, sometimes repeating the first syllable of its name two or three times, and sometimes making a curious chatter, like the blackbird, but much louder and stronger: it cries sometimes nearly all night in warm weather, and also on the wing. It feeds on the ground at times; lays chiefly in the titlark's nest, which bird I have frequently seen feeding its large foster-child, and showing much anxiety about it. The young cuckoo will sit, if undisturbed, a long time on the same stone or hedge, and will let both fosterparents feed it frequently. The cuckoo arrives here the latter end of April, and departs the last week of June; the young remain sometimes till August. The missel thrush sings occasionally before Christmas, and afterwards till July; its song resembles that of the throstle, but it is not, I think, so full or sweet; it builds its nest often in the fork of a tree, and sometimes in the small branches near the top, it is very bold and clamorous in defence of its eggs and young, fighting with and beating off the magpie and other enemies valiantly. It will even fly very near human beings, like the lapwing, screaming very much, and appearing greatly distressed: if it were quieter, its nest would not be so easily discovered. In this respect it differs from the sweet songthrush, which steals almost unperceived from her nest: I have seen fifteen of these birds in a flock in autumn. This delightful songster plasters her nest inside with cow-dung. The blackbird delights in singing in warm weather. The redwing thrush arrives about the middle of October, and departs about the same time in April. — *H. N. January*, 1831.

Art. V. *Monthly Calendar of Nature for Scotland.*

Extracts from the Meteorological Register, kept at Annat Gardens, Perthshire, North lat. 56° 23½′, above the Level of the Sea 172 ft., and Fifteen Miles from the Coast; being the Mean of Daily Observations taken at Ten o'Clock Morning and Ten o'Clock Evening.

Results for February.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
February 10. 1831.	38°	36·8°	31·8°	29·01	2·8	·15
— 20. —	42·5	37·7	37·5	29·35	·3	·21
— 28. —	37	36·2	32·1	29·	·1	·37
Monthly mean	39·1°	36·9°	33·8°	29·12	3·2	·73

The average temperature for February at this place is 39·5°. The mean for that month this season is within a small fraction of a degree of the

ordinary mean. The rain and melted snow in the rain gauge is 82 decimal parts deeper than the average depth for February.

Results for March.

Month.	Mean temperature.	Dew point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
March 10. 1831.	43·5°	40·	37·9	28·82°	1·8	·05
— 20. —	42·4	38·8	37·3	28·8	1·15	·17
— 31. —	43·9	40·	39·5	29·57	·35	·38
Monthly mean	43·2°	39·3°	38·2°	29·06	3·3	·6

The average temperature for March at this place is 40·6°. It will be seen by the above table that the temperature for that month, this season, exceeds the ordinary mean by 2·6°; and the fall of rain exceeds the ordinary depth for the month by 1·95 in.

The first day of February was the coldest: mean temperature of that day, 31°; extreme cold, 26°; wind boisterous and N.E. The warmest day in that month was the 10th: mean temperature of that day, 52·5°; extreme heat, 56°; wind west. There were 13 days on which rain or snow fell; on 11 days the atmosphere was clear, on 7 cloudy, and on 10 days there was partial sunshine. The wind blew from the N.E. on 3 days; from the N.W. on 6 days, from due N. on 5 days, and from W. and S.W. on 14 days.

The coldest day in March was the 13th: mean temperature of that day, 37°; extreme cold, 34°; wind S.W. and extremely loud. The warmest day in that month 22d: mean temperature of that day, 48°; extreme heat, 51°; wind westerly. The wind blew from easterly points on 7 days, from the N. on 2 days, and from westerly points on 22 days. Rain fell on 16 days, 17 days were cloudy, 3 were brilliant, and 11 partial sunshine. There was a violent storm of loud wind and drifting snow on the first four days in February; and, contrary to what is often observed, this storm was almost simultaneous in its commencement and duration all over the island. An elevated temperature, on the 8th, 9th, and 10th, rapidly dissolved the drifted snow, which the frost prevented from penetrating into the soil, and of 2½ in. of water which fell in the shape of snow, the greater part rushed in torrents from the higher grounds, overflowing levels, or finding its way to the ocean. A loud fresh westerly wind on the 10th and 11th thawed the earth's frozen surface, and nature began to assume the face of spring.

A strong gale of wind accompanied with rain set in from the S.W. on the morning of the 12th of March, and continued about 48 hours. The rain which fell during this storm amounted to 1½ in., and the mean temperature during the period of its duration was 37°, lowest range 34°. Loud winds, though of much less velocity than that on the 12th and 13th, occurred on the 17th and 18th, also from the W., with a mean temperature of 45°, range of thermometer between 51° and 40°. After the winds and storms in the early part of February were over, the feathered tribes soon forgot their privations. The bat was seen abroad on the evening of the 10th, when the temperature was at the unusual height of 52°. The winds that followed prevented larks from singing till the 12th, which, according to antiquated notions, prognosticated that we should have no severe subsequent storm in the spring months, of which the early singing of that bird is supposed ominous. Woodpigeons were heard cooing, and partridges sounding their love-notes on the evening of the 16th; the mavis and blackbird first tuned their lays on the 18th. It may be

remarked, that the blackbird seldom attempts commencing music when the temperature is below 42°. The lark will sing, if the sky is serene, at a temperature of 34°.

In consequence of the long protracted winter frosts, vegetation had been stationary throughout the winter months. The Christmas rose (*Hel*léborus nìger) had its flowers formed in December, but did not open till the 14th of February; snowdrops and the winter aconite were in flower on the 15th, and spring crocuses began to appear above ground. The temperature of the last 10 days of February being 37°, vegetation became again stationary. The aurora borealis was brilliant on the evenings of the 2d and 7th, indicative of the unsettled state of the atmosphere which prevailed till the middle of the month. The crocus was in flower on the 4th, five days earlier than last season. The mezereon was in flower by the 8th. Wheat from Tangier sown on the 22d of January, appeared above ground on the 10th, a period of 47 days; mean temperature of that period 38·5°, corresponding exactly with privet wheat sown on the 26th of January last year (Vol. III. p. 296.), both as to temperature and period of duration under ground. The *Saxífraga oppositifòlia* opened its flowers on the 14th, exactly on the same day as last year. Garden peas sown on the 21st of February appeared above ground on the 22d of March, a period of 29 days; mean temperature of that period, 41°. Apricots were in full blow on south walls on the 22d; the Erythrònium Dens Cànis, and *Narcíssus* mìnor, on the 26th. Gooseberries were in leaf on the 27th; and the Pulmonària paniculàta was then in flower. The progress of vegetation at this period, it will be perceived, is as near as can be to the corresponding period last season. The only observable anomalies are, the larch trees appear about as forward in leaf as on the 8th of April last season, which may be accounted for by the excessive moisture of the soil throughout the early part of March, and consequent cold produced at the earth's surface by evaporation, affecting the progress of herbaceous plants, while lofty trees enjoyed a higher temperature. The *Dràba aizöides* in the same situation as last year, has not kept pace with its fellows; it having flowered last year on the 16th and this season on the 26th of March. It is not so easy to account satisfactorily for this anomaly. — *A. G. April* 2. 1831.

Art. VI. *Retrospective Criticism.*

Periodical Publications. — Sir, Accidentally looking over a very well-written article on Strutt's *Sylva Britannica*, in your last Volume (p. 549.), my eye was caught by the following passage: — "We could wish, for his own sake, that Mr. Swainson would not levy so exorbitant a tax on his subscribers as to charge them half-a-crown for about eight pages of titlepage, preface, indexes," &c. Now this, abstractly, is a just animadversion; but, with reference to the work itself, it is a very partial mode of reasoning, and therefore not fair. In each regular number of the *Zoological Illustrations* (which amount to twelve in thirteen), there are five highly finished plates for 4*s.* 6*d.* Now let the writer compare this price with that of three other zoological periodicals, of the same size, and executed with equal care: he will find that in one of these there are six plates for six shillings; in another, four plates for four and sixpence; and in another, where the letter-press is more copious, two, or sometimes one plate, for three and sixpence. Let me ask the writer, which he would rather have done: the number of plates reduced from five to four, so as to bring the work upon a level with those just alluded to; or would he rather continue to pay this "exorbitant tax" of half a crown for every thirteenth number? It is surely enough that there are still men of science who will devote their time, and moreover their for-

tune, to the publication of illustrative works, without being condemned in this manner. A. Y. R. may not know that such publications are always a certain loss to their projectors: the booksellers know this full well, and will never have any thing to do with them. Your correspondent A. Y. R., and "a Purchaser of Periodicals," whom I take to be one and the same, need not, however, fear this "exorbitant tax" will continue, or that the science of the country will be much burthened with illustrative works. I leave the *Zoological Illustrations* out of the question; they are only pretty pictures, fit to copy from, and sketchy descriptions: but I could name some others, of much higher pretensions, which, to the disgrace of patrons of periodicals, and of the true legitimate science of the country, are most unworthily neglected; they are, in fact, all but discontinued. Why is this? Because the grown-up public are satisfied with infants' food, in the shape of cheap compilations, crude translations, wonders of the insect world, &c. &c., with such like amusing trifles, fit only for children. While the ——— of Dr. H., the I— Z— of G. H., the S. C. of G. S., and half a dozen others, which would reflect honour upon any age or country, are left to languish and decay. If such a mighty passion for natural history has really sprung up among us, why do not the different public subscription libraries, provincial institutions and societies, and wealthy individuals, purchase and uphold such books? Is there no writer in your Magazine with the abilities and the courage to point out which of all these countless periodicals deserve encouragement, and which do not? Let A. Y. R. take up this subject, for I suspect he is equal to it, and he will confer a signal benefit on science. Let him give you a critical list, and then let all the provincial societies make a choice of some one, or two, or more, as their funds may permit, and send their orders to the publishers. We shall then see some real patronage of science excited, and for the highest purpose, the increase of knowledge. But so long as this merit is assumed by societies which merely arrange stuffed skins in their museums, or import wild beasts, and receive money for exhibiting them afterwards, we must in vain look for any real encouragement to natural history. Yours, &c. — *W. S. February*, 1831.

The Natural Productions indigenous to Britain. — Sir, The subject which your learned correspondent T. E. L. has entered upon, in his observations upon the "Natural Productions indigenous to Britain," is one so interesting to every native of this country, and so instructive generally, that I cannot let his paper slip through my hands without making a few remarks upon it.

In every meal which a man in the middle ranks of society usually takes, there is one, if not more, of its ingredients the produce of a foreign country. His breakfast and evening meal are supplied either by China or Jamaica; and an indispensable part of his dinner, though at present naturalised to our soil, once found its way, in some "rich argosy," from the wilds of America. The trees which compose the shady coverts and bowers of our gardens are principally foreign; the laurel, and those graceful varieties of shrubs which adorn our pleasure grounds, have all derived their birth in distant lands. Many of our larger trees are aliens, the silver poplar of Italy, and the lusty poplar of Ohio, the chestnut, and many others. From T. E. L.'s opinion that the abies and the fagus are not natives of Britain, I feel much inclined to differ. In the first place, I conceive that abies is the common pine, and fagus the beech. That the pine is indigenous to this country, the daily discoveries of embedded forests of that wood declare to us; and our peat bogs, which were formed centuries probably before any connection that the inhabitants of this country had with strangers, bear testimony to this fact. That the beech is indigenous I feel less confident; but the opinion of Evelyn* bears me through in my supposition that it is. There is a

* Vide Evelyn's *Sylva*, Hunter's edit., vol. i.

passage in Cæsar's *Commentaries* * which would seem to confute my opinions; but I must aver that I conceive the author to have been either misinformed or little acquainted with the interior of the country. T. E. L., your correspondent, vindicating this opinion of Cæsar's, is confident that the tree mentioned in the passage quoted is not the beech, but a species of oak; and this he strengthens by adducing passages from authors of antiquity, describing the fruit of the fagus as an article of food. That the fruit of the oak was and is used as food, I know; and also that the fruit of the beech was not only formerly used as food, but is so to this day. The kernels of the beech-nut are to this day, in some parts of France, ground and made into bread; and from the same nut an oil is extracted useful and pleasant to the taste. Deer and swine have pastured upon beech-nuts from the earliest ages. I should therefore rather interpret fagus, with several learned expositors, the beech than the oak; since the argument in favour of its being the oak, from its fruit being mentioned as an article of food, I think I have proved to be futile. But granting for a moment that fagus is not the beech, but the oak; if we allow T. E. L.'s argument, it will lead us to the conclusion that the oak is not a native of Britain; a conclusion which I should hope all your readers know to be false. T. E. L.'s reasoning is this: — Cæsar was correct in saying that the fagus was not found in Britain; but Cæsar's fagus is the oak, and not the beech; therefore the oak was not found in Britain. In describing the pearls found in England in the time of Agricola, T. E. L. will not forget the fisheries of the Conway river, which, if my memory fails not, has been productive of pearls from the earliest times. I am, &c. — *D*. *January*, 1831.

Hares taking the Water. — Sir, Your correspondent (p. 143.) recommends those who doubt the emigration fancies of the hare to visit the island of Havergate, where they might have ocular demonstration of such an extraordinary fact. Being rather sceptical on that point, I proposed taking a journey thither: but as I am well acquainted with Mr. Edwards, the proprietor of the island, I thought a little conversation with him upon the subject would answer my purpose quite as well. That gentleman assures me (to the best of his belief) that every hare upon Havergate Island was either born there, or is one of the original stock sent there by himself for the purpose of colonising the island; he trusting to the formidable aqueous barrier for their preservation. Mr. Edwards is an old sportsman, and is of opinion hares will never voluntarily take to the water: he says your correspondent must have very much misunderstood him.

Naturalists have recorded an instance or two of extraordinary sagacity shown by hares that have taken to the water, in cases of emergency, to evade their pursuers; but that they will swim backwards and forwards, as it were for amusement, across a rapid stream of 200 yards in width, is more, I suspect, than most naturalists will give credence to. "Not being a fox-hunting or hare-coursing parson, I know but little about game;" but it is the first time I ever heard of any migratory propensity peculiar to British animals, or that the quadrupeds of England had caught the mania for crossing salt water from their biped superiors. — *S. V. W. Woodbridge*, *March*, 1831.

Missel Thrush singing on the Wing. — Sir, Your correspondent, who signs himself "*Scólopax rustícola*," in p. 183., among other very just observations relative to that amusing bird the missel thrush, remarks that *he has once in his life observed one to sing whilst in the act of flying from one side of a field to another*; "but," he adds, "it is a solitary instance, as I neither observed it before nor since, and had they been in the habit of doing so, I should most certainly have noticed it." I am inclined so far to agree with

* "Materia cujusque generis præter fagum et abietem."

your correspondent, that this must be, at least, a rather unusual occurrence, inasmuch as I never recollect to have observed it previously to seeing his statement in your Magazine; and yet I have not been inattentive to the habits and manners of the bird. I can now, however, bear testimony to the accuracy of the remark. On the 3d of March I was an eye and ear witness to the fact of a missel thrush singing,—and singing in good style,—on the wing, flying over the Lammas Fields, between this village and Coventry. And it is a singular coincidence, though perhaps too trifling to be noticed, that this occurred the very next morning after I had read the remarks of your correspondent. That cuckoos frequently sing on the wing is a fact, I believe, well known to naturalists.

The above remarks may perhaps be deemed too unimportant to find a place in your pages; at the same time it strikes me, that the remarks of one naturalist in corroboration of those of another, relating to a fact which, it appears, had almost escaped the notice of an *out-of-doors* observer, may not be entirely without interest to some at least of your readers.

I will only add, that the missel thrush commenced its ordinary song in this neighbourhood on the 24th of November, 1830. Yours, &c.—*W. T. Bree. Allesley Rectory, March* 8. 1831.

The Nuthatch in the Neighbourhood of Bedford.— Sir, The very handsome manner in which Mr. White has alluded (p. 184.) to the remarks which I took the liberty of making in a former Number (Vol. III. p. 450.) on his statements relative to the song of the cuckoo and the departure of the swifts, induces me to put another question to that intelligent naturalist; and I now feel confident I may do so without running the risk of giving him offence. Mr. White, in his "Journal of the Weather kept at Bedford" (p. 171.), says, "the nuthatch (*Sitta europæa*) *arrived* on the 24th of March." Allow me to ask whether the bird is a migratory species in that neighbourhood. Possibly it may be so; for some birds are partially migratory: I mean that in some districts they are to be seen only in summer or in winter, while in others they are to be met with during both seasons alike. An example of this kind occurs, as I am informed, in the common kingfisher; a very able naturalist, resident at the time in Yorkshire, once assured me that the kingfisher was only to be found in his neighbourhood in the winter; and I have been told of other places where the bird is only to be met with in the summer. In Warwickshire, however, both the kingfisher and the nuthatch undoubtedly remain with us throughout the whole year.

The Cuckoo. Again, Mr. White (p. 172.) says, "the cuckoo *departed* on the 3d of July." Does he not rather mean that the bird then became silent? that being just about the season when its song usually ceases to be heard. But the bird itself does not *depart*, or leave this country, till long after it has ceased to sing; not, I believe, till the autumn, or at least till late in the summer. I conceive it to be the right, I might almost say the duty, of one naturalist to criticise (provided it be done with courtesy and moderation) the remarks of his brother students in the field of nature; for by these means the truth, which *ought* to be the object with all naturalists, is most likely to be elicited and confirmed. And I cannot but express a wish that all your correspondents would receive the remarks of those who may happen to differ from them in opinion, in the same candid and gentlemanlike spirit as is evinced by Mr. White.

I had almost forgotten to state, that the facts of the cuckoo being heard on the 28th of July, and four swifts seen on the 27th September (see p. 185.),—facts, the accuracy of which I no longer feel myself at liberty to call in question,—are certainly very unusual ones, and, as such, are well worthy of being recorded in your Magazine. Yours, &c.—*Id.*

The pectinated Claw of the Goatsucker.—I cannot but smile at the simplicity of Mr. Rennie, who, with an obvious desire for truth, is sometimes

very unfortunate in his speculations. He thinks the question of the "goatsucker's foot-comb" is "set at rest," because he discovers that these birds are infested with vermin. Does he not know that it would be difficult to name *any* land bird which is without such parasites? If he doubts this fact, let him examine the heads of all our native birds; or, what is better, let him go to the British Museum and ask to see Dr. Leach's collection of these extraordinary insects. To suppose that nature has given to one or two families of birds the exclusive power of freeing themselves from an enemy which in like manner infests *all* birds is preposterous. I can, moreover, assure him that the Australian Podárgus is so tormented, since some of the empty *nits* still adhere to the feathers of my specimens. Is Mr. Rennie now satisfied? Wilson in general is remarkably accurate, but he also must, in this instance, give place to our White. — *Sw. Feb.* 1831.

Formation of Wax by the Bee. — Most practical men think Professor Rennie (p. 185.) wrong, notwithstanding the authorities that he has in his favour. I have been taught to believe that the farina of flowers is the material of the wax, and that it is cemented by a glutinous secretion of the insect. Wasps scrape or bite off the soft down-like pile which is generally found on the surface of oak boards or posts that have been exposed to the weather, and mixing it with a gluten which they secrete, form a kind of paste or paper of which they construct their cells. Hornets make use of rotten wood instead of the scrapings of oak boards to form the paper for their nests; and I observe by the *Bulletin Universel* that a gentleman in France has taken out a patent for the same thing. — *J. W. L. London, March*, 1831.

The "Flora of Richmond as compared with that of Thirsk," contained in your Magazine (p. 24.), exhibits a few inaccuracies which I wish to rectify, and some opinions which I feel inclined to oppose.

It seems to me that one of the plans the most conducive to the advancement of the science upon which your Magazine treats, is that of the inhabitants of particular counties or districts transmitting to you an account of their discoveries, stating to you their remarks, and the inferences they draw from the data they possess: still this system, useful as it is, without it is conducted with caution and fidelity, will prove futile, and tend to mislead the enquiring naturalist. In making some remarks upon the peculiarities of the woods about Richmond, the author of the paper before me says, that, "ascending the higher grounds, the woods, if any, are principally fir." Now, I conceive that this is not peculiar to Richmond, since where firs are not of spontaneous growth, in all elevated situations where the soil is barren and unprofitable, the proprietors usually plant fir trees, as affording the best crop which they can procure from soil of that nature; and this I conceive to have been the origin of the plantations near Richmond.

May I ask the author of this paper, did he not mean to write metalliferous, when he wrote carboniferous, limestone? I believe coal is scarcely found within many miles of Richmond (a peculiarity of the mountain limestone series), though the metals galena, zinc, and copper are found in abundance; from which fact this limestone is denominated by geologists metalliferous. Mountain limestone totally prevails at Richmond, though your more cautious correspondent says only generally. The town of Richmond stands upon a rock of limestone, and the same stratum forms the bed and banks of the river Swale. As to the cavernous fissures which T. E. L. mentions, I can assure him I know them well, and in the days of my youthful enterprise, equipped with tinder-box and candle, I have traversed their depths with the adventurous spirit of a Quixote, and returned to the daylight soiled and bemudded as much as ever mining practitioner was. As to T. E. L.'s assertion, that the mountain limestone series is "generally" full of fissures, I feel too dubious upon the subject to hazard

a negative. Some of your readers may perhaps be able to give an opinion more strongly confirmed by experience than mine would be. The valley of the Swale, some miles above Richmond, is rich in veins of galena, and, far from being "not uncommon," they constitute the entire wealth and produce of the country. From that valley lead is forwarded to all the Yorkshire markets and consumers, and from Stockton upon Tees great quantities are shipped to London and the southern ports.

Perhaps I may be ignorant of the meaning of the term "elevation" used by T. E. L. in describing the "thickness" of the mountain limestone stratum; or science may have assigned to that polysyllable a different interpretation from its common conventional one. T. E. L. makes the words "thickness" and "elevation" synonymous. The passage is this:—"The thickness of the mountain limestone varies; perhaps we may not exceed the mark in assigning it an elevation of 300 or 400 feet." It appears to me that the latter member of this sentence does not explain the former; since the elevation or height of a substance can give no clue to discover its thickness. Here is an arithmetical problem, which will employ as much of T. E. L.'s time to solve, as it would of mine to unriddle his observation:—If the perpendicular height of a maypole be 60 ft., what will its diameter be? Perhaps T. E. L. will explain me this matter.

The mountain limestone not unfrequently appears lying under the gritstone, as is the case at the outcrop at Ingleborough Hill, and Whernside in Yorkshire. This latter hill, indeed, derives its appellation from the ancient household article in making which its gritstone was employed, namely, the *quern*, which by an easy corruption becomes *whern*.

T. E. L. says "there are *evident* proofs of the valley [of the Swale] having been narrower in former times." I should like him to give me his reasons for such an *evident* conclusion. It never struck me as having been likely, nor does it appear at all probable. Does T. E. L. mean by the "*basis* of the hills" the land in the valley? Some further remarks from T. E. L. upon the "geography of plants," if gathered by his own observation, and well supported by facts, would be interesting and instructive.

My kind wishes for T. E. L.'s success as a naturalist have drawn me into these remarks. I am in general so inert that nothing but my kind feelings towards him, or some "such convulsion of nature," or "great acting force," as hath formed a passage through the hills for the river Swale, and dismembered the Round How from its parent rock (as T. E. L. describes it), could have impelled me to scribble at such length, and with such prolixity.—*N. January* 27. 1831.

The specific Relations of Anagállis arvénsis and cærùlea.— Sir, In reply to Professor Henslow's communication (Vol. III. p. 537.), I have to state that, in 1828, a friend sent me a small parcel of seeds of *Anagállis* cærùlea, from which I raised a considerable number of plants; but not one of them presented any thing different from the usual appearance of the plant from which they were derived. I suffered the plants to scatter their seeds, and the following year they came up equally numerous, but still without any deviation. The above was not done with any view to ascertain the fact of identity; but had any variation occurred in the colour, &c., I should have observed it, as I was very frequently looking at the plants. The soil upon which they grew was gravel, with a slight covering of mould. It may be as well to observe that we consider the *Anagállis* cærùlea a very rare plant; indeed, I have never seen it wild, although *Anagállis* arvénsis, as in most other places, is one of our commonest weeds. As blue flowers are subject to more variation than others; and as flowers of that colour and white frequently turn to red in their last stage, Professor Henslow should have stated if the flowers were red at first opening; and if they were precisely of the same colour as the *Anagállis* arvénsis. I presume every means was used to prevent the introduction of the more common plant, which is so very

frequently a trespasser in gardens. I am, Sir, &c. — *Dan. Stock. Bungay, Dec.* 2. 1830.

In the botanic garden, Bury St. Edmund's, *Anagállis cærùlea*, which was introduced there by the Rev. Geo. Reading Leathes, came up annually from seeds dropped the year before; and as its numerous bright blue flowers, glittering in the sunshine, made it a very ornamental little annual, the plants of it were allowed to be numerous; amongst them all I never perceived any variation. — *John Denson. jun., lately Curator there. Bayswater, Feb.* 19. 1830.

Art. VII. *Queries and Answers.*

Erratum. — Page 144. line 12. from the top, for "Vol. II. p. 123.," read "Vol. III. p. 193."

Accentuation. — Sir, We have in this vicinity several young persons who are pursuing the study of entomology with a zealous application; but having unfortunately, like our immortal bard, "but small Latin and less Greek," we are frequently unable to ascertain the derivation, accentuation, and application of the nomenclature. This is a truly discouraging circumstance, as it very much impedes those personal communications of discovery and progress, from which arises, as we conceive, an intense gratification to those united in the same study. We have resorted to your Magazine, as a work that would materially assist us in subduing our difficulties; we expected much improvement from it, and we have not been disappointed: but, in general, you do not enter extensively enough upon our favourite pursuit; and you have lately very much shaken our confidence by an alteration of your practice. In fourteen Numbers you uniformly placed the accent on the penultimate syllable of what may be termed the patronymics of the science, but in the fifteenth Number the said syllable is shortened: thus we have Cynípĭdæ, Chalcídĭdæ, &c. Lempriere, our best reference in this case, generally adopts your latter accentuation: but Withering teaches his readers that all terms ending in *idæ* have their penultimate syllable long, according to your former pronunciation. Now, who is to decide when doctors disagree? If those whom we deem masters in a science falter, what are the inexperienced novices to do? We at least think ourselves justified in making a respectful appeal to you, for the reason of the change that you have adopted; and, as the case before us fully evinces the necessity of some standard of reference even to the learned, we, the unlearned, feel ourselves entitled to make a still bolder appeal. We frankly call upon the veterans in the science for a dictionary of British Entomology, with derivations, accentuations, and reasons of application, &c. Since Mr. Stephens's *Catalogue* has been before the world, a work of this description has become of easy accomplishment to the scientific: but who is there that can present such an effectual assistance to the student so well as our venerable head and tutor the Rev. Mr. Kirby, or Mr. Weston? To use the words of the former gentleman, "May it therefore, in such good hands, begin, make progress, prosper, and, *Deo favente*, be happily concluded! *Verbum sapienti.*" I am, &c. — *Frank Plain. Jan.* 28. 1831.

In the earlier Numbers, names of families in *idæ* were printed with the penult long, under the impression that they were composed of the name of the type and *eidos*, like; as Cynip-idæ (Cynips-like): but, as these names were subsequently ascertained to have been used as patronymics by the eminent naturalists who invented them, and without any reference to *eidos*, they have in later Numbers been regulated by the prosodial rules that govern patronymics, and of course have the penult long or short

according to the termination of the word from which they are formed. As far as entomology is concerned the penult is always short; as Cynipidæ.

The terms Animal and Vegetable.— Sir, I should consider myself highly favoured, if you would give me, in your forthcoming Number of the Magazine, a distinct definition of the term "animal;" also, a distinct definition of the term "vegetable;" and if you would show me how you can satisfactorily draw a line between the animal and vegetable kingdoms.— *Inquisitor. Jan.* 24. 1831.

Lady Derwentwater.— Is your correspondent, W. B. Clarke (p. 92.), acquainted with the voice of the heron? If not, will you allow me to hazard an opinion that it is the mortal body of this majestic bird, upon which tradition has fixed as a tabernacle for the spirit of this Lady of the Lake? I well remember, whilst leisurely rowing round the islands on this beautiful sheet of water on a lovely evening last spring, to have watched this bird soaring high above my head whilst uttering its singular scream. After the sun had disappeared behind the western mountains, and the dusk of evening precluded my again seeing this feathered friend, its cry was still to be heard; and, though there is nothing particularly plaintive in it, I shall be inclined to adhere to my opinion, in the absence of a better illustration of the fair spirit's dwelling-place. The unsuccessful attempt of your correspondent and his friends to obtain a sight of the birds on the island, strengthens the probability of its being some bird that emits its note whilst high on the wing.— *J. B. Giles. March* 28. 1831.

The Breathing-Tube of the Boa. (p. 20.)— Quære, Whether the breathing-tube of the boa, noticed by Mr. Dillon, was not the fleshy receptacle (if I may so apply the term) into which the snake withdraws its tongue? Whilst I was an under-graduate, I kept a couple of snakes for some time, which, after fasting for three months, at length began to take food. I have frequently seen them swallow the largest-sized frogs. When these were sometimes slowly receding, hind quarters foremost, into their enemy's stomach, the distended jaws of the snake were in one period of the process tightly contracted round the frog's head, producing the curious effect of an animal with one mouth (the frog's) and four eyes, two of which were winking continually and the other two in a glazed stare. I never saw any breathing-tube exserted during the operation, neither should I consider any such apparatus to be needful, because my snakes would frequently lie wholly under water for a much longer time than was necessary for them to swallow their food. The common snake is particularly abundant in the fens of Cambridgeshire; and may be seen in the spring, upon any fine day, basking on the banks of the ditches, into which it immediately retreats upon being disturbed, swimming across them with the greatest facility. A fenman and his two sons were formerly employed to procure these snakes for an agent from London, who paid for them, when skinned and dried in the sun, at the rate of one shilling per dozen. The men remember to have had one day's sport more remarkably good than usual, in which the three respectively caught nine, eight, and seven dozen. To their great regret, this profitable trade has suddenly ceased. What the man who purchased them did with them they never knew; but perhaps some of your correspondents may throw some light upon the subject. — *J. S. Henslow. Cambridge, Feb.* 4. 1831.

On Snakes taking the Water.— Sir, In Vol. III. p. 450., J. Murray of Carmarthen says:— "In reference to your Portsmouth correspondent, it may be remarked that I believe it not a rare phenomenon to find snakes or vipers occasionally take the water, either to cross a stream or traverse a pond or lake." I think there can be no doubt of the fact. Although my opportunities of observing the habits of snakes in this country have been few, I have often seen them in the water in North America in search

of frogs, which I believe to be their principal food. I have also very frequently seen them in pools of water by the road side, with their heads above the surface, watching for their prey; and I have often relieved the poor frog from the fangs of his enemy, having been attracted by his cries to his assistance. Being in search of aquatic plants in a small lake in Upper Canada, in a birch canoe, I was joined by a young Indian whom I was acquainted with. He had come there in search of fish or wild-fowl. He called to me as he approached, and pointed out to me a very large black snake, about fifty yards from the shore, which lay coiled up amongst the water-lilies with his head raised about four inches above the surface. I called to the Indian to fire; he did so, and the snake disappeared under the water, and again made his appearance nearer the shore. I also fired, but with no better success, for we saw no more of him. I enquired of the Indian if the black snakes often went into the water. He replied, "O yes, they go a-fishing."—In Canada I heard many wonderful stories of snakes charming their prey, particularly birds; but I confess I am myself somewhat sceptical on this head. The following, which exactly agreed with my own opinion on the subject, was related to me by a very respectable farmer, who had previously been a true believer in their fascinating qualities. He was walking in a field near his house, when he perceived a bird fluttering above the stump of a tree, uttering an uncommon cry, and by degrees getting nearer to the ground. The farmer's attention being drawn by the uncommon cries and motions of the bird, he walked slowly towards it, but it seemed to take no notice of him, and continued still getting closer to the ground. The farmer at last observed that the bird's attention was drawn towards a large snake, resting against a stump, nearly erect, with its head close to a small hole. The bird (probably encouraged by the presence of the farmer) struck at the snake with his wings, which caused him immediately to drop. On examination, it was found that the bird's nest was within the tree, with five unfledged young ones; which the snake had been exerting his ingenuity to procure a part of for his dinner.

I think, Sir, I hear you exclaim, after reading this, What is all this to the purpose about the snakes, without giving their scientific names? I am sorry to say that I am obliged to plead ignorance on that head, being only acquainted with the local names given to them in America; the most common snake of which country is the garter snake, which I believe seldom attains the size of the common snake of England. The rattlesnake, I think, has not been met with in Lower Canada; but they are found in considerable quantities in Upper Canada, particularly about Lake Erie. I am, &c.—*Thomas Blair. Stamford Hill, Jan.* 3. 1831.

The Circumstance of Snakes taking the Water (Vol. III. p. 450.) is to be observed wherever they are common; and, as far as my observations go, they abound most in those places where there is shallow water, which is favourable for their obtaining a due supply of food, such as frogs, &c.—*Rusticus. Newark on Trent, Feb.* 4. 1831.

Rooks detecting Grubs.—A perusal of the *Discourse on the Study of Natural Philosophy*, by Mr. Herschel (No. 14. of Lardner's *Cyclopædia*), will furnish many of your readers with valuable hints for directing their reason and observations to the true and easy solution of what may at first sight seem to be most unaccountable phenomena. I here extract an article for the notice of your correspondent L. D.; he will find it at p. 84.

"In Captain Head's amusing and vivid description of his journey across the Pampas of South America occurs an anecdote quite in point. His guide one day suddenly stopped him, and, pointing high into the air, cried out 'A lion!' Surprised at such an exclamation, accompanied with such an act, he turned up his eyes, and with difficulty perceived, at an immeasurable height, a flight of condors soaring in circles in a particular spot. Beneath that spot, far out of sight of himself or guide, lay the carcass of a

horse, and over that carcass stood (as the guide well knew) the lion, whom the condors were eyeing with envy from their airy height. The signal of the birds was to him what the sight of the lion alone could have been to the traveller, a full assurance of its existence."

Doubtless the rooks could distinguish some marked peculiarity in the plantains and other plants attacked by the grubs; although, to an unaccustomed and less interested eye, the "verdure of the pasture might remain uniform, and without any sensible appearance of withering or decay." — *J. S. Henslow. Cambridge, Feb.* 4. 1831.

Electricity of the Caterpillar of Cerùra vínula. — Animal electricity (that is, the voluntary power of communicating electricity) is one of the strangest phenomena in nature; and this seems to accord so much with the general sense of mankind, that any new fact of this kind is listened to with inattention, if not with incredulity. It has been allowed to be ascertained in some fishes, and in one insect, a beetle from Brazil. What I am going to relate establishes the existence of the power among caterpillars, at least to the conviction of my own mind.

Observing the leaves of a young poplar, of the species *P.* canéscens, to be much destroyed, I was led to examine the cause. Two large sorts of caterpillars were feeding upon it, both to me, at that time, unknown; and the name of one of them I am still ignorant of: the other is now called Cerùra vínula. I broke off two twigs, with one of each, and was carrying them home: the Cerùra showed decided symptoms of irritation, which particularly drew my attention. It began to contract itself, drawing itself closely together, and by degrees elevated and extended its bifurcated tail; and there were slowly protruded from each of the points bright red filaments, about one eighth of an inch long, and irregularly bent to one side. In a short time I felt a sudden tingle along my arm, which made me stop with surprise. Suspecting, however, that this might be imaginary, I again proceeded; and, shortly after, I felt another shock, which made me almost involuntarily throw the twig with the creature upon the ground. As I was near the house, and one of the children with me, I sent her for a wine-glass, in which I put the caterpillar, which immediately drew in its tails to their original parallel position, and coiled itself in the bottom. On entering the house, I set the one in the glass on the chimney-piece; and, as the other was more lively, I passed a minute or two in examining it with a pocket lens. I then turned to the Cerùra from which I had the electrical shocks; and as it had remained coiled together when I set it down, I was surprised to see the glass empty, and the insect gone: it had fallen upon the carpet; and I was sorely disappointed to find that the child had crushed it with her foot, displacing the intestines, and along with them a clear gelatinous matter, consisting of a great number of short cylinders. Upon attempting to lift one of these with the point of a pin, I found that I pulled more after it. They were attached to each other by small ligaments; and I was agreeably astonished to discover that they separated from the mass exactly after the manner that the links of a land-measurer's chain are extended, and had been so arranged in the body of the caterpillar, forming an organ, composed of these cylinders, at right angles with its length. I convinced myself that this apparatus had nothing to do with the viscera of the insect, and remain satisfied (not altogether philosophically, I must acknowledge) that they composed the electrical organ by which I received the shocks.

As I have never been so lucky as to procure another of these caterpillars (although in 1826 they abounded in great numbers, as I learned afterwards, on a plantation of poplars at Thirlstane, the seat of Lord Napier, on the Ettrick), I would, therefore, be glad to hear, through your Magazine, if any analogous fact relating to this well known caterpillar has been observed. — *W. L. Selkirkshire. Nov.* 1830.

The Portuguese Man-of-War. (p. 96.) — This appellation is usually given to the Velélla limbòsa, a figure of which may be seen in Shaw's *Naturalist's Miscellany;* and though the vague description of the animal referred to by your correspondent (R. S.) should seem to agree with this zoophyte in many particulars, yet the tubes of twenty feet to an animal of six or eight inches must be either a mistake or a newly discovered marvel. At all events, this mention of the name has recalled to memory my having detected this Velélla on the shores of England. In the summer, or rather in the autumn, of 1817, I found it at Ilfracombe, in Devonshire, thrown up by the waves after windy weather, sticking to the rocks, and on the beach. Some of the specimens were alive, retaining their brilliant blue colour, and others were dead, transparent, and without the delicately filamentous tentacula beneath them. The specimens were presented to Dr. Leach, of the British Museum, by whom they were placed in the room appropriated to British zoology, and where I have since seen them in a bottle of spirits, labelled as above mentioned. I am not aware that any previous memorandum has ever been made of their having been found on the British coast, though it was certainly Dr. Leach's intention at the time to make the fact known. — *J. S. Henslow. Cambridge, Feb.* 4. 1831.

The Portuguese Man-of-War. (p. 96.) — Sir, I had an opportunity of examining one, in a voyage from the West Indies, about a year and a half ago, and I now send my observations on it. This animal I take to be one of the Mollúsca, the *Holothùria Physàlis of Lin.* The individual I examined was scarcely 6 in. long, of a delicate pink on the upper part (the top of the crest being darkest), and shading off into an azure blue; the cirri were none of them longer than 3 ft.; but the animal was in a bucket, and, as it has the power of contracting them, it may have reduced them to this length to accommodate them to the shallowness of the vessel. The fact of these Mollúsca being able to descend at will, I doubt; for though I never remember to have seen them in a gale, yet in a tolerable breeze, when we have been going at 7 or 8 knots an hour, I have seen them rather abundant, but still not so much so as in a calm. My reasons for doubting their having this power are these: — When they are blown over, which frequently happens, they lie on the top of the water till they are able to right themselves; which, from experiments I made on the one caught, appears to be by an exercise of muscular power, and not by the mass of cirri acting as ballast; on the lower part or keel of this little ship muscular fibres are very evident. When a bucket is thrown over to try to take them up, though they may be upset by the shock and splash of the water, they never sink; which, as all animals have an instinctive dread of danger, we may suppose they would do if able. Besides, with a knife I opened the crest of mine, and, notwithstanding the air escaped, the animal still floated, its weight not being sufficient to sink it; though, from the motion of the cirri, it was still alive, and, therefore, had the power of sinking, if it ever possessed it, as much as before. The cirri are, no doubt, intended for securing prey. As a proof of this, a small fish, about an inch long, was put in with the *Holothùria*; and, when it came within the influence of the cirri, it was seized and carried among the mass situated close to the body of the animal. It remained there some time, and, when expelled, it was quite dead and squeezed flat; so that the animal appears to live by suction, and not (like the Actíniæ) by passing the solids into its stomach. The sting of the cirri is like that of nettles, both in feel and appearance, but I do not think so severe as it is generally reported; for, to ascertain the fact of its stinging at all, which I had very much doubted, I took it up in the palm of my hand, and felt no inconvenience; a part, however, clung to the back of my hand, and occasioned the sensation I have mentioned. Another person tried it, and the palm of his hand was not stung, but the tender skin of his arm was. The poison, therefore, appears not strong enough to penetrate the hardened

cuticle of the palm. On looking at one of the cirri through a small pocket microscope, it appeared covered by a number of small hooks; and I think it must be those that occasion the pain.

There is a very good delineation of this animal in Forbes's *Oriental Memoirs*, but a little too highly coloured. I have not the work, or I would send you a copy of it. They are not all of the same colour, some being much brighter than others, and they are of various sizes. I am, Sir, &c. — *C. Jan.*, 1831.

Lobster-like Insect attacking the Leg of a House-fly. (p. 94.) — Sir, I apprehend the circumstance of the common house-fly having been attacked in the way described by O. was purely accidental, if his description of the creature attacking it be correct. Judging from his observation of its having claws resembling those of a lobster, it must have been a species of the genus Chélifer *Geoff.* and *Leach*, belonging to the class *A*rachnòida *Fischer*, &c., fam. *S*corpiónidæ *Leach*. There are several species of this genus; their most common habitat being beneath the bark of trees, and they are occasionally met with in moss. Your correspondent will find a figure of Chélifer *c*ancröides in the second volume of *Kirby and Spence*, pl. v. fig. 5., from which he will be able to judge of the correctness of my opinion. Had your correspondent not alluded to the peculiarity in the form of the claw, I should have concluded it to have been a parasite of the class *A*'cari *Leach*, by which many Díptera and Hymenóptera are attacked. About three years since, my attention was called by my children to a fly (*M*úsca vomitòria) which they described as being mad: it had been spinning about upon its head, and appeared incapable of flying any distance. On taking it up, I found it infested with an *A*'carus, which I believe to be the Ocýpete rùbra *Leach*. The proboscis, neck, and anterior pair of legs were so covered as to disfigure the fly; and having enclosed it in a box, and fumigated it, I destroyed both the insect and its tormentors. On counting the number of *A*'cari which were in the box, I found no less than sixty-two, which I preserved, placing them beneath the unfortunate insect in my cabinet. Whether these pests are truly parasitical on the Díptera, I think, admits of doubt: the *A*'cari may attach themselves to their legs while they are depositing their eggs in dung and corrupt animal substances, in which *A*'cari abound. Bees, however, which do not frequent such matter, are often met with similarly infested, particularly the common Bómbus terréstris. — *A. H. Davis. London, Feb.* 7. 1831.

A Lobster-like Insect attacking the Leg of a House-fly. (p. 94.) — Sir, From the short account given of the insect attacking the *M*úsca *c*arnària, by your correspondent O., it may be inferred to be the Chélifer *c*ancröides, or book scorpion (*P*halángium *c*ancröides of *Lin.*); if by lobster-like is meant a small apterous insect, about the shape of the common bed-bug, resembling a small scorpion without a tail, having eight legs, and two long palpi like the arms or claws of a crab, with which it catches its food, carrying them forward in rather a menacing attitude. Its motions are quick, and it runs usually sideways, like the crab. It inhabits old libraries and collections, feeding on the insects which infest those valuable repositories. Not only the entomologist should be inclined to cultivate the acquaintance of this little creature, and tender it his protection, from its habits, but the herbalist will also find it a kind friend, and the librarian and general collector will do well to allow it the free room of their shelves and cases; and last, though not least, the housewife will find it of essential use where the *C*imex lectulàrius abounds. Whether it eats the eggs of the bug, or catches the young ones (which is most probable), I have not been able to ascertain; but I have frequently observed it inspecting the haunts of this annoying insect, and on one occasion found it among a range of eggs, which had been carefully emptied.

The circumstance mentioned by your correspondent, of its attaching itself to the leg of a fly, is in accordance with the habits of Chélifer cimicoïdes, which I have seen dragging the dead carcass of the Stomóxys calcitrans (which resembles the *Músca doméstica*) by the legs. This species inhabits the bark of old trees, and feeds like it on small insects. I remain, Sir, &c. — *F. C. L. Guernsey, Jan.* 11. 1831.

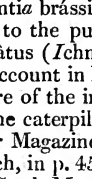
A Lobster-like Insect, &c. — A species of the genus Chélifer, which not unfrequently employs gnats and other flies as a means of transport, but whether accidentally or intentionally, is for the decision of entomologists. These insects are to be met with in decayed trees, where I have often seen them whilst searching for minute fungi. — *J. S. Henslow. Cambridge, Feb.* 4. 1831.

Caterpillar infesting the Sycamore. — Had A. E. pursued the usual entomological course of feeding his caterpillar, and of tracing it through its transformations, he would, in all probability, have long since obtained the information he asks for at p. 93. The insect is common everywhere near London, and its larvæ infest the sycamore in the autumn. The imago appears in September; it is not a *Nóctua*, but one of the *Bombýcidæ*; the common vapourer moth of English collectors; the Orgỳia antiqua of Ochsenheimer. The female of this moth is apterous, and deposits her eggs on the external portion of the cocoon from which she escapes. — *A. H. Davis. London, Feb.* 7. 1831.

Greenish black-marked Caterpillars on Cabbages. (Vol. III. p. 476.) — The caterpillars are, no doubt, those of the large garden white butterfly (Póntia brássicæ); and the "minute eggs" I have no hesitation in referring to the pupæ of a well known small parasite called Microgáster glomeràtus (*Ichneùmon glomeràtus of Lin.*), of whose operations you will find an account in Professor Rennie's *Insect Transformations*, p. 61, 62., where a figure of the insect will be found in its different states, together with that of the caterpillar on which it preys. The insect has also been figured in your Magazine (Vol. III. p. 52.) under the name of Platygáster ovulòrum, which, in p. 452. of the same volume, is shown to be erroneously applied. In *Gard. Mag.* (Vol. VII. p. 121.) will be found quoted the passage in *Insect Transformations* referred to, in an article by your correspondent W. T. Bree. I am, Sir, yours, &c. — *A. D. Feb.*, 1831.

The Rot in Sheep. — Sir, I have sent specimens (*fig.* 51.) of what are provincially termed flukes, taken from the liver of a sheep and generally supposed to be the cause of the rot, now so very prevalent that it becomes a matter of no small, consequence to ascertain what is the cause of the disease. It is said by the farmers who have land by the river side here, that the meadows never rot sheep unless they are turned in immediately after a flood. Whether that is the case or not, I will not pretend to say; but if any of your numerous correspondents could give information as to the occasion of the rot; in what manner the fluke gets to the liver; how produced, and to what class or family the flukes belong, it may be a means of finding a remedy for a disease as fatal to sheep as consumption is to man. I am, &c. — *Rusticus. Newark on Trent, Feb.* 4. 1830.

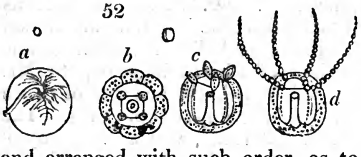
51



Luminosity of the Sea. — Sir, Being out upon an excursion on the 19th of last July, I wanted to get from Lowestoft to Yarmouth that evening. A party of gentlemen whom I knew had engaged a boat for the same purpose, and offered me a seat. Unfortunately there was no wind stirring, and we were consequently kept upon the water four hours, namely, from six to ten o'clock, in accomplishing a distance of nine miles. This, however, turned out very fortunate for me, as I was particularly anxious to witness that

singular phenomenon, the luminousness of the sea, which I had the satisfaction of seeing that evening in great perfection. As it became dusk, the edges or divisions of the waves became luminous, and the spray from the oars particularly so. When it became nearly dark, every disturbance of the water gave out a brilliant flash of phosphoric light. By placing the finger in the water it was seen to great advantage, and small particles of light were perceived for several seconds, receding from the boat in the wake thus produced. Water taken up, and spilled on the floor of the boat, appeared like so much mercury let fall by daylight, as the points of light diverged in radii from the spot where the water fell. I had no opportunity of examining the water at that time, but a friend (the Rev. Wm. Foulger) procured some for that purpose from the same locality, and we determined, by the aid of the microscope, that the luminousness of the water of this part of our coast proceeded from a small animalcule (*fig.* 52. *a*) resembling that figured in Mr. Baird's paper (Vol. III. p. 313. fig. 82. *d*). These appeared in great numbers near the surface, and arranged themselves round the edge of the glass into which we poured the water for examination. They were sometimes so numerous, and arranged with such order, as to resemble a string of beads. This animalcule is a thin transparent globule, from the upper part of which rises a small tube, in length about one diameter of the globule; a number of minute vessels diverge from the base of this tube, spreading thin ramifications over the surface of the animalcule. We also detected another animalcule (*b c d*), twice the size of the former, which appeared to possess a greater degree of luminosity when agitated in the water. It had the appearance of a hollow fleshy globule, having a retractile tube arising from the bottom of the cavity, over which is a square aperture, and at the angles of this aperture are placed four moniliform tentacula (*d*), which, when the animalcule is in a state of repose, are contracted into four lobes (*c*). The exterior is divided longitudinally into eight parts, and is studded with minute points. I should be glad if any of your correspondents would inform me, through the medium of your pages, to what genus these animalcules may be referred, and the work or works in which they are figured or described. The first, I conceive, cannot possibly be a Medùsa, as stated by Mr. Baird. I am, &c. — *Samuel Woodward. Norwich, Nov.* 8. 1830.

52



The Aster which rolls back its Corolla, of which an imperfect specimen has been sent us by M. A. Brown of Walsal, appears to be the Kaulfùssia amellòides. The circumstance of its rolling back its marginal petals during overcast weather is a peculiarity; most plants closing their petals in such weather over the flower. — *Cond.*

Epidéndrum fuscàtum. — The orchideous specimen sent us by A Constant Reader is not a parasite, as he supposes, but an epiphyte. A parasite grows into the living trees as does the mistletoe; an epiphyte grows upon the outer bark or rotten wood of a tree. The specimen sent is the Epidéndrum (*epi*, upon, *dendron*, a tree; place of growth) fuscàtum, an orchideous epiphyte. It is a stove plant of easy culture in rotten tan, with a strong moist heat. — *Cond.*

The Constituents of Bezoar. — Sir, As your correspondent, A Mineralogist (p. 96.), wishes to know of what substances the bezoar is composed, I have drawn up a short account of the different varieties, according to the analysis of MM. Vauquelin and Fourcroy, published by them in the *Annales de Chimie* (see *Ure's Dict.*), and the animals in which each particular kind is said to be found. Bezoars have been found in the intestines,

stomach, gall bladder, gall ducts, salivary ducts, and pineal gland. There are nine or ten varieties: —

1. Phosphate of lime, forming concretions in many of the Mammàlia. The bezoars of the pineal gland and salivary ducts are of this kind. Bezoars of this species have occasionally been formed in fish.

2. Phosphate of magnesia, semi-transparent and yellowish, specific gravity 2·16. This kind has been found in horses, and many of the Ruminàntia; though it is difficult to conceive whence the magnesia is obtained, as only a minute portion of it enters into the composition of their food.

3. Triple phosphate, phosphate of ammonia and magnesia, composed of concentric laminæ, radiating from a centre, and rattling within like the *Æ*tìtes, or eagle-stone. This kind of bezoar is of a brown colour, and is confined principally to herbivorous animals; as the elephant, horse, ass, &c. The horse bezoar (*Bezòar* * equìnum, or hippolite, as it was formerly called) was generally composed of this triple phosphate. Dr. Watson has given us an account of two bezoars of this kind taken from the intestines of a horse; one of which weighed 15 lbs. 12 oz., and the other 19 lbs. A very large one of this kind was taken from the intestines of a horse belonging to Mr. Hayward of Brandon, Suffolk; and there is now in the museum of Guy's Hospital a bezoar of this description, weighing upwards of 7 lbs. The *Bezòar* microcósmicum, human bezoar, or enterolite, was occasionally of this variety (*Good*, vol. i. p. 211.); an instance of which is recorded in the case of a lady under the care of Dr. S. Fitzgerald of Mullingar. (*Med. Com.*)

4. Biliary. Colour reddish brown, found in the gall bladder of oxen and sheep. This was called the *Bezòar* bovìnum. It is very common in the human species; it has all the characters of inspissated bile, and is used as a pigment by painters.

5. Resinous. This variety, commonly called the Oriental bezoar was procured chiefly in Malacca, from unknown animals, by traffickers in the East, and was by them very often sold for ten times its weight of gold. The *Bezòar* hýstricis, *Bezòar* porcìnum, pietro del porco, or lapis malacensis was said to be of this kind. It was found in the gall bladder of the Indian porcupine, had a bitter resinous flavour, on being steeped in water communicated its bitterness to it, and was taken formerly as an aperient and stomachic. Some specimens of the Occidental bezoar, taken from the stomach or intestines of an animal of the goat or stag kind, a native of Peru, were said to be of the resinous kind, but they were sometimes also composed of the triple phosphate. That the Oriental and Occidental bezoar occasionally consisted of resin and bile, there is very little doubt; but for the most part they are composed of inert vegetable matter. A few of the Oriental bezoars analysed by Dr. Watson were of the latter description (*Philosoph. Trans.*, vol. lxxxviii. p. 46.); though it is highly probable that these were not from the gall bladder, but from the stomach or intestines.

6. Fungous: consisting of pieces of the *B*olètus igniàrius swallowed by some animal.

7. Hairy. The one described by I. W. D. of Greenwich was probably of this kind. They are by far the most common of all bezoars, and have been found in a great number of animals, particularly in beasts of prey, on account of the hair which they swallow with their food becoming agglu-

---

* From *pa*, against, *zahar*, poison, *Persian;* having been first employed as an antidote, or counter-poison. Some derive the term from *pazar*, a goat, *Persian;* because the most anciently known bezoar stones were procured from the stomachs of goats feeding on the mountains of Persia.

tinated together, so as to put on the peculiar spongy appearance described by your correspondent. The ægagrópilæ, *Bezoar simiæ*, or bezoar of the monkey species, bezoars of the camel, the alpine goat, the chamois (*Antilope Rupicapra Linn.*), and gazelle (*Antilope Gazella* Linn.), are occasionally of this description. In these latter cases the hair most probably is taken into the stomach, as I. W. D. observes, by the animal licking itself.

8. Ligniform, agglomerated lignin, or woody fibre. Most probably those mentioned by the "Mineralogist" were composed of a mixture of this and the preceding variety. The emperor of Persia sent three bezoars as a present to Napoleon, and by the analysis of Berthollet they were composed of lignin.

9. Cholesterine.* This kind is not mentioned by the French authors; but there is at this time in the museum of Guy's Hospital a beautiful specimen, consisting of pure cholesterine, or the pearly matter of bile, in a subcrystalline arrangement, taken from the gall bladder of a bullock, and another from the gall bladder of a mare.

10. Extraneous, composed of foreign bodies introduced into the stomach, and there, through the medium of some of the preceding varieties, agglutinated together. The bezoar of the cobra di capello, or "pietra de cobra di cabilos," and rhinoceros bezoar, "pietra de mombazza," were of this description. In 1749, Sir Hans Sloane communicated to the Royal Society an account of two pretended stones, said to be found in the head of the cobra di capello. "The first," says he, "I have heard, and also do believe, to be a stone found in the intestines of the rhinoceros, not, that I know, taken notice of by any natural historian except Redi." (*Phil. Trans.*, vol. lxxix., p. 910.) Dr. Waldo, who went to the East Indies on purpose to search after the natural products of that country, sent specimens of the "pietra de serpente de mombazza" to his sister in London, with directions to show them to the Earl of Pembroke, Sir Godfrey Kneller, and Sir Hans Sloane. Among them were some which were by him called "pietra de mombazza," or rhinoceros bezoar, supposed by Sir Hans to be taken from the stomach or guts of that animal. From the description and drawings given by Sir Hans Sloane, these bezoars evidently consisted of the stones of fruit agglutinated together. They were very hard, and were capable of being polished.

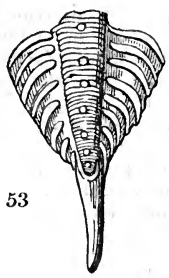
These are the general varieties, but bezoars are occasionally composed of other materials. "La plupart des animaux ruminants de l'Amérique méridionale, tels que les guanacos, les tarugas, les rigognes (llama), sont sujets à porter une pierre connue sous le nom de bezoard occidentale. Quatre onces de ce bezoard traitées avec l'acide vitriolique donnèrent à M. Proust de la sélénite (sulphate of lime), et une once d'acide phosphorique." † (*Annales de Chim.*, vol. ccxcvi.) A. M. Fernandes had also in his cabinet bezoars of the guana lizard. They were light, spongy, and had the appearance of white agaric. (*Annales de Chim.*) The pietra de Goa, or pietra de Malacca, were generally factitious; being composed of bone earth and the concreted bile of some animal. Yours, &c. — *H. I. C. East Bergholt, Jan.* 1831.

A Species of Trilobite. — Sir, The accompanying sketch (*fig.* 53.) is

---

* Fourcroy, Animal Chemistry, vol. iv. p. 16.

† "In most of the ruminating animals of South America, as the guanacos, tarugas, and llamas, is found a stone known by the name of the Occidental bezoar. Four ounces of this bezoar, treated with vitriolic acid, yielded to M. Proust sulphate of lime, and an ounce of phosphoric acid."



53

taken from a small slab of limestone which I obtained from Dudley. It appears to be the caudal termination of a species of trilobite, differing materially from the A'saphus caudàtus in being furnished with a number of rounded processes and very minute transverse lines down the middle lobe. There are two of these specimens upon this slab, rather smaller than the drawing, mixed with fragments of the Calymène variolàris, A. caudàtus, various testacea, and madrepores; but no head or upper portions can be traced, which might lead to an idea of its complete figure. I shall be glad to be informed if this specimen has been before noticed. Yours, &c. — *F. I. Feb.* 5. 1831.

The Atmosphere never dark on a windy Night. — Several years since, when travelling by night in the mail coach, in the depth of winter and during the absence of the moon, I was surprised to observe, that, though dense clouds covered every part of the horizon, and not a single star could be seen, yet the night was far from being dark, and large objects near the road were easily discerned. On expressing my surprise to the driver, he replied, " The wind is very high, and during a great many years that I have been upon the road, I never knew it to be dark on a windy night." The observation was at that time new to me; but subsequent experience has convinced me that it was true. Many plausible explanations might be offered; but I conceive the most rational one would be, to attribute it to the evolution of a small quantity of light from the whole atmosphere by the pressure of the particles of air during a high wind. When atmospheric air is suddenly and violently compressed in a tube, sufficient heat is evolved to ignite combustible substances, and I believe a sensible quantity of light is also given out at the same time; it is, therefore, not unphilosophical to infer that a lower degree of pressure, on an immense mass of air, may evolve a portion of light from each particle, which may collectively afford a low degree of illumination, sufficient to render large objects perceptible in the night. Perhaps some of your correspondents can give you a better explanation of the cause of this phenomenon.

Being for many years an amateur star-gazer, I have invariably observed that, however clear the sky might be, if the stars appeared to swim in the focus of an excellent achromatic object glass, and the more delicate double stars could not be defined, the following day was always more or less rainy.

In the course of the last summer, when the weather for a few days seemed to promise a fine settled state of the atmosphere, I observed about midnight what appeared to be a strong twilight in the north-west, but too luminous to be produced by the refraction of solar light. After observing it for some time, a single ray only rose towards the north, and disappeared. This was sufficient to prove the phenomenon to be the common aurora borealis. The light continued steady for a very long time. The following day the weather changed to rainy, and continued so for many days. The aurora was too near the horizon to be observed in London. It bore a strong resemblance to common twilight.

In December, or the latter end of November, 1821, there was one of the most tremendous thunder storms at Geneva I ever remember to have witnessed: it occurred about four o'clock in the morning. The evening previous the mercury in the barometer fell suddenly lower than it had been observed in that city for forty years. The storm was followed by a general change in the state of the weather, which had been previously fine and mild. — *B. Hampstead, Nov.* 1830.

THE MAGAZINE

OF

NATURAL HISTORY.

JULY, 1831.

ART. I. *Letters, descriptive of a Natural History Tour in North America.* By T. W.

(*Continued from* p. 116.)

Letter 5. *The American Highlands.*

MY dear B. — Rounding Stony Point, we were quickly in prospect of what is called the Entrance of the Highlands. The river becomes narrow and rapid, and winds a singularly twisted and angled course for a distance of sixteen miles, or throughout the whole of this mountainous region. It is hemmed in on both sides by stupendous cliffs, and rocks of magnitude sufficient to stem the weight and fury of an ocean; the bed of the river appearing to be troughed out of the solid stone. It is very deep, and easily floats the largest vessels close to its margins. From the whirls, rapidity, and violent tossings of the stream, its depth in many places cannot be accurately ascertained, but it is supposed to be very considerable. (*fig.* 54.)

Forts Independence, Montgomery, and Clinton, now so dilapidated as scarcely to be distinguished from the crags that surround them, are at the entrance of the Highlands, and at the time of the revolution were posts of very great consequence; they were, therefore, the scenes of many an arduous struggle, and never remained long in the hands of either party. Fort Putnam is two or three miles farther up the river, and is said to have been the strongest fortress on the Hudson; its outer walls were 30 ft. in thickness. It stands on a rock composed principally of feldspar and black schorl, or tourmaline, and is 600 ft. above the level of the water. To prevent the enemy's fleet from ascending the river at the

Highlands, the Americans contrived to throw across its channel a boom and chain.

The Hudson, near Vredideka Hook.

1, Primitive rock, granite. 2, Secondary rock, compact limestone.

The Hudson, more especially about the centre of the High lands, presents some of the most interesting and remarkable scenery perhaps in the world. Nature, it would seem, here made the wilderness of romance her chief delight, and studied to excel in the ruggedness of stupendous cliffs and crags.

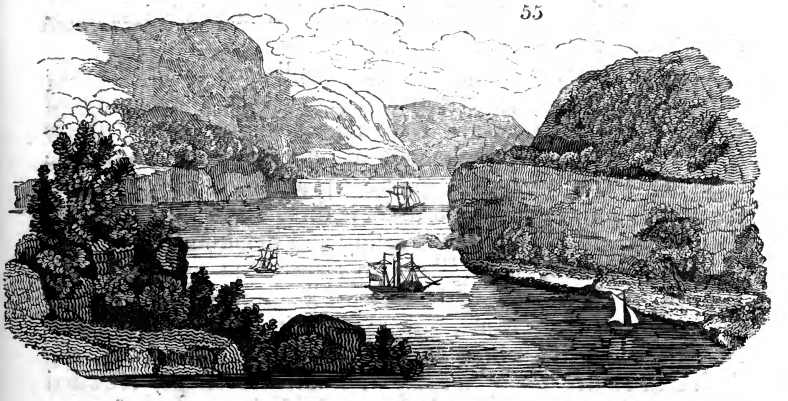
The Jersey, or western, shore of the Hudson, as far as the Highlands, is of secondary formation, and consists principally of limestone, which in some places is of a flinty hardness, in others as soft nearly as the soapstone, and occasionally mixed up with organic remains, such as small bivalve shells, &c., including veins of pyrites and spars of different denominations. The eastern shore of the Hudson, commencing near the city of New York, and taking in the whole range of the Highlands on each side of the river, is of primitive formation, and almost wholly composed of compact granite and gneiss, dipping towards the east, and intermixed in places with mica of various shades, quartz, and mica slate. The mountainous ridges contain bears, wolves, foxes, racoons, wild cats, deer, and rabbits. Birds are not numerous in these forests; the eagle may be frequently seen soaring far above the highest summits. Among serpents, the rattlesnake, the copper-head snake, the hoop snake, and the flat snake infest these " airy

heights," of which, most likely, I shall soon have an opportunity to treat more at length.

West Point is the seat of a military school, and is a place of great notoriety. It is an extensive level, near the termination of the northern slope of the Highlands, and on an elevated angle of the river, of granite formation. Two hundred young gentlemen cadets are instructed at this establishment, not only in soldiership, but in the arts and sciences generally, as well as in various languages and polite literature. In the war of the revolution, the camp of the illustrious Washington was stationed at West Point, when Sir Henry Clinton, the British general, was to have surprised him; and if the plot of Arnold had succeeded, the commander of the American forces, and with him their choicest army, must have fallen into the hands of the English. The scheme failed; Major André was taken prisoner, and forfeited his life. This gallant officer was employed by Clinton to negotiate with Arnold.

At West Point the river is narrow, and difficult of navigation. In its vicinity are the remains of many batteries and entrenchments, where bullets and human bones are yet to be found. Diedrich Knickerbocker (Washington Irving), in his *History of New York*, has laid some of the most amusing scenes in that work in this neighbourhood. Below you have a sketch (*fig.* 55.) of West Point (1), and of the northern slope of the Highlands, looking south.

55



Passing the base of Anthony's Nose, the top of which is about 1600 ft. above the level of the river, and two or three other mountainous elevations of less importance, we were clear of the Highlands. Our prospects were now of another description: instead of enormous crags, and overhanging cliffs, the hissing, foaming, and gushing of waters, the

almost endless towering of mountains and lofty ridges, we had an extended view of apparently a richly cultivated country, pleasingly ornamented with villas and other vestiges of human skill and activity. The river, which is in many places very broad, and studded with small islands, stretched before us about thirty miles in nearly a direct line.

At four P.M. we came up to Newburgh. This flourishing village is distant seventy miles from the city of New York: it is built on a gradual but pretty steep acclivity; and is seen at some distance, and very advantageously, from the river. The Neptune had now finished her voyage, and was hauled alongside of a wooden wharf (wharfs and piers in this country are uniformly constructed of wood). I adjourned to Crawford's, which is a large and somewhat elegant hotel. My old *calculating* companion, who, at least, certainly appeared to consider my welfare and personal comfort as matters of no trifling importance, strongly recommended this house to my notice. He described it as having quite superior accommodation, keeping the best of tables (a first-rate American consideration), and having excellent and wholesome beds, as soft as the softest down. "Besides," he added, "the landlord is a smart, good-natured, and civil fellow, always upon the spot, and alive to the wants and enjoyments of his guests." Here he gave such a recital of the good living, the luxuries, the feasts of turtle-soup and the like, of which he had from time to time partaken at this hotel, that I am sure it would have raised the appetite of an individual of infinitely less notoriety than an alderman.

It was, however, more out of compliment to my friend's wishes than to my gastric propensities, that I was induced to conform to his pleasure in taking up my temporary abode at Crawford's. To be thought an epicure would annoy me most unmercifully; and, therefore, I pray you to bear in mind, that my sojourning at Crawford's is directed by other feelings than those which voluptuous eating and drinking can afford.

The first thing most likely to attract the attention of a stranger at Newburgh is the state of its improvements. Like the machinery of a clock, every part is in motion The number of recently built houses, and those now being built, the dash and rather gaudy display of numerous shops, crowded storages, the continual and almost deafening noise of carts, and the lively, bustling, business-looking faces and quick movements of the inhabitants, considering the size of the place, are quite astonishing. The upper stories of the dwellings are mostly made of wood, and painted white; the lower ones are of stone or brick, and for the greater part are

painted yellow; a style of building that may be singular, but by no means, as they are here finished, inelegant or inconvenient. Windows in great abundance. In this country dwelling-houses are much better supplied with lights than in England. Glass is one half cheaper, and windows, no matter how numerous, are not taxed in America.

Newburgh contains about 2000 inhabitants, is rapidly improving, and promises soon to be one of the largest and most considerable places in commercial importance on the Hudson. Nearly opposite is Fishkill, another large and beautiful village. The river is here about five miles in breadth, and is bounded on each side by much variety of interesting scenery. The trade between this place and the city of New York is very extensive; from ten to fifteen sloops are constantly employed in the transferring of goods between the two ports. It supports two printing establishments, from one of which is issued weekly a newspaper, *The Political Index.* By the spirited and laudable efforts of a few gentlemen, a lyceum has been recently established: although small in stock, and commenced upon very limited resources, it contains some rare and many valuable specimens of minerals, a collection of fossils, dried plants, and relics of Indian handicraft, with a few birds and animals in excellent preservation. I have to acknowledge many obligations which I received from its worthy and talented vice-president.

Strolling into the fields, in the immediate vicinity of Newburgh, one of the first things that particularly took my attention was a large black snake (*Cóluber constrictor*), the first of the kind I had seen. The motions of this snake are much quicker than those of the generality of snakes; it is sometimes found of 7 or 8 ft. in length, and although its bite is not poisonous, it is still an object of great horror with the peasantry of this country, who assert and believe wonderful tales about it. The present one was about 4 ft. long, in bulk well proportioned, and from the middle part gradually tapering to the caudal extremity, until it terminated in a point not more than the twelfth part of an inch in diameter; head rather small; colour, above, a shining iridescent black; sides same, but less intense; below, nearly a pure white, running into a whitish freckle, growing less defined as it approached the tail. The arrangement of the scales was similar to that generally found in the reptile tribe; those of the abdomen, however, I thought, were larger than any I had seen in other snakes of a proportional size; and this fact may account in some degree for the celerity of progressive movement of the

black snake. Teeth closely resembling those of the common fresh-water eel.

If not a convert to the principles of the law, as laid down by Mr. Martin and others, I can respect and venerate feelings that would not wantonly take away the life of any creature, however worthless or insignificant it might appear; yet, as the very purposes and constitution of the brute creation rest upon the doctrine of subserviency, the sacrifice of life is an ordination of necessity, and consequently its justification becomes irrevocably established, leaving choice and inclination quite another thing, these having nothing whatever to do with the regulation of the matter. I killed this snake, that is certain; and I trust the act, associated with the motive, will find favour in your sight.

Snakes are very tenacious of life; in them the vital principle seems to be more independent, or less circumscribed, than in most other animals; they having this property almost in full perfection in every part of the body. Hence the tail of a snake will move for a long time after it has been severed from the body, will shrink from the infliction of pain, and be alike sensible of the least touch. The action of the heart, too, is peculiar; in the present instance I detached it from the body, and placed it upon the ground at some distance, and yet it continued to beat vigorously for several minutes. After it had ceased to move, a slight touch, especially with a sharp-pointed instrument, would again cause it to beat; and this kind of excitement, repeated at intervals for nearly half an hour, produced the same effect — a return of motion, regular contraction and dilatation. The former, I observed, was always the first to grow feeble, and the first to cease to move. On inspecting the contents of the abdomen, eighteen small bodies arranged in a string in close contact, white, soft, and pulpy, resembling bags or cysts of fat, were exposed. These were, no doubt, the eggs of the animal snakes in embryo. In size they varied from that of a small pea to an ordinary playing marble.

In the vicinity of Newburgh is an abundance of bluish clay, immediately below the soil, resting upon a stratum of transition argillite, in which anthracite and occasionally petrifactions are found. This clay supplies the inhabitants with good brick. At a short distance north of this village, limestone, evidently transition, containing numerous organic remains, is procured, which affords, by the usual process, an excellent lime. This rock, the metalliferous limestone of Eaton, sometimes appears above the transition argillite; when it does not, it is generally overlaid by greywacke. The petri-

factions found in it are always of marine origin, and consist chiefly of madreporites, terebratulites, encrinites, anthocephalites, gryphites, belemnites, and trilobites; of some of these there are two or three species, more especially of the last, which not unfrequently occur of a very large size.*

Yours, most sincerely, T. W.

Newburgh, May, 1823.

Letter 6. *Newburgh to Albany.*

My dear B. — I am about to take my departure from this place, and have already engaged my passage for Albany in the sloop Charles. Crawford's, as was represented to me, contains every thing desirable to a stranger; besides excellent tables and accommodations, there are always found some respectable company, groups of well-informed loungers, whose politeness and interesting communications render the time of the sojourner agreeably and profitably spent. Last evening I stepped to the Piazza. This is constantly a retreat for select parties; independently of possessing a most delightful prospect, from its elevation and contiguity to the river, a fine breeze is always present, one of the most exhilarating and desirable things, in a hot climate more especially. The place was nearly crowded with ladies and gentlemen; ladies, handsome of course, dressed very fashionably, and attended by their gallants, were promenading in one part; another and the remaining part was occupied solely by the other sex, many of whom surrounded small tables, which apparently were well stocked from the stores of Bacchus, whiffing cigars, and spitting in all directions. This spitting practice of the Americans is extremely annoying, and I am much surprised at its being so prevalent among the better societies; how they tolerate and indulge so frequently in what is so much at variance with their general character and deportment in other things, I am at a loss to conceive.

Three hours' pleasant sail brought us opposite the *landings* of Poughkeepsie. Poughkeepsie contains 3000 inhabitants, and is in a flourishing condition. It stands pleasantly at a short distance from the eastern shore; and on a fine stream of water, which falls rapidly from the hills, in its course from the

* Since the above was written, a canal, uniting the waters of the Hudson with those of the Delaware in the state of Pennsylvania, has, by immense labour and expense, been completed, and opens a few miles north of Newburgh. This, from the extent and nature of the ground, is a herculean work; but the achievement of great and mighty undertakings is characteristic of the American people.

village to where it empties itself into the Hudson, several mills, principally for the manufacture of flour, are erected.

After passing Poughkeepsie, the traveller meets with little to interest him on this majestic river until he reaches Albany. The country is nearly a level, a great portion of which is appropriated to agricultural purposes, and consequently destitute of that sublime and splendid wildness which always accompanies the scenery of the mountain. Kingston, Esopus, Glasgow, and Caatskill are villages on the western border. These are places of small account to the stranger, yet they contribute no trifling share to the stores of the greatest commercial mart of this country, New York. There is a lyceum at Caatskill, well supported, and, I am informed, upon an extensive scale. The village of Hudson is situated on the eastern bank, thirty miles from Albany, and was a few years ago in possession of the principal trading on this river, monopolising a very extensive commission business. The times have altered, and with them the commercial prosperity of Hudson. Although not now noted as a place of business, it maintains a degree of wealth and influence which none of its more bustling and enterprising neighbours have yet attained. Its lyceum is one of the best in this country, and in it regular courses of lectures on subjects of natural history are constantly given.

We reached Albany about noon of next day. Albany is a city, and the capital of the state of New York. It is built on an irregular descent, and crowded down upon the western shore of the river. It was founded by the Dutch, and for a number of years afterwards contained few inhabitants of any other nation. Some of the houses appear very antique, and are constructed after an old Dutch fashion, of a most grotesque description. The streets are irregular, mostly narrow and crooked; the buildings, too, are destitute of that uniformity of structure so conspicuous in all the principal towns I have seen in this country; for amidst some of the best and most elegant, in the gayest and most fashionable parts of the city, may be found Dutch huts or miserable-looking wooden-framed houses. For these and other singularities Albany is indebted to the taste and unwieldy manners of its ancient inhabitants. State Street is about 500 yards in length, very broad, and consists generally of handsome brick houses, of three and four stories in height. On an elevation, and directly across the upper extremity of State Street, stands the Capitol. The exterior of this building is by no means elegant, or governed by any regular laws of architecture; and, with the exception of the court-room, which is spacious, with mahogany

desks in circular rows, and also appropriately decorated with tapestry and paintings, its interior is confined and inconvenient. The front is the only part which distinguishes it from an ordinary public academy or free grammar school. This consists of a portico, with a pediment supported on four massive white marble pillars of the Corinthian order, and finished in a style creditable to the artist. At the centre of the roof is a plain-looking cupola of wood painted white; on the top is a figure dressed with studied simplicity, intended, no doubt, to personate Justice: but Justice requires no human invention to make her lovely in the eyes of all. The state legislature holds its sessions in this building.

Almost close to the Capitol stands the Albany Academy. This edifice is in an unfinished state; but, when completed, will form a handsome and commodious building, and is to be endowed with all the rights and privileges of a chartered college. It already contains both a lyceum and museum, which promise to become valuable and extensive. From the literary and scientific acquirements of the principal conductor, this academy must soon rise into great celebrity. Here is also an agricultural society, which holds its meetings in one of the apartments in this institution. Albany supports a charity-school also, of about 400 scholars, who are taught upon the plan of Lancaster.

There are three banks in this city, modern and not unhandsome buildings; being made of an inferior white marble, quarried from the transition limestone of this country. As in England, these banks issue money made of paper, without, it is feared, much reference to capital or means of redemption. The natural consequence of such a system is, that bank failures are common, and the country inundated with paper money, and those pests of mankind called money changers.

Your friend, T. W.

Albany, June, 1823.

ART. II. *Rough Notes made during a Pedestrian Tour to the Lakes of Cumberland and Westmoreland, in the Spring of* 1830. By G.

" To a homeless man, who has no spot on this wide world that he can truly call his own, there is a momentary feeling of independence, when, after a weary day's travel, he kicks off his boots, thrusts his feet into slippers, and stretches himself before an inn fire. Let the world without go as it may, let kingdoms rise or fall, so long as he has the wherewithal to pay his bill, he is for the time being the very " monarch of all he surveys ;"

the arm-chair is his throne, the poker his sceptre, and the little parlour of twelve feet square his undisputed empire. It is a morsel of certainty, snatched from the uncertainty of life, it is a sunny moment gleaming out kindly on a cloudy day; and he who has advanced some way on the pilgrimage of existence, knows the importance of husbanding even morsels and moments of enjoyment." — IRVING.

HAVING made arrangements with a gentleman in the north to perform a tour of the lakes, we determined that the George Inn, Penrith, should be our place of rendezvous, where, after thirty-six hours' travelling, I arrived, at 4 A.M., Monday, 17th May, 1830. My friend had been some days in the neighbourhood, and had taken up his abode at our inn the evening before, in anticipation of my arrival. We rose at eight, and immediately after breakfast set off for the residence of the Reverend T. Gibson of Tirrel, at whose house Mr. H. had lately been a guest, and whence we were to commence our pedestrian excursion. The morning was cloudy without rain, and cleared up for a fine day about noon.

The distance from Penrith to Tirrel is about three miles. Crossing Emont Bridge, you take the road following the course of the river to Tirrel, from which there is a pretty view of the Penrith Beacon, peeping with its grey head above the trees with which it is surrounded. Mr. Gibson's house is very pleasantly situated about midway between Penrith and Powley Bridge; and a more eligible and delightful situation for a boys' school is seldom to be seen. We presently commenced the needful preparation, by furnishing our knapsacks and the pockets of our shooting jackets with such articles, and such only, as were likely to be of service to us. Mine consisted of a single change of linen; pair of thin shoes; corked insect-box; bottle for insects; sandwich-box; liquor-flask, &c., with a large oilskin cape fastened under the straps of the knapsack, for use in the event of heavy rain. Mr. H. made much the same provision, with the addition of a portfolio of blotting paper for plants, and a sketch-book; but we both afterwards regretted that we had not also taken a pair of light trousers, which, after a wet day, would have proved a great convenience. Equipped in a shooting-dress, and shod in very thick and strong shoes, with our knapsacks at our backs, we bade adieu to our kind friends, Mr. and Mrs. Gibson, and set off for Ulswater. The road from Tirrel to Powley is uneven and varied, whilst the banks on each side of it are, at this season of the year, adorned with a profusion of wild flowers, amongst which are primrose and scentless vetch in great abundance.

The little chapel at which Mr. Gibson officiates stands on the right-hand side of the lane, at no great distance from his

pretty residence; and before you arrive at it, on the same side, you pass a white building, which was probably intended for a barn, but which is now appropriated to the purpose of a quakers' meeting-house; here we found the nest of the willow wren (Sýlvia *Tróchilus*) containing five eggs, which are white, beautifully spotted with pink; the nest is composed of moss and grass lined with feathers, and was snugly constructed in the bank by the lane side.

We did not obtain a sight of Ulswater until within a very short distance of the lake. Passing through Powley, which consists of about a dozen houses (one occupied as an inn, and another by a surgeon), we crossed the bridge at the extremity of the lake, and took the road winding along the western margin of it, at the foot of a range of mountains, beautifully wooded with pine and other forest trees.

The finding ourselves really on that spot which we had so long hoped to see, and the knowledge that we were actually pursuing a path which we had years before pencilled out upon our map, and often trod over in anticipation by a Christmas fire, produced feelings which it would be equally impossible to describe or to forget; and to attempt even the most distant description of the scenery would be undertaking a task which I feel my thorough incompetency to perform; indeed, the views all along the lake are exceedingly picturesque; and the brightness of the day, throwing the mountains into light and shade, added not a little to the beauty of the picture. Mr. Green, in his *Guide to the Lakes*, informs us, that Ulswater is in the shape of a Z; but I could find so little affinity between Ulswater and that letter, that I am induced to suppose that Mr. Green and myself have not been taught by the same writing-master. Following the second turn of the lake, or rather the down-stroke of the Z, you presently reach Gowbarrow Park, the property of the Duke of Norfolk. On entering the park we were particularly struck and pleased with an old oak, from the broken trunk of which, about 6 ft. from the ground, grew a large bough of sycamore: the seed of it had in all probability been deposited there by some of the feathered race, at a distant period of time. I made a sketch of it; and we were afterwards informed that these parasitical branches are by no means unfrequently to be met with in Cumberland.

Gowbarrow Park is situated at the foot of a hill, and appears to be well stocked with deer. About the centre of it, on a gently rising eminence, is Liulph's Tower, a stone building, having all the appearance of antiquity, with its decayed wooden sentry-boxes standing outside its walls, and a

bloodhound chained at the gate. It is, however, a modern building, and was erected by the late duke for a shooting-box.

Arriving at the third bend of the lake, you come in full view of the Place Fells, a range of high and barren mountains, which descend quite into the water on the eastern side of the lake. Mr. Marshall, M.P. for Yorkshire, has a mansion delightfully situated here, and so also has his son still nearer Patterdale.

About seven o'clock P.M. we arrived at the King's Arms Inn, Patterdale, having walked fourteen miles, with little or no fatigue. After refreshing ourselves with a cup of tea, and changing our heavy shoes for the others that we had provided, we were quite inclined to explore some of the everlasting hills with which we were surrounded.

Running through Patterdale is a little stream from the lake, called Coldrick Beck, and over it a rustic stone bridge, by crossing which we soon ascended above the slate quarries, in the side of Place Fell, in the fond hope of obtaining a view of Helvellyn, which we purposed ascending on the morrow; but the tops of the mountains were so cloudcapt that it was impossible accurately to distinguish it. On the grassy side of this mountain we found the nest of the titlark; it was composed of moss, the interior being lined with fine grass, and contained four small eggs, darkly freckled with brown: leaving the eggs for the pretty bird, which was anxiously fluttering about us, we returned to our little inn about nine o'clock, much delighted with our first day's excursion.

* * * * *

King's Arms, Patterdale, Tuesday, May 18. 1830.

Disappointments commenced. We retired to rest last night in full purpose of heart to ascend Helvellyn this morning on the eastern side, and then to make a descent towards Keswick. Our friends had laughed at our intention of climbing the mountain on the Patterdale side at all, and the villagers recommended us not to attempt it without a guide; but, like young and sanguine travellers, we now set the opinions of friends at defiance, hoping to have the laugh on our side by accomplishing this deemed impossibility. Having therefore heartily broke fast, replenished our sandwich-boxes and spirit flask, we a second time mounted our knapsacks, and set off in quest of adventures; but alas! our preparations were useless, for we were not to "climb the dark brow of the mighty Helvellyn" to-day; the pass, by which alone we could reach Helvellyn and the intermediate mountains, was so com-

pletely enveloped in clouds, that it would have been rashness to have proceeded; and, though we were not inclined to be frightened by little difficulties, we were not quite such fools as to encounter certain destruction. After descending again from the mountain fog, we made for a pretty cascade, at a short distance from our inn, that was falling from rock to rock in the most romantic manner. This waterfall, which feeds a trout stream that empties itself into the lake, is completely overhung with trees; and, in scrambling from one promontory of this rock to another, we got thoroughly drenched by the thick foliage above us, which had condensed the vapour from the mountains. The force of the water, which has doubtless fallen for many centuries, has here and there formed natural tanks in the rock; and the clearness of the stream enabled us to see that many of them were several yards deep.

The whole village of Patterdale does not consist of more than a dozen houses; and, as it has no communication with any market, its resources as to provisions are completely within itself. In the winter it sometimes happens that the only road by which there is access to this spot is for several months rendered quite impassable by the drifted snow. Then it is that Patterdale is a microcosm of itself; Ulswater supplying the villagers with fish, and their little farms with more substantial animal food; whilst those who are not *so well to do* subsist principally on aver cake and bacon: but even in this humble village of Patterdale you will find, in the neatly white-washed inn of Mrs. Dobson, a pianoforte for the amusement of her fair summer visitors, who, from the album in which travellers enter their names, appear to be very numerous. At the inn, also, is an old oaken chest, which, from its spacious dimensions, and the work carved in relief upon it, brought instantly to my mind the beautiful lines by Rogers on "Genevra."

The King's Arms is very pleasantly situated, about a quarter of a mile from the lake, which lies directly before it; behind and on each side of it are very high mountains. It is a most comfortable inn; and here you may depend upon meeting not only with the greatest civility, but with the most comfortable and reasonable accommodation.

We had eventually no occasion to regret our disappointment as regards Helvellyn, as it enabled us to reconnoitre the more immediate vicinity of this truly delightful dale. The chapel of St. Patrick, or village church, is situate between the inn and the head of the lake, and forms a picturesque object in the distance. In this churchyard the humble villagers of many generations have found a last resting-place,

with no other monuments than the green clods of the valley. In the building is no room for the squabbles of a select vestry; the surplice of the clergyman lay on the reading-desk or pulpit, upon which was laid a well-read church bible, covered with brown paper.

The most remarkable feature of the churchyard is a very old yew tree, with hollow trunk, which is figured by Mr. Green, and of which I also made a sketch. On the summit of three or four moss-covered steps, from the crevices of which grow in profusion a beautiful little geranium (*G. Robertiànum*), then in full bloom, is a stone pillar, surmounted with a brass sundial intended to supply the place of a village clock. On the other side of the lane, and nearly opposite the little cemetery, is the parsonage house, a small stone building; whilst hard by is a curious erection, composed of uncemented stones, appropriated to the use of the parish schoolmaster. We saw this flourisher of the village birch, and there certainly was much more of the rural than the classical about his outer man.

This afternoon we gained the summit of the mountain behind our inn, from which, on a clear day, there must be a commanding prospect; but, as it was, we saw little else than that the summits of the surrounding mountains were enveloped in clouds. Here we could not help remarking the beautiful variety of the mosses and lichens vegetating from the rocks on this mountain. Before tea we strolled along the bank of the lake, gathering many of the beautiful wild flowers that we met with, including three species of geranium, of which there was a great quantity growing out of the rock. Here, also, we had a sight of that beautiful bird the pied fly-catcher (Muscícapa luctuòsa *Temm.*): it is most plentiful in the mountainous districts of Cumberland, and is often shot in the woods at Lowther. The curious voice of that "delightful visitant," the cuckoo, was to be heard almost every hour of the day; and their being so numerous in Cumberland and Westmoreland may probably be in some measure accounted for by an immense number of titlarks inhabiting such of the mountains as are covered with vegetation. It is in the nest of the titlark that this unnatural mother deposits her egg.

We frequently saw the delicate sandpiper skimming over the surface of the lake, or strutting in the shallow water on its edge.

The extreme length of Ulswater is about nine miles; and we were informed by a gentleman angling in the lake, that in some parts it is 130 fathoms deep. It abounds with fish, particularly trout, and a small species of char: wild ducks are very plentiful upon it. G.

ART. III. *Remarks on the recent Mode of publishing the Numbers of Stephens's "Illustrations of British Entomology."* By A. H. DAVIS, F.L.S.

Sir,

THE task of a public accuser is by no means an enviable one; and it is only by regarding it as a duty, that I have as an original subscriber to Mr. Stephens's work, come forward to expose the unexampled line of conduct pursued in its publication. I disclaim any personal feeling towards the author, for whose efforts and talents as an entomologist I have high respect: my observations in the present case relate only to the publication of his work.

On the first appearance of this periodical (on the 1st of May, 1827), it was announced at 3*s.* 6*d.* per number, and was to be completed in sixteen years. It appeared regularly till the conclusion of the first volumes of each sub-class; but previously to commencing the second volumes, the price was raised to 5*s.*, to enable the author to give a larger quantity of letterpress, while the work was to be completed in 135 numbers, and in ten years.*

At this period commenced those irregularities in the publication which have produced so much mystification, as to render it extremely difficult to arrive at any satisfactory conclusion as to the relative situation of the author and his subscribers. A slight delay which occurred with Nos. xv. and xvi. was attempted to be atoned for by another pledge (being the third alteration) to complete the work in 120 numbers. Owing to these irregularities, the second volumes were not completed until the 1st of July, 1829, instead of the 1st of May; and on the wrapper of No. xxviii., which appeared on that day, a farther proposal was announced: it was this — to reduce the coloured figures, and increase the letterpress; a promise was given that each number should contain alternately a plate with six figures, and thirty-two pages of letterpress, and a plate with three figures, and sixty-four pages: the advantage to be derived being the completion of the work in 87 numbers instead of 135, and the cessation of the author's labours in five years; and the cost, at least, two thirds less than originally proposed.† His renewed engage-

* How this was to be accomplished was not so evident. Mr. Stephens proposed to describe all known British species, amounting, according to his own catalogue, to above 10,000. He professed to describe 800 annually: now, 800 × 10 gives only 8000, leaving 2000 species undescribed, without allowing for new discoveries, which he elsewhere estimates at one tenth.

† The fallacy of all this would admit of exposure. Four years have now been consumed, and the author has described less than 2500 species: at the same rate of proceeding, sixteen years will be required to describe 10,000.

ment, then, binds him to furnish annually six plates of six figures each, with twelve sheets of letterpress; and six plates of three figures each, with twenty-four sheets of letterpress.

Irregularity and apology, and irregularity without apology, have been the order of the day ever since this number; until the confusion arising from it seems as inextricable as any man wishing to puzzle his subscribers could possibly desire. I have taken no small pains to go through the whole series of promises, pledges, alterations, explanations, evasions, and attempts, rather too undisguised, to persuade his supporters that the author has exceeded his engagements. I wish to deal only with facts, and I believe the result of my labours to be correct. As I conceive an exposure of the system which has been pursued would be of real advantage to science, you will excuse my going a little into detail.

On No. xxx., which was published 30th September, 1829, is this address: —

"Uncontrollable circumstances having unexpectedly occurred to prevent the author from devoting his attention to his MSS. during the past two months, he has been compelled to publish the present number without its due allowance of letterpress: in order, however, not to disappoint his subscribers by any further delay, it has been thought advisable to bring out the sheet of descriptions required to complete No. xxviii., and with it two plates containing nine figures (the latter being equivalent to an ordinary number). But as this plan rather interferes with the usual arrangement, No. xxxi. will contain six sheets of letterpress, without any plate; and will be published on the 30th of November, and the succeeding numbers on the last day of the ensuing months respectively, until the author is enabled to regain the lost month, which he hopes to accomplish before the conclusion of the present volume."

Let us see how these pledges are redeemed. No. xxxi. does not come out till the 31st of January, four months being lost; and instead of containing six sheets, the author, with singular modesty, puts forth one plate of three figures, and a single sheet of paper, with the usual *moderate* charge of *5s.* No apology is offered for the disappointment of his subscribers, but a tirade about "uncontrollable circumstances," and so on, with a promise to make good his deficiencies in No. xxxii., which was to appear on the 31st of March (*losing another month!*); and that No. xxxiii. would appear on the 1st of May, and the succeeding numbers regularly.

Did No. xxxii. appear on the 31st of March? Oh no! it bears date the 1st of May; and contained no plate, and only two sheets of letterpress, again charged *5s.*: *five shillings* for two sheets of printed paper, value, on a liberal scale, even of allowance for the author's labours, not exceeding *1s. 6d.*! An address states the usual story of "uncontrollable causes;" which, he assures us, are of "no immediate interest to his subscribers." The

causes, certainly, may not, but the effects most indisputably affect their pockets. Instead of the deficiency being at once given, it is now to be "made good during the progress of the volume" (volumes?); which are not both complete to this day, although they ought to have been so on the very day this address was dated. It was now stated that the work would be completed in *eighty-one* numbers. By a careful examination, I find the author was at that period at least five and a half sheets in arrear.

No. xxxiii. appeared on the 1st of June, *without a plate*, with three sheets of letterpress: the omission of a plate being accounted for from "the late period at which the author resumed his labours."

No. xxxiv., dated July 1., contained *no plate*, and only two sheets of paper, price *five shillings;* but No. xxxv. was to "contain two plates, and five sheets of letterpress."

On the 1st of August comes out No. xxxv. *part* i., a single sheet of printed paper, worth 9*d.*, charged 2*s.* 6*d.*, and another statement of an "unexpected circumstance," &c.

No. xxxv. part ii. is dated August 15. (but did not, I believe, appear till the 31st), and contained two plates of three figures each and four sheets; and it was stated that "the remaining portion, promised on the 1st of July last, is now published." Of course, any person taking all upon trust would suppose we were now all right; but, in truth, the author was then in debt to his subscribers one plate of three figures, two plates of six figures, and three and a half sheets of letterpress.

In each of the succeeding numbers, to the 30th of November, there was a deficiency of letterpress, and none of the portion due on the 1st of August was made up.

The following extract is from the wrapper of No. xxxviii., dated Nov. 30. 1830: —

> "The author having been prevented, by a severe domestic affliction, from superintending more than the accompanying quantity of letterpress [one sheet only!] in time for publication on this day, begs to inform his subscribers that No. xxxix. will contain the full supply thereof, and the figures required to complete the third volume of each sub-class, agreeably to the proposals on the wrapper of No. xxviii.; and that No. xl. (to be published in January next) will commence the fourth volume."

Thoroughly sick of this dilatory course of proceeding, I resolved on completing the third volumes of each sub-class, and then to discontinue the work. I cannot help suspecting that the author had some strong misgivings that many persons would entertain a similar design; and was, therefore, led to adopt a course which, however it may be consistent with the policy of a certain class of booksellers, is at least discredit-

able to any man professing to be actuated by honourable principles, and influenced by a regard for his reputation. This course has been, to publish the back portions of vols. iii. which are due, to subscribers without farther charge, in connection with the numbers of the fourth volumes, in direct violation of the pledge above given. On the 31st of December last, No. xxxix. was published; but instead of containing, as promised, the "full supply" of letterpress, and "the figures required to complete the third volumes," it had no plate at all, and only four sheets. A poor subterfuge for the omission of plate 19. of six figures is made, arising from the colourer having spoiled the entire impression; but

"It, with plate 32. of Haustellàta, and the letterpress required to complete the third volumes of the work, will be presented *gratis* to subscribers when ready, which will be as speedily as possible, without interfering with the regular publication of the work."

Here we perceive at once on what a shallow foundation the author builds his promises. In November, the whole letterpress and plates in arrear are to be given in No. xxxix.; but on the 31st of December he finds it convenient to say, "as speedily as possible;" promises it *gratis*, which, according to all reasonable acceptation of the term, means, that it can be obtained without proceeding with the next volumes: in proof of which, he states it will not "interfere with the regular publication." Let us see how these renewed engagements are kept. On the 31st of January appeared part xl., which, in utter defiance of all honour, contained one plate of three figures, and a sheet of the fourth volume; and one plate of six figures, with four and a half sheets of letterpress, completing one only of the third volumes: for this part there is the usual charge. The author has the unblushing confidence to append a note to this effect: — "The conclusion of the Haustellàta will *shortly appear*." Be it remembered, a portion of the work promised on the 31st of December, and due long before! Thus the subscriber is compelled to go on again, and buy as many numbers as it may please Mr. Stephens, in his cupidity, to force upon him. That I do not apply too strong terms is pretty evident from the next number having been published on the 28th of February, and containing all new matter, although still less than the stiputed portion. The design of leading on the subscriber is clearly shown in a note, which states that "the conclusion of the third volume of Haustellàta will, if possible, appear with the next number;" but, to the shame of the author, No. xlii. also appeared with matter entirely connected with the new volumes: after promising in November to complete the "full

supply" in December; in December, to deliver it *gratis;* in January, that it "will shortly appear;" in February, that "if possible in March;" now, on the 31st of March, the author gravely says, "It *will appear* with No. xliii.," placing his assurance in italics.

In spite, however, of this confident assertion, No. xliii. appeared on the 30th of April, with a plate of six figures and one sheet belonging to the fourth volume, and only two sheets of the promised letterpress to complete the third volume of Haustellàta, accompanied by the following modest address: —

"A misunderstanding having occurred [with whom ?] with regard to the time of publication of plate 21. of Mandibulàta, and plate 32. of Haustellàta (intended for the present number), which was not discovered till too late to rectify by the 30th inst., the former will be added to No. xliv., and the latter to the conclusion of the third volume of Haustellàta, which will appear by the close of the ensuing month.

"*** The author takes this opportunity of stating, that the matter in arrear will be published as speedily as is consistent with accuracy; the delay having enabled him to embody the more recent observations of Continental writers, and the discoveries of new species, in their respective locations." [A plea on which the work might well be delayed for twenty years.]

This final master-stroke of policy determined me on stating to you this intolerable grievance; and I ask whether any thing more characterised by chicanery can possibly be conceived than the whole affair since December last. I have been compelled to go on; and have already paid 20*s.*, and am, it appears, to pay 5*s.* more, for that to which I am honestly entitled without paying one farthing. According to my calculation, relying on the proposals made on No. xxviii., the author is still indebted to his supporters two plates of six figures each (although, in the index to the volume, I see he allows only four), and at least three more sheets of letterpress.

As to the fourth volumes now in progress, they are at this day in arrear one plate of six figures and six sheets of letterpress.

It would be impossible to find in the annals of periodical publications, with which I am pretty conversant, any instance of manœuvring at all approaching this. An author is obviously bound to adhere to his part of a contract, or act so that his subscribers may withdraw their support, without being forced to unnecessary expense for that purpose. But Mr. Stephens makes no less than five deviations from his original plan, and debars his supporters from their undoubted privilege. I am not singular in the view I take of the course pursued by the author. His broken promises and violated pledges, and the paltry advantages he has taken, have excited

in numerous instances a feeling of indignation, of which that gentleman may be in ignorance. Should Mr. Stephens keep his promise on his last wrapper (which, from past experience, I much doubt)*, the third volumes of the work will be completed just *thirteen months* later than the time originally promised. Were it not for the tame submission of the public to such impositions as these, we should have fewer of them: and if this attempt to expose the system be of any advantage, my purpose will be gained.

I am, Sir, yours, &c.

May 26. 1831. A. H. Davis.

Art. IV. *An Attempt to explain the principal Phenomena of Geology and Physical Geography, by the Precession of the Equinoxes and the Earth's Figure as an oblate Spheroid.* Presented to the Geological Society of London by the Author, Sir John Byerley, Member of several learned Societies.

Gentlemen,

If we take a survey of the present state of the sciences of geology and physical geography, we shall find that there is scarcely a single phenomenon that is not the subject of conflicting hypothesis; even the rainbow has found an advocate to bend it to the text of Moses.

Such, indeed, is the unsettled state of opinion, that, from the same data, one party infers our globe to have had an igneous and another an aqueous origin. They will both, perhaps, bestow the smile of pity on a theory which supposes the earth in its origin to have been, in all essential points, the same as at present, and simply modified through the succession of ages in its surface, to a certain depth, by the action of constant astronomical causes.

Such, however, gentlemen, is the doctrine I have the honour to submit to your consideration. I have recourse to no hypothesis for its support: the only data on which the whole system is founded are two facts, established by universal consent: the precession of the equinoxes, and the figure of

* The fact has supported my doubt. No. 44., which appeared on the 1st instant, *does not complete Haustellàta;* but, as if the author were resolved on trying how far he could impose on his supporters, although the *whole of the number* (with the exception of a plate) belongs to the back volumes, and ought to have been delivered gratis, it is as usual charged five shillings. It remains to be seen, through how many more numbers this third volume of Haustellàta is to be scattered.

the earth as an oblate spheroid. To illustrate the theory, I have taken the liberty to present you a globe, and an instrument which shows the flattening of the poles by the centrifugal force.

Sir Richard Phillips appears to be the first who conceived the idea of great physical changes on the globe arising from the precession of the equinoxes *: but to M. Guesney, an advocate of Coutances in Normandy, is due the merit of developing and applying the theory.† The globe before you is his invention; and had he studied physics instead of the law, he would not have coupled a sublime discovery with one of the wildest theories of the universe ever produced, nor have confined the application of his theory to the phenomena of the deluge and magnetic needle.

Baron Cuvier has already passed in review‡ and rejected the precession of the equinoxes, as being totally inadequate to explain the grand cataclysm which is erroneously called the universal deluge. The authority of so great a name justly inspired me with a diffidence of the truth of the new theory: I accordingly adopted the excellent method laid down by your learned secretary, in his *Principles of Geology*. I diligently collected every fact from observation and the best authorities; and I had the satisfaction of finding, that, however isolated, or to whatever order they appertained, our little geological globe invariably offered a simple and elegant solution.

It is, therefore, with confidence that I submit to you, gentlemen, a rapid sketch of my researches, in which you will find that imagination has no part.

"The pole of the earth," says M. Cuvier, "moves in a circle round the pole of the ecliptic."§ Can you conceive, gentlemen, that for 2000 years astronomers have resembled the one in the fable of La Fontaine; they have been so occupied with the heavens, that they have paid no attention to what was passing on the earth? They never considered that the ecliptic, instead of being an imaginary line, to be traced at pleasure on the terrestrial globe, provided it cut the equator at an angle of 23° 28′, is a real circle, and can only be placed in one position, to be in harmony with the annual motion which it is intended to represent: and as every circle must have a centre, the ecliptic necessarily ought to have one too; especially as it

* Proximate Causes of the Material Phenomena of the Universe, 1821.

† Mouvement Héliaque. Paris, 1824.

‡ Discours sur les Révolutions de la Surface du Globe. Paris, 1822—1830.

§ Discours, &c., p. 42. 6th edit. 1830.

is round this centre that the pole of the equator turns on a radius of 23° 28′, performing its revolution, according to Delambre, in 25,920 years.

It may be proper to notice here an objection of the French astronomers, founded on an observation of the illustrious De la Place. In his *Exposition of the System of the World**, he states: — "All the researches I have made on the displacing of the poles of rotation on the surface of the earth prove to me that it is insensible."

It is difficult to account for such a conclusion, after the admission that the poles of rotation revolve in the circumference of a circle† of 2816 geographical miles in diameter. Our globe seems to offer the only solution possible. M. de la Place had found from observation, that, during the space of 2000 years, the length of the day had but very slightly varied; and thence he probably conjectured the immobility of the pole.

If M. de la Place had had our globe before him, he would have found that we, in western Europe, are situated near the first meridian, on the colure of the winter solstice, which passes through the poles of the ecliptic and the equator.

The pole of the equator is now at nearly its greatest distance from us: it has moved through 30 degrees in 2160 years, which is about the commencement of the astronomical observations on which any reliance can be placed. Its motion, as it regards us, is therefore nearly due west; and M. de la Place appears to have been led into the error from the versed sine of the arc being so small, that, for the last 2000 years, none of the great phenomena arising from the change of position of the pole could possibly affect the portion of the globe we inhabit. The great changes in the northern hemisphere have, during this period, been confined to Russia and North America, the history of which is confined to a few centuries.

It would, therefore, seem that M. de la Place has mistaken the versed sine of the arc of 30° for the real approach of the ecliptic to the equator.

The first point, therefore, is to determine the position of the pole of the ecliptic. M. Guesney has supposed it to be placed in the magnetic meridian passing through the island of Ferro, at the distance of 23° 28′ from the pole of the equator, or in the polar circle at the back of Iceland; and geological phenomena prove that he is very near the truth.

From this point, then, and its antipodes, I have traced the

* Exposition du Système du Monde, p. 277. † Ibid., p. 95.

usual circles of the sphere in *red ink*, to distinguish the system of the ecliptic from that of the equator. It is from these few circles that I propose to explain the principal phenomena of geology and physical geography.

If we now look at our globe, we shall find that the solstitial colures divide the two great continents; all is ocean in their lines from pole to pole, if we except a small portion in the vicinity of Kamtschatka; and this, we may observe, is the natural effect of the earth's motion in its orbit on those poles.

We next discover that the magnetic needle points to the pole of the ecliptic, and also that its dip corresponds with the altitude of that pole; and we can hence explain why the dip varies in different places situated in the same parallel of latitude. We shall see in the sequel why the magnetic pole is in the immediate vicinity of that of the ecliptic.

As the pole of the equator performs half its revolution in 12,960 years, the present place of the pole will in that time be in the latitude of 43° 4′, or that of the south of France; and we find from the globe that at one period —

Kamtschatka is in lat. 56° 30′;		at another in lat.	9° 34′
Tobolsk -	- 77	—	30
Waigatz Straits	90	—	43 4
Nova Zembla	- 90	—	43 4
Bordeaux and Lyons	90	—	43 4
Ural Mountains	- 83 28	—	36 32
Pekin -	- 42 32	—	0 32
Bagdat -	- 63 28	—	6 32
Quebec -	- 80	—	33 30
Algiers -	- 81	—	35 4

We perceive that the Ural Mountains, in which such precious mines have been discovered, were formerly in the latitude of Mexico; and it is a curious coincidence that the Baron de Humboldt, on his visit to the Ural Mountains, was so struck with the similarity of their physical structure to those of Mexico, that he suggested a search for diamonds, which was crowned with the success he anticipated.

We can now satisfactorily account for the remains of tropical animals being found in the polar regions, and why the same fossils are found in the higher latitudes of the two continents *, and not in the equatorial regions.

The next subject to which I shall solicit your attention is the deluge. As nearly all within the polar circle is ocean, on whatever point the pole of the equator may be, a circle round

* By the globe we find that all these countries are nearly in the same degrees of ecliptical latitude.

it of 2800 miles in diameter will be submerged, buried under the Frozen Ocean; and the extreme slowness of the motion of the pole, which takes nearly 1000 years to traverse France, will cause the duration of the deluge on any one spot to be nearly 4000 years: the question is not, therefore, at what time the deluge took place (for it is now in operation), but at what period it took place in a given spot.

On examining our globe, we shall find that, 8280 years since, Grand Cairo was in the first meridian *, and in lat. 67°, or within the polar circle. That epoch we may therefore consider as the middle period of the deluge; and, from the configuration of the earth's surface in those parts, we may fairly assume that the waters did not retire until the pole had moved to Warsaw, or 1700 years afterwards, which brings the end of the deluge down to 6580 years. I am ashamed to have kept father Noah and his animals nearly 4000 years in the ark; but it is the fault of the pole of the equator, and not mine.

Baron Cuvier has filled nearly half his volume on the revolutions of the globe, with a dissertation to refute the pretensions of the Egyptians and Chaldeans to a high antiquity. By our globe the question is decided at the first glance. Egypt and Chaldea, about 6000 or 7000 years since, had been buried in the waters of the pole for perhaps 4000 years; which, I think, must be considered as fatal to the pretensions of the Egyptian priests and their chronology. Indeed, if we wanted any positive proof of the imposture of these "sages," we shall find it in the story they told Herodotus of the sun having at two periods in their annals risen in the west. It is evident, from a simple inspection of the globe, that at no period of time could this happen.†

Before we quit Egypt, we will attempt to solve by our globe a curious point of chronology, the period of the construction of the pyramids.

The late M. Nouet, astronomer to the expedition of Egypt, found, from the most careful observations, that they were placed due north and south, declining to the west only 19′ 58″. Now, we learn from Proclus, in his Hypotyposes, or representation of astronomical hypotheses, that even in his time the learned knew of no other method of tracing a meridian than the inexact one now in common use for fixing sundials; and as 19′ 58″ are little more than one minute of time, it proves

* By first meridian is to be understood the parallel of longitude which intersects the two poles.

† If we regard the tradition as correct in point of fact, we may be led to suppose that the Egyptians are a colony from Abyssinia.

that the architect traced the meridian as correctly as his imperfect means permitted.

If we now examine the globe to find at what period the meridian at Cairo was precisely in the same direction as at present, we shall perceive that the parallel of longitude, or in other words the meridian, intersects the polar circle at 82° 30′ from the pole, or 5940 years since, and 640 years after the period we have supposed, of the final retreat of the waters of the pole; the tradition of which being so recent, the pyramids were probably erected to preserve the remains of royalty from the ravages of a future deluge. By the same method we find that the tower of Belus at Babylon was built 4680 years since.

We have seen that the pole of the equator passes in its revolution directly over Lyons: at that period Kamtschatka will be distant only a few degrees from the equator; the Isle of Skye will be due south of London, and Alderman Jones's Sound in the latitude of Lyons; and there can be little doubt that then Asiatic Russia and North America will form one continent, as Icy Cape will be in lat. 26° 30′; Inverness-shire will probably be then the Spitzbergen of the globe, and Ben Nevis the Black Point Mountain of the island.*

Our globe seems also satisfactorily to account why the debris of the Alps are found in Lombardy; those of the Jura, across the Lake of Geneva; those of Scandinavia, on the other side of the Baltic; and those of England, drifted from north-west to south-east; such being the line of direction of the waters of the pole: and future observations will probably prove that the debris of Judea and Arabia Petræa are from the Anti-Libanus and the mountains which stretch along the coast of the Red Sea.

That great naturalist, Baron Cuvier, whose work on fossil remains is a stupendous monument of genius and application, declares, in the most decided manner, that this motion of the pole of the equator can account for no natural phenomena: "the revolution," says he, "was sudden, instantaneous; and no slow motion can produce a sudden effect."

Happily we have no popes in science, and are, therefore, not bound to believe in the infallibility even of the greatest authorities: we bow to them with respect, but must have a reason for our faith.

Let us suppose the waters of the pole advancing against the chain of the Alps; it is a matter of little importance whe-

* In the table of the heights of the mountains of the globe, Ben Nevis follows immediately after Black Point, it being only 50 yards lower.

ther the mass of ocean gains their summits in 1000 hours or 1000 years; it at length breaks over them, at perhaps a maximum depth of 2 miles, and in breadth extending the length of the chain. Such a column of water is surely sufficient to break off fragments of 50,000 tons, and transport them to great distances, even heaving them to the summit of a distant mountain.

M. Cuvier attributes, I humbly conceive erroneously, to two distinct events, the evidence of violent convulsion, and the state of perfect repose, discoverable in the beds of fossil remains. This distinction, we find, holds between terrestrial and marine deposits. According to our theory the fact could not be otherwise. Land animals were destroyed by the influx of the waters, and borne along by the currents in chaotic disorder, until they were deposited in caverns, generally on the western sides of mountains, or in plains, where the subsidence of the waters suffered them to remain. It is probably from this cause that we find in the same place the remains of animals of such different natures, from the great mastodon to the hyena, and down to the water rat, including even those of different climates. Dr. Young informs us that the tides on the British coasts move 50 miles an hour, and in open seas with still greater velocity; and this will perhaps explain, what M. Cuvier considers as the most difficult problem of geology, why some animals have been found with the skin and hair on, without the extreme hypothesis of an instantaneous change of temperature from that of the torrid to that of the frigid zone.

As to the marine deposits, they were formed at the bottom of the ocean, where they had accumulated for 4000 years; which accounts for their immense mass in the Jura and other places. The ocean retired, and left them dry; hence their state of perfect repose and evenness of surface.

Many other phenomena may be also explained by inspection, which it is unnecessary here to enumerate.

The Magnetic Fluid. — I have already observed that the magnetic needle points to the pole of the ecliptic, and that its dip is nearly equal to the altitude of that pole; it must not, however, be supposed that the magnetic pole and that of the ecliptic are the same, though, as I hope to prove, very near each other.

It is a generally received opinion that the magnetic fluid resides in the earth, and flows from the equator to the poles; but even conjecture is silent as to the cause of such an effect. May I be permitted to aver an opinion directly the reverse, and attempt to show that the magnetic or electric fluid resides in planetary space, and flows from the poles to the

equator? Many recent experiments tend to favour the former; and those of Messrs. Humboldt, Parry, &c., confirm the latter, by proving the increased intensity of the magnetic fluid in approaching the pole; and it will probably be found to agree with Newton's law, and be as the square of the distances. I conceive it to be concentrated at the pole by the combined diurnal and annual motions of our planet; the same as electricity is concentrated and developed by the rapid rotation of the plate in the electrical machine; and the current forced to the equator, in the same manner as the polar currents, which I attribute to the same combined motions.

Now, if we consider that a point, even on the equator, moves only by the rotatory motion at the rate of 24,856 miles in 24 hours, and that in the same space of time the planet itself moves through 1,610,709 miles in its annual course, we find these forces are nearly as 67 to 1; and by the law of the composition of forces we find that the magnetic pole is not farther distant than 22 miles from that of the ecliptic.

If it be asked, how are we on this system to account for the variation of the compass, which in various instances departs from the general law? this, I conceive, may be done, on considering that the interposition of any mountain, or even stupendous iceberg, in the immediate vicinity of the magnetic pole, will necessarily cause a deflection of the fluid, as we know is the case with chains of mountains in the lower latitudes.

The last point to which, gentlemen, I have to solicit your attention, is an entirely new theory of earthquakes and volcanoes.

Our planet being flattened at the poles, and enlarged at the equator, by the diurnal rotation of the pole; if the equator remained stationary, there would probably be few either earthquakes or volcanoes; but the pole moving at the rate of nearly 600 yards per annum, every part of a line of surface of 2816 miles becomes in succession in the equator. Hence we have a constant astronomical cause, raising one part and depressing another, so that the whole surface of the globe is in a constant state of commotion: veins, faults, and caverns will be necessarily created, especially where rocks intervene. This will afford room for the developement of the subterranean gases; and consequently, if earthquakes ought to excite our wonder, it is that they are not more frequent.

I have, gentlemen, to solicit your indulgence for this crude essay, and beg you to consider it merely as materials for thinking. I have studiously avoided developing the theories it contains, not to fatigue your patience; but, should you

deign to receive it favourably, I shall finish the work I have in hand, wherein I show that the phenomena of our globe appear invariably to accord with the theory.

I have the honour to be,
Gentlemen,
Your very obedient servant,
Paris, Feb. 11. 1831. J. BYERLEY.

ART. V. *A farther Defence of certain French Naturalists.* By WILLIAM SWAINSON, Esq. F.R.S. F.L.S. &c.

I FEEL particular regret that Mr. Bennett, whose mild and conciliating manners are so well known, should have been induced to join in the unworthy attack that has been more particularly aimed at M. Lesson; and still more must I regret, in common with some of his intimate friends, that he should now proceed to defend such conduct, rather than silently acknowledge it was hasty and ill-judged. I truly believe him to be "anxious to give credit where credit is due;" and that, in general, he is "prone to entertain feelings of universal good-will." In the present instance, however, he seems to deceive himself.

The fault is either Mr. Bennett's or mine, that I did not clearly understand that M. F. Cuvier had attributed the discovery of the Indian Tapir to Major Farquhar. I have not the work, and therefore could only depend upon Mr. Bennett's statement; from which it certainly appeared to me that such was not the case. The passage runs thus:—"This latter circumstance," (meaning the discovery, as I supposed, *and description* of the Tapir by Mr. Farquhar,) "it is true, is *not* mentioned by M. Fred. Cuvier." It seems, however, that it *is;* and I am very glad of it.

I will, then, fully admit that both MM. Desmarest and Lesson "knew of all this." But are we to conclude, therefore, that they desired "wilfully to mislead their readers?" Such, indeed, would be a fair inference, if, *as I had supposed*, they had given no quotations, or if they had concealed from their readers where any further information on the subject could be procured. But they, as well as myself, must thank Mr. Bennett for having shown the utter improbability of such an intention. So far from these gentlemen wishing to leave their readers in the dark; to prevent them knowing *all* the

particulars of its discovery; to conceal from them names, dates, and circumstances; they have both, as I am now informed by Mr. Bennett, actually referred to the volume and page where all these particulars are given! No man who wishes to tell a falsehood, and to have that falsehood believed by others, will be so inconceivably silly as to refer to a book, or cite as an authority, a statement which would completely belie his words. Nay more, it now appears that M. Lesson, not content with quoting M. Cuvier's work, goes still farther: he refers to a passage of Sir Stamford Raffles's paper, where the true history of the discovery is again given! Now, had M. Lesson's motives been dishonourable, he could not have chosen a more certain method of exposing his own duplicity. Why, therefore, Mr. Bennett should construe this latter act of justice into a jealousy of Major Farquhar's name, is to me perfectly unaccountable.

Truth is generally the result of discussion; and, however I regret being drawn into a controversy with Mr. Bennett in defence of an absent friend, I cannot but feel pleasure that I am now enabled to place the motives of MM. Desmarest and Lesson beyond suspicion. Mr. Bennett himself must now acquit them of wilfully intending to mislead their readers. The weight and importance of his charges have not, I think, been increased. I wish it to be observed that I do not possess any of those works to which Mr. Bennett alludes; they are all out of my line of study. I have therefore taken his own authority; the best, perhaps, that could be brought forward on this occasion.

Mr. Bennett regrets "that, in the discharge of an unpleasant duty, he was compelled" to speak of MM. Desmarest and Lesson in such terms. Let me ask him, what was this "duty?" and in what manner was he "compelled?" Pursuant to the plan of his work, he had to describe one animal, the American Tapir: what occasion was there to wander from that subject, to travel to Asia, and introduce a controversy about a totally different animal, the Tapir of Sumatra? Why seek occasion to follow up, under a new form, the attack made upon M. Lesson by his colleague in office only a few months before? Assuredly this was neither a "duty" nor was it compulsory.

Mr. Bennett will surely perceive that the charge of accusing the French naturalists collectively is not applied to him. It is urged against the writer who states that M. Desmarest makes "a national rather than a personal attack" upon British naturalists; and who has unequivocally declared that "there prevails, to a great extent, a disposition to depreciate the

zoological labours of this country among the Continental writers." I hold this statement to be unfounded. Let the writer defend it. The words are plain, and cannot be mistaken.

Regarding the Hyacinthine Maccaw, I have little to say. It is not usual to call Azara, whose work was published in 1809, "a writer of the last century," although he was in Paraguay from 1781 to 1801. When I read that "no author of the present century appears to have observed the Hyacinthine Maccaw, with the exception of M. Spix," I concluded Mr. Bennett had ascertained that the bird was not mentioned by Azara, and that consequently I was the first ornithologist who had discovered its "true locality." I do not, however, share in Mr. Bennett's "sorrow" that he cannot invest me with this immortal honour. Had I not put some faith in the writer's accuracy, I should not myself have erred. But is Mr. Bennett correct in deciding that Azara's bird and mine are the same? I suspect not. The synonymes he has now brought forward may be accurate: but I have ceased to place any faith in those voluminous compilations, which have so long encumbered rather than facilitated science; nor do I ever venture to pronounce upon such questions from such guides. Having seen, however, the Paris specimen, I strongly suspect it is quite distinct from mine; but, from not being in the same museum, it could not be compared with the other. I suspect, also, that it is not M. Spix, but his draughtsman, who is in error. I could blame no one, with justice, for not mentioning my account and discovery of the bird in Brazil, since neither had been published: but it appeared to me somewhat strange, that while Mr. Vigors (or, as it now appears, Mr. Bennett) was investigating this species, altering his opinions upon it, and then endeavouring to show that a traveller of no mean authority, who had seen the bird in its native regions, was in error; it seemed to me, I repeat, rather strange, that he should never have had the curiosity to enquire about a specimen which he must have repeatedly seen in the Linnean Society's rooms, before he wrote that "no author of the present century appears to have observed it, with the exception of M. Spix." I certainly conceived that, if the work received the least assistance from Mr. Vigors, it would be in what concerned the Parrots.

I hope that, in defending those scientific friends from whom I have received great and signal assistance, and who are not here to defend themselves, Mr. Bennett will acquit me of all personal hostility towards himself. It will give me most sincere pleasure to evince this on any and on every occasion. It

is neither fair nor just to speak of foreign naturalists in a different language to that which we should use among ourselves; and I will put it to Mr. Bennett's good sense and good feelings, whether such language would not breed dissensions among us, or would not deeply injure the reputations of MM. Desmarest and Lesson, if left uncontradicted.

Tittenhanger Green, St. Alban's,
May 28. 1831.

ART. VI. *A Reply to Art. I. No. XVIII. of this Magazine.* By N. A. VIGORS, Esq. A.M. F.R.S. &c., in a Letter to the Editor.

My dear Sir,

THE appeal which I stated, in my letter of the 12th of April (p. 206.), that I had made to the writer of an article in your Magazine (p. 97.), containing many extraordinary and injurious attacks upon my character, has been made in vain. The hopes I had entertained that I should have been spared the mortification of being the vindicator of my own reputation, and the pain of exposing, at the same time, the conduct of a fellow-labourer in science, have thus been frustrated. My forbearance has been met by a repetition of the same offensive insinuations; and my conciliatory advances have only subjected me to insult in addition to injury.

I do not however regret having made that appeal, although it has been thus abortive. I feel that in that act I have done my duty. I feel strong in the approbation of those eminent and impartial persons through whom I made the appeal, as well as of all those my coadjutors in science whose favourable opinion it is an honour to possess; and who, having admitted that I had done all in my power to avert the continuance of this controversy, and the exposures consequent to it, have decided that I am perfectly justified in using the weapons, however severe, with which a just cause has supplied me. I now enter into the combat with unsullied hands. If my language be strong, or my observations severe, they both are forced upon me. My opponent has left me no other alternative in repelling his unprovoked and wanton outrage.

The unprovoked and wanton nature of this attack is one, indeed, of its most extraordinary features. The common civilities of life dictate a conciliating mode of feeling and

expression towards all with whom we are, even by accident, associated in any common cause. Do we differ from them in opinion, or interfere with them in interests, we endeavour to explain the one or reconcile the other in mild and courteous language and demeanour. But here is a person who, without a shadow of provocation, commences an abrupt assault upon an individual following in an honourable track the same science and the same line of studying it as himself: an individual who at all times has endeavoured to do justice to his merits, and to give commendation to his labours where commendation was due; who has gone out of his way to assist him in his pursuits, to recommend him in his professional capacity, and befriend him on all occasions — and many such have occurred — where friendly interposition could have been of service; here is a person who, not content with the usual channels of disseminating his calumnies, obtrudes a private copy of them, lest their venom should be lost, upon the notice of every scientific friend of him whom he volunteers to calumniate; here, Sir, I must still further continue, is a person who, when appealed to in the language of conciliation, and advised of the recrimination to which he has exposed himself, by a generous and candid exposition of the heads of the defence which may be brought against him, — those, in short, which will appear in the following pages, — obstinately refuses to make any reparation, reiterates his offensive insinuations, and shelters his unmannerly attacks under the pitiful and unmeaning subterfuge of their being levelled, not against a private individual, but against a public character.

What, Sir! do we live in an era and in a country which will tolerate such an outrage upon all honourable feelings and principles? Is any man to be allowed with impunity to accuse another of dishonour, and then contend that he means no dishonour to attach to him, because he unites to the character of an individual the character of a public man? In the present instance this evasion will admit not of the slightest palliation. A writer has the audacity to accuse another of having abused the authority intrusted to him as editor of a scientific journal, by introducing into that work private communications addressed particularly to private individuals, and not intended for the public (p. 97.); of abusing the same power, by making a spirit of dissension and of invective the conspicuous feature of that journal (same page); of equally abusing the influence which he is alleged to possess as the ostensible agent of a scientific institution, by rendering that institution far behind all others, whether of France or England, in the march of liberality (p. 106.); of being the detrac-

tor of men of merit (p. 104.); of not acting in accordance with his own recorded professions (p. 98.); of rendering his professions of *truth* being his guide utterly worthless, by not putting them in practice. (p. 105.) — A writer, Sir, I repeat, advisedly and deliberately advances such charges as these; advisedly and deliberately repeats them; and, forsooth, he means no offence! He speaks not of the individual, but of the editor; not of the gentleman, but of the author; not of the man of honour, but of the public agent of a public body! In the circle of society in which Mr. Swainson appears to revolve, such insinuations may perhaps be little regarded; their shafts may most probably fall blunted from the coarse and callous feelings of the individuals of his caste: but among gentlemen and men of honour the case is different. I am here, in fact, left but one alternative. I will meet this asperser of my honour upon his own grounds. Since he so pleases, I will sink the individual, and let the public man alone be prominent. And, in the language of honest indignation, the editor of the journal which Mr. Swainson censures, — the author of the papers which he misrepresents, — the secretary of the institution which he has dared to calumniate, — tells Mr. Swainson, — tells him before the world, and in the face of day, — tells him, without evasion or reserve, — that his accusations are as false as they are malignant.

Let us descend from these generalities, and now examine in detail the accusations of this writer. I will advert to them nearly in the order in which they occur.

1. I am accused of publishing controversial papers which were not intended for the public eye; in this manner giving publicity to expressions of ridicule and contempt which my correspondents have used in private communications, but which their sense of what is due to the courtesies of life would withhold from using in public. (p. 97.) A deep and serious charge; and one which, if substantiated, would stigmatise the "guilty person" for ever in the eyes of all honourable men! "*There are*" some papers of this description in the *Zoological Journal*, asserts the accuser. I unhesitatingly answer, *there is not one.* With the exception of some scientific extracts, avowedly, and with the consent of the authors, taken from private or demi-official letters, — not one of them being controversial, — there is not a line printed in that journal, at least since my connection with it, which was not composed, written, and transmitted to the editor for express publication. The want of truth in this accusation being established, there is no need to refer to its malignity.

2. I am accused of publishing other papers in the same

journal, which, being avowedly written for the public eye, are much more calculated (i. e. than the aforesaid private communications) to foment bitter feeling among individuals, and to bring national reproach upon us all. (p. 98.) It is, moreover, insinuated that I have misused my influence as editor, in making a spirit of dissension and invective the conspicuous feature of that work, and thus giving rise to one of the chief causes of the decline — yes, Sir, the decline! — of zoological science in this country. (p. 97.) The only answer, perhaps, which ought to be made to such assertions and insinuations is a reference to the names of those eminent persons who cooperate with me in the editorship of that work. These would be of themselves a sufficient guarantee that no papers of a disgraceful nature would be allowed to creep into it. But I do not shield myself beneath their common responsibility. Neither shall I seek shelter under the principle, however universally acknowledged, that no editor of a journal or superintendent of scientific transactions is answerable for the papers contained in them, to which the authors affix their names. And yet, Sir, if we do not subscribe to this general principle, what inconvenience will be the result! You, among others, will have to answer not only for the errors and misconceptions, but for the evil passions and severe recriminations, of your correspondents. You will be responsible for all Mr. Swainson's misrepresentations; you will even be called upon to account for the language of indignation in which I am constrained to rebut them. But I do not, I repeat, rely upon such a mode of defence. Standing upon higher grounds, and voluntarily assuming every responsibility, I boldly appeal to the work itself for its own justification. Let us enquire what are the controversial papers thus alleged to be injurious to science? Your readers will be startled at finding that the very first paper of a controversial nature, which I had any share in having inserted in that journal, was written by Mr. Swainson himself! Yes, Sir, this meek inculcator of temperance, moderation, and self-denial (p. 106.), was the first to set the example of "prominency in this species of scientific warfare!" (p. 98. note.) The very man, Sir, who accuses me of introducing into the journal over which I presided a litigious spirit, was the man who first tempted me to the deed! Let me not, however, be understood as condemning the introduction of that paper. It is the blinded inconsistency alone of the would-be critic that I reprobate. The paper itself was a reply, — right or wrong, conclusive or inconclusive, I say not, — but a reply to a previous attack made upon the opinions of the author. As such, I know not how in common justice the

publication of it could be refused. But the same principle of common justice which authorised its insertion, equally authorised the insertion of every other paper published in that journal, against which this delinquent — if to defend one's opinions is to be esteemed delinquency — has vented his rancour. Let us enumerate them in order. Immediately following Mr. Swainson's paper, appeared a reply to it by Mr. Gray. (*Zool. Journ.*, vol. i. p. 523. art. 64.) After some interval was inserted a paper of mine, entitled, and deviating in no respect from the title, "Reply to some Observations in the *Dictionnaire des Sciences Naturelles*, upon the newly characterised Groups of the *P*sittácidæ." (Vol. ii. p. 91. art. 11.) Next in order appeared a "Reply to some Observations of M. Virey in the *Bulletin des Sciences Naturelles*, 1825," by my ever-valued friend, Mr. William S. MacLeay. (vol. iv. p. 47.) Shortly afterwards was published a letter, by the same author, to J. E. Bicheno, Esq., in examination of his paper "On Systems and Methods" in the *Linnean Transactions*. (vol. iv. p. 401.) And here I must deviate a little from my purpose, to state my own conduct on the occasion of this last publication. Living on terms of friendly intercourse with Mr. Bicheno, and unwilling to bring before the public any document which he might in any degree consider as calculated to wound his feelings, immediately on receiving the paper in question, and before I laid it before the board of editors, I submitted it to his inspection, and obtained his full sanction for publishing it without restriction. I have at this moment before me the reply of that gentleman to my communication on the subject; and with pleasure would I transcribe it, but that it contains remarks upon the course I had taken too complimentary for me to repeat. It has been my endeavour throughout life to act with manliness, openness, and candour to all; and I know not how I could better have maintained those qualities than by the course I thus pursued. The only papers remaining, that partake in any degree of a controversial nature are, Mr. MacLeay's, on "The *Œ*strus of Mr. Bracy Clark" (vol. v. p. 18.), a paper written in answer to an attack made upon him, by that well known veterinarian, in the *Linnean Transactions;* and a "Notice respecting some species of Mammàlia" referred to by Dr. Horsfield and myself in a previous number of the journal; a defensive paper also, containing a reply to some observations on our labours by M. Lesson, in the *Bulletin des Sciences Naturelles.*

Now, Sir, the whole of these papers are replies to what the authors considered injurious observations on their scientific labours. If controversy is to be reprobated in science, the

blame must surely rest upon those who commence the attack, and not upon those who act merely on the defensive. In the present instance, it is not the *Zoological Journal* that is to be condemned; but the *Linnean Transactions*, the *Dictionnaire*, and the *Bulletin des Sciences Naturelles*. I know not, in fact, how the cause of science is to be advanced, or her truths maintained, if the voice of the accuser is alone to be heard, and that of the accused is to be condemned to silence. Under Mr. Swainson's new system of morality, our science will be one of mere aggression on one part, and patient submission on the other: — *ubi tu pulsas, ego vapulo tantum.* The assassin may stab our reputation in the dark, or the bravo may assault it in the open day, and we must endure the injury and the insult, lest our honest defence should expose us, in the eyes of some mawkish sentimentalist, to the imputation of being possessed of a litigious and controversial spirit! Sir, I will admit of no such insensate reasonings. The publication of the papers referred to, which, in conjunction with my colleagues I was instrumental in introducing into the journal, was not only justifiable but praiseworthy. Among them, — I allude more particularly to the papers of Mr. MacLeay, — are to be found, intermingled with the necessary defence of the opinions of the author, some of the profoundest trains of general reasoning, and some of the most lucid expositions of the truths of science, that were ever brought before the scientific public.

3. I am accused of occupying myself a distinguished station as a combatant (p. 98. note); as selecting two, among the best known naturalists of France, as fit subjects for discourteous treatment (p. 98.); as being the detractor of those naturalists (p. 104.); of repeatedly insinuating accusations to the disadvantage of M. Lesson and other distinguished Parisian naturalists (p. 106.), &c. &c. &c. This charge is attempted to be supported by a reference to three articles; the first two of which are the papers which I have already mentioned as being published by me in the *Zoological Journal*, the third an article contained in the eighth number of *The Gardens and Menagerie of the Zoological Society delineated.*

The last of these claims our first attention, not only as it is that which is stated by the accuser himself as involving the most serious "guilt" on my part; but as it is the only charge of the three on which he condescends to enter into the details of the case, or to go beyond mere vague and unsupported assertion.

Your readers, Sir, have already been convinced, by Mr. Bennett's letter in your last Number (p. 199.), of the un-

founded nature of this charge, both as it refers to me, who never wrote the work in question, and as it refers to himself, who was the real, avowed, and well known author. That gentleman has proved, beyond a doubt, the accuracy of his own statements, and the fallacy of the arguments by which Mr. Swainson has endeavoured to impugn them. The injustice of the accusation having been thus fully established by Mr. Bennett, it remains only for me to advert to its malignity. And is it not, Sir, an outrage upon all common decency, deserving of the severest language that the indignant feelings of an honourable man can use, that an individual is to be dragged before the public as the author of a work, — even allowing it to be deserving of censure, instead of being, as in the present case, deserving of all praise, — of which work every proof, every certainty, every publicity was afforded that it was written by another? On the respective cover of every number of that work it has been made known that the descriptions and anecdotes illustrative of the natural history were furnished by Mr. Bennett. In every society where such subjects as zoology, and the novel information occasionally accruing to that science, are wont to be discussed, Mr. Bennett received the credit, and the well founded credit, I will add, of being the author. In an article of your own Journal (Vol. III. p. 201.), written by me, and evidently read, for it has been quoted, by the writer who would despoil Mr. Bennett of his well earned reputation, the work is referred to as Mr. Bennett's, and due praise assigned it. Surely, in the worst of those invectives with which Mr. Swainson would seek to injure one who never wished but to benefit him, he could not venture to accuse that individual of praising the work which he himself had written! — Nay, Sir, even beyond all this, lest a doubt should exist of this authorship being known to all, I have only to refer to the preface, published in No. x. of the work in question, to which Mr. Bennett's name is subscribed as the sole and responsible author. And here let me pause a moment. — It is worth while to examine the accuracy of the writer, who is so forward to scatter his random shafts upon what he calls the gross mistakes, the looseness of research, and the inaccuracy of observation, of others. At p. 101. of your Journal he has given us the following words: — "If the reader turn to No. viii. (the last number, as we are informed, which has been published), he will find," &c. &c. Now, Sir, the voluntary information included in the parenthesis must have some meaning. The writer, I repeat, must have had some object, secret or open, in view, when he furnished his readers with such a gratuitous addition to their knowledge. But

open object he could have had none; for the observation is entirely extraneous to the subject treated of. A hidden object there must be; and but one can be here inferred; viz. that these words were volunteered for the purpose of anticipating any future reference to the tenth number, to which the preface, containing Mr. Bennett's subscription, was affixed. Oh! says the critic, *we* were not aware of that fact; at the time *we* wrote *our* critique *we* were informed — for *we* do not descend from the importance of our collective and kinglike dignity to inform *ourselves* respecting such "trivial periodicals"—*we* were informed that the eighth number was the last which was published. But mark the fatuity of the proceeding. That left-handed wisdom, which condescends to such subterfuges as these, ever betrays itself by overshooting its mark. The gratuitous information afforded at p. 101. is forgotten, nay, contradicted, at p. 104. There the eleventh number* is quoted at length by *us*, who, a few pages before, were unaware of the existence of a subsequent number to the eighth! *Quem Deus vult perdere prius dementat.*

The only charge which there is any attempt to substantiate by a reference to the details of the case thus falls to the ground. Of the two remaining papers of mine, on which the accusation of my being "a detractor" of the French na-

* It is curious to trace the modes of *reasoning* by which this writer would arrive at his conclusions. Speaking of what he calls the *famous* hyacinthine maccaw, he censures the author of the *Menageries*, &c., for inferring that it had been noticed by no writer previous to M. Spix; because I, — the authorship of the work being as usual attributed to me, — I was aware that he, Mr. Swainson, had given one specimen of the species to the Linnean Society, and sold another to Mr. Leadbeater. Of the first fact, it is true, I had a casual knowledge, by seeing the bird in the Linnean Museum; and I had *heard* of the second in consequence of a *famous* story, the only thing famous I ever knew of the bird, which the latter gentleman often tells with his usual facetiousness, respecting his purchase. But how my knowledge of the aforesaid gift or the aforesaid purchase could invalidate the observation, that no *author* had noticed the species previously to a given period, I am at a loss to divine. Had I been inclined, as superintendent of the work, to suggest any additions to Mr. Bennett's remarks, I do not consider the scanty information I possessed regarding the two foregoing facts would have contributed much to its value. As to the superintendence of this very valuable and popular work, which is all, as is well known, that devolves upon me, I shrink in no respect from the responsibility attached to it. Much more commendation, indeed, than censure, on this score, would fall to my share. But let not the superintendence of the whole be confounded with the execution of any particular part. Were the excellences of Mr. Bennett's pen to be attributed to me, those of Mr. Harvey's pencil, and of Messrs. Branston and Wright's graver, nay, those of Mr. Whittingham's type and paper, would equally swell the measure of my praise. I should soar into reputation on no ignoble wing.

turalists is founded, I shall first advert to that which contains my "Reply to some Observations in the *Dictionnaire des Sciences Naturelles* on the newly characterised Groups of the *P*sittácidæ."

Now, Sir, after a lapse of four years, and in consequence of the present accusation, I have looked back to that paper, and read it over for the purpose of forming a dispassionate judgment on the opinions expressed in it, and the spirit which dictated it. And here I will allow no false modesty on my part to interfere with my general sense of justice, or deter me from declaring that a more temperate reply to an uncalled for attack and an unusual mode of criticism never issued from the pen of a naturalist. There is not a sentiment nor an expression in that paper, which the calm reflection of the present moment would induce me to alter or expunge. The parts which come at all under the description of being controversial are purely defensive; and the whole tenour of the reasoning evidently proves my object to have been the explanation and elucidation of some of the higher truths and principles of science, even more than the justification of my previous opinions.

But what judgment, Sir, will your readers form of this writer's mode of criticism in calling me the "detractor of M. Desmarest," when I acquaint them that, in the very paper of which I have spoken, so far have I been from detracting from the merits of that highly respectable naturalist, every honour is bestowed upon him? His name is studiously kept apart from all participation in the blame which I meant to ascribe to the real author of the critique that called for my answer. One of the objects of my paper was actually to prove that M. Desmarest did not write that part of the article which reflected on Dr. Horsfield and myself. The only blame in any respect attributable to that veteran in science is his having permitted one of those numerous critics, those hackneyed drudges of the bookseller, who, unfortunately for the cause of science, are to be found in Paris as well as in London, to foist his surreptitious remarks into the paper which bore his valued name. The style, in fact, of this extraneous critique in the *Dictionnaire*, the very contradictions that set it at variance with the rest of the subject, evidently separated that part of the article from the body of the article itself. The superficial slime betrayed the reptile's track.

The remaining paper, in which, according to Mr. Swainson, I have taken a conspicuous part as a combatant, is an answer to some observations of M. Lesson upon a previous paper of

Dr. Horsfield * and mine. In the journal so often alluded to, we had made some remarks upon four species of Mammàlia belonging to the collection of the Zoological Society. Upon these four species M. Lesson volunteered some very flippant observations, to which I replied, — for in the present instance I should not feel the slightest objection to take upon myself the entire responsibility, if it so pleases this worthy pair of suddenly created friends, — to which, I say, I replied in the same strain, by observations equally flippant. If there is any point connected with this subject on which I can condemn myself, it is my having deviated from my accustomed mode of animadversion, and condescended to stoop for, and make use of, my adversary's weapons, after they had fallen harmless from his hand. The whole business, in fact, is but a paltry affair, scarcely worth the time that is spent or the paper blotted by a reference to it. And yet upon this feeble foundation alone, this single discussion between M. Lesson and myself, — a discussion for which that gentleman is responsible, as having provoked it; a discussion in which he is palpably wrong, and in which, by the way, it is of little consequence whether he was right or wrong, — are rested all those sweeping charges of my combative disposition, all those unmeaning and declamatory insinuations of my setting at variance the "two greatest nations in the world," and bursting the "silken cords" — yes, Sir, the "silken cords — of friendship and respect that should unite them."

Once for all, Sir, in order to dismiss these senseless allegations of my hostility to the French naturalists, I will appeal to such of my works as bear a reference to their labours in science. There your readers will judge for themselves, if

* Mr. Swainson has insinuated (p. 98.) that Dr. Horsfield had no participation in the paper which contains our reply to M. Lesson; and he volunteers to express the difficulty he feels in "divining how his name came to be associated" in that article. Now, I wish not to involve any man in any question that regards myself. I am fully able and willing to vindicate, single-handed, my own cause. But justice to one of my most valued friends will not permit me to allow it to be thought, for a moment, that he would desert an associate at the hour of need. The following extract from a letter of his on this occasion will evince that he does not shrink from the responsibility: —

"The sorrow which I feel, on behalf of the attack that has been made on you by Mr. Swainson, is increased by the consideration that it must have affected you more severely, from the apparent desertion, as insinuated by him, of your unworthy associate. Now, in the case of the papers in question, I feel it my duty to assure you, that I do not at this moment depart from that share of responsibility which devolved on me when the papers were published; and I consider my name to stand, as it was originally, associated with yours."

they feel any interest on such points, how far I have been either ignorant of the labours of our French contemporaries, or unjust to their merits. There they will find that, as I have elsewhere expressed myself, I was among the very first of our British zoologists, and in union with some of the most enlightened among them, to break through the restricted mode of studying nature that retarded the growth of the science in this country, and to open the eyes of our rising naturalists to the improvements of the Continental schools. I here, indeed, find myself standing on high ground. Nor have my exertions been unfelt or unacknowledged. I could refer to the kind and flattering expressions of many of the most eminent of the founders of those schools, to testify how little they are desirous of such a "defence," as Mr. Swainson, or any other uncalled for volunteer in their cause, could advance on the present or any other occasion.

It is true that, in some of my previous writings, I have regretted the fact, that, while we have done justice in every respect to the merits of the Continental zoologists, a disposition has prevailed to a great extent, on their part, to depreciate the zoological labours of our countrymen. But it is equally true that I have had grounds to regret it. Those who are at all conversant with the history of zoology for the last twenty years, require no chain of evidence to be convinced of the prevalence of that feeling. It has, indeed, been a source of regret among us, as universally acknowledged as deeply felt. The very names which Mr. Swainson so strangely brings forward on this occasion — strangely, I must say, for they militate most powerfully against himself — those of Sir Stamford Raffles*, the greatest benefactor of science that this or any other

* The general prevalence of these prejudiced feelings against our naturalists on the part of the Continental writers, but certainly not those of the highest reputation, is a fact known and lamented by all who know any thing of the state of our science. The insinuation that when I alluded to this fact (*Zool. Journ.*, vol. iii. p. 92.) I looked only to my own case, and inferred the existence of that feeling, in consequence of a writer under M. Desmarest's signature having *rejected* my arrangement of the *P*sittácidæ, and of M. Lesson not acknowledging my species of Mammàlia, is too paltry to be noticed, but as it points out the petty-minded spirit that pervades Mr. Swainson's paper. He can know little, indeed, of the views and principles of our modern naturalists, who asserts that they imagine their own peculiar modes of communicating their knowledge of the facts of nature will be adopted by others, or even that they should wish them to be so. As to the reference to M. Lesson, it is sufficient to say, that my observation, above referred to, in the *Zoological Journal*, was printed two years before that gentleman's remarks in the *Bulletin des Sciences*. The anachronism involved in Mr. Swainson's insinuation is as glaring here, as his mode of confounding cause and effect elsewhere.

country ever produced; and of Dr. Horsfield, the friend, companion, and cooperator in the liberal views and splendid exertions of that great man, will suggest sufficient proofs of the justice of my assertion. I will add to these examples of unjust treatment that of Mr. Swainson himself: and I need adduce no farther case in point beyond that with which he has himself in the present instance supplied us, his controversy with M. de Férussac (p. 106.); a case where he accuses and convicts of striking injustice a naturalist of France, in the very paper in which he contends, with notable inconsistency, that no such injustice exists in that country.

4. The accusation to which I shall next allude is almost too contemptible to be noticed. It amounts simply to an assertion that I have described two birds as new to science eighteen months after he — I beg pardon, *we* — Mr. Swainson, had already described them. Nothing but the previous comment, that this was "a much graver charge than mere carelessness," and the subsequent attempt to prove, by a series of what is meant to pass for argument, that I *knowingly* described these birds a second time, to the disparagement of the first describer, would justify me in introducing such a paltry subject upon your readers' notice. Now, Sir, such a charge as the latter brings with it its own refutation. Is there any man, I will ask, in his right mind, who would *knowingly* describe animals as new, which are in reality old; or, in other words, would *knowingly* commit an error which he equally well knows would be detected at the first glance? Such is the futile nature of the charge itself; but it is worth the attention of your readers, to trace out the inconsistencies of the whole paragraph which contains this charge. The first step of the writer is to lay down the conclusion at which he means to arrive, his object being to establish *a graver charge than mere carelessness:* — his second step is to point out the *gravamen* of the charge, assuming it to be "malice prepense" on my part, which he proves, by a chain of undeniable reasoning — "I *knew* his paper, where he described these birds, for I quoted it:" — his third and concluding step is to draw his deduction from the foregoing premises, "what, *then*," he says, "are we to think on this matter? Simply, what we believe: the mistakes are unintentional; proofs of looseness of research, and inaccuracy of observation," &c. — Mark, Sir, the subtle logic of this our "goodman delver" in criticism. The error was *knowingly* committed; argal, it was *unintentional:* — it originated in mere carelessness; argal, it exposed the "guilty person" to a much graver charge than mere carelessness!

But this is trifling with our subject. Let us see what are

the facts of the case. I *did* consult Mr. Swainson's paper, — although I must confess it to be one of the most difficult tasks imposed upon the naturalist, to hunt out all the scattered information disseminated by the traders in science throughout the multifarious periodical publications of the present day, which afford a "consideration" for their scientific peltry; — I did, Sir, I repeat, consult Mr. Swainson's paper, and found my two birds totally disagreeing with the descriptions* of his two species. The very name of one of them actually proves my reference to his species, as it points out the specific difference that separates one bird from the other. The species which he meant to describe may by some possibility have been the same as mine: but in that case his descriptions are imperfect; and, in the eyes of science, an imperfect description stands for no description at all. After all, Sir, let us allow that the worst suspicions of this writer have been realised, and that I actually did describe a second time two species which should have borne the honours of his important name, as having previously been noticed by him; is not this an error of unavoidable and of everyday occurrence among our best and most accurate writers? — an error from which Mr. Swainson is not, and cannot be supposed to be, exempt; — an error which only requires to be noticed in a friendly manner, in order to be repaired on the first opportunity; and not, as in the present instance, to have been brought forward after an interval of two years, as the subject of a grave and formal accusation?

5. The foregoing charges are, comparatively speaking, of little moment, as they involve the character and the feelings

* The difference between my Colàptes collàris and Mr. Swainson's Col. Mexicànus consists chiefly in the collar, which marks the breast of my bird, whence its name; and which is not mentioned in the description of the Mexican bird. I presumed that such an important character would have been mentioned, if it had existed; particularly as less important characters, such as the markings on the back, are particularised in the specific description. My *Pìca* Collièi (not Collièri, as Mr. Swainson misquotes the word) differs from the description of his *Pìca* formòsa, by being one third greater in size, and by having a black throat and breast, with a white abdomen, while the whole under part of the latter species is white, with the exception of a black pectoral band. I make little doubt that Mr. Swainson's bird is the same as M. Wagler's *Pìca* Bullóckii, and M. Temminck's Garrule commandeur. (pl. col. 436.) If I was in error in describing the bird brought home by Captain Beechey as different from the Mexican species, and consequently deserving of the very flagrant censure that he would bestow upon me, so equally was Mr. Children, so was the editor of the translation of Cuvier's *Animal Kingdom*, so was Mr. Audubon; all of whom described the bird as different from Mr. Swainson's species, and nearly at the same time with myself.

only of an individual. The last to which I shall direct your attention is of much more serious importance, as it is directed against the reputation of a scientific Institution, flourishing under the high patronage and unmingled approbation of the public. This writer has the temerity to charge the Zoological Society with illiberality; and he denounces it as being in this respect far behind all similar institutions whether of France or England. This charge I shall examine, first, according to Mr. Swainson's own statement of the case; and, secondly, according to the facts, the official facts, which exhibit it in its proper light.

"Not being a member," says the complainant, "we were prohibited from making any effectual use of the Zoological Society's museum, while engaged on the ornithological portion of a national work, Dr. Richardson's *Northern Zoology*. We, therefore," — what did we, *therefore*, do in this distressing embarrassment? Become a member, and thus quietly surmount the impediment to our wishes? No, Sir; that would have been the plain and legitimate conclusion at which any single-minded man would have arrived, who did not study his logic in the same school as Mr. Swainson. No, Sir; "we, *therefore*, went to Paris!" There the accuser goes on to state his having met with that courtesy and assistance in his studies which every naturalist, as we well know, expects to find, and is never disappointed in finding, in the public institutions of that city. Now, Sir, if I can at all ascertain the meaning of this logician (which, indeed, is no easy task, while he deals in such extraordinary *non sequiturs*), the illiberality of which he would complain consists in the law which limits the privileges of the Zoological Society to its members; while, on the other hand, the liberality which he commends in the French institutions consists in the law that opens their privileges to the public. The two cases, nevertheless, although at first sight apparently dissimilar, are precisely the same. Both institutions equally confer their privileges on those who respectively support them; the members of the London society providing the funds that are indispensable for its maintenance, the public purse supplying similar funds to the Parisian establishments. There is, therefore, no more liberality on one side of the Channel than on the other; the regulations on both sides being in principle and in spirit the same. If there is any illiberality in the present case, it attaches to him who admits that he would not support an institution, the benefits of which he would at the same time gratuitously appropriate to himself. If, indeed, there is any class of persons on whom it is generally supposed

to be more incumbent than others to contribute to the funds of science, it is that class which is known to pursue science as a source of emolument. And yet here is a person, deriving, according to public rumour, considerable emoluments from zoology; nay, who is employed, with a liberal recompense, on a work, for the completion of which he alleges that it is necessary to consult the collection of a zoological establishment; and yet he has not generosity sufficient to spare, out of those ample emoluments, a trifle, — a very trifle, certainly not equal to the expenses of a journey to Paris, — to support an institution, ostensibly devoted to a science which liberally supports himself. Does not the charge of illiberality thus recoil upon him who prefers it?

Such are the insufficient grounds of Mr. Swainson's accusation, even according to his own statement. Let us now turn to the actual facts of the case, as taken from the official records of the Society.

Mr. Swainson, Sir, *was a member of the Zoological Society.* He was among the first to afford to the infant establishment the high sanction of his name; but, unfortunately, his name alone — *vox et præterea nihil* — testified his devotion to the science cultivated by that body. For two years he continued a *nominal* member; after which period a correspondence took place on the subject between the financial department and himself, which terminated in his expressing his wish to cease being a member, on the plea of his not having it in his power to enjoy any of the privileges of the Society. His request was liberally and cordially complied with by the council, and his name was withdrawn from the list of members. Shortly after this period, Mr. Swainson again appeared before the council of the Society; not as a contributor to its support; not as the fulfiller, even the tardy fulfiller, of his previous engagements; but as a suppliant for its favours. Unmindful of the delicacy of the situation in which he had placed himself, and forgetful of his antecedent declaration that he could enjoy no advantage from a connection with the Society, he applied for permission to consult the museum; nay, farther, for what could scarcely be accorded even to the best benefactor of the Society, for *unrestrained* permission to consult it! No circumstances could have authorised the council officially to grant such a request. Their rules, but more particularly the principles that dictated their rules, imperatively forbade them. But still, in accordance with the truly liberal spirit that animated all their proceedings, and unwilling that any conduct towards themselves, however discourteous or ungenerous, should interrupt the even tenour of that spirit,

they allowed their secretary to offer, in his individual capacity, whatever information their museum could afford to Mr. Swainson. An intimation to that effect accordingly accompanied the official letter that conveyed the refusal on their own part. The same assistance towards the prosecution of his work was of course offered to Dr. Richardson, the employer of Mr. Swainson, and was freely accepted and frankly * acknowledged by him. If Mr. Swainson did not make use of the liberal assistance thus placed within his reach, if he considered himself compelled to seek in a foreign country that aid in science which was freely open to him in his own, the fault rests with himself. What, Sir, I will ask, in conclusion, will your readers now think of the conduct of an individual, who, having placed himself in circumstances under which any man of common delicacy of feeling would have shrunk from observation, nevertheless obtrudes himself unblushingly into notice as an accuser, where, by right, he should stand as the accused, and the calumniator of an honourable institution, that had treated him with unprecedented generosity and forbearance?

It is not the least of the evils that attend such controversies as the present, into which an individual is dragged contrary to all his feelings and principles, that he is forced to make himself the subject of discussion, and even, at times, to speak of himself in language that must apparently bear the character of commendation. One of the insinuations advanced by this writer, in his inconsistent and ill digested attack, is, that the illiberality, of which he accuses the Zoological Society, — with what justice we have already ascertained, — may be attributed to the secretary of that body, whom he honours with the distinction of being " its chief adviser." Your readers, Sir, will scarcely imagine that the individual thus accused of illiberality, in using his influence to debar men of science from the use of the Society's museum, had it in his power, if such had been the bent of his disposition, to mono-

* I should refer on this occasion to Dr. Richardson's published acknowledgments of the assistance he received from our Society, in the *Faúna Boreàli-Americàna* for instance, were it not likely to be said that such acknowledgments are but matters of course and form, and, as such, of little weight. I shall therefore transcribe the following letter of his, written expressly in answer to an appeal of mine on this subject: —

" My dear Sir, — In answer to your question as to whether I have or have not received from you every facility in consulting the collection of the Zoological Society, I have no hesitation in saying that you afforded me every facility that I could desire, and showed the greatest anxiety to aid me in my researches.

" I am, my dear Sir, very truly yours,

" *London, June* 14. 1831. JOHN RICHARDSON."

polise to his own use the greater portion of the contents of that collection, and to shut out the public from all participation in its benefits. Yes, Sir, the greater portion of the collection, the whole, it may almost be said, at the period of which we treat, with the exception of Sir Stamford Raffles's splendid Sumatran gift, had originally been the private property of that illiberal secretary, and was by him presented to the scientific public, without reserve, without condition, nay, almost without acknowledgment. So reckless, indeed, was he of all personal considerations, or of aught but the public benefit, that he believes, even up to the present day, that there is not a record of the transaction. But there are gifts of higher price than those which may be measured by the common rates of value; such gifts as those of time, and labour, and thought; such sacrifices as those of ease, and leisure, and private interests, and personal gratifications. Such contributions there are, and such it was the pride of him, who is forced into this declaration, to offer to the science which he espoused, and to the institution which devoted itself to that science. Such, at least, was his endeavour. If he has been unsuccessful, his failure has arisen from want of capacity, not from want of inclination or exertion; and it may be added to those numerous proofs of the blindness of our judgment, which every day demonstrate that, where we have fondly fancied ourselves to have been most strong, there we have been found most weak.

Such, at least, I repeat, was my endeavour; and I repeat it the more pointedly, because, from this very endeavour on my part may be traced the origin of the present attack, which otherwise appears so causeless and unaccountable. The attempt to introduce into science a spirit of disinterestedness and liberality, could not fail to excite a hostile feeling on the part of those whose connection with science was based on selfish and sordid considerations. It is an unfortunate fact, that the elements of corruption are as rife in science as in any other pursuit of man; and that jobbers, and jealous competitors for emolument, and petty monopolisers of petty power, abound among the apparently retired students of the closet, as fully as among the votaries of more bustling and public professions. To these selfish and mercenary propensities alone is to be attributed, not the decline of science*, in our country — for

* The "decline of science" is the cant of the present day. Every man who has a petty grievance to bring forward, or some trivial point of minor information on which he hopes to be borne into notice, adopts the "decline of science" as the post from which he starts. Mr. Swain-

when did science, our science at least, stand on a higher elevation than at present?—but the clogs that have so long retarded its progress. Where the exertions of the naturalist are founded on the love, not of science itself, but of the good things that accompany it, little is to be expected of energy in the investigation of truth; little of patient research, for it tends not to the profit of the moment; little of generous cooperation, for it interferes with the monopoly of the "money-changer." In the eyes of these dealers in nature, the attempt to impart a higher tone and a purer spirit into natural pursuits is a crime not to be pardoned. The reformer becomes a marked man. Hence the secret enmity, that works its injuries wherever it can work in darkness and impunity; hence the open rancour, that, when it becomes too effervescent to be restrained, and must find utterance, vents itself, as in the present attack, in froth, and slaver, and impotent malignity.

But it is time that I should conclude: already I have gone far beyond the limits which I have any claim, from the nature of my subject, to be accorded to me in your journal. I have, indeed, to apologise to your readers for intruding so tedious and uninteresting a series of details into a work which should be devoted to science alone; and, when I look back upon the style and language in which they have been clothed, I have equal apologies to offer on that score. But I must let my words pass as they are. I have neither time to revise, nor inclination to recur to so disgustful a subject. Something, it is true, should be accorded me; and the provocation I have received should be accounted in my favour. It should be remembered that the aggressor has voluntarily and deliberately commenced this attack, and voluntarily and delibe-

---

son's assumption of the present decline of zoology is most amusing to those who have marked its late progress. Can he tell when zoology was at its height, or point out the period when it commenced to go down? The causes he assigns for this degradation of zoology are distinguished by the same logical acuteness which seems to be characteristic of the bent of his mind. They are worth repeating. The first cause is, "the denial of the greatest and most acknowledged truths by bold and specious reasoners." When or by whom were they denied? The second is, the "zealous adoption by some, and the unqualified rejection by others, of theories or systems *which neither party understood.*" What influence these *misunderstanding* parties could have had upon the general interests of zoology, I am at a loss to conjecture. The third, "the substitution of flowery and sententious oratory for the results of deep and patient research." Where does this substitution appear? or how could it in any respect produce the slightest effect upon the real interests of the science? In what academy could this logician have studied his modes of reasoning?

rately has rejected * all conciliation. I am forced into the contest, an unwilling defendant. And if my language exceeds the bounds of moderation, it expresses but the natural aversion with which every honourable mind recoils from what is mean and sordid, from what is selfish and malignant. To this man, as a fellow-labourer in science, I held out the right hand of friendship; to this man, as one whom I fancied to have been deceived, and to have required explanation only in order to be induced to retrace his false steps, I held out the olive branch of conciliation. He has spurned both; he has derided both; he has heaped injury upon me in exchange for kindness; he has loaded me with insult in return for forbearance. On the head of the aggressor let the odium rest!

I am, my dear Sir, faithfully yours, &c.

Chester Terrace, Regent's Park, N. A. Vigors.
June 20. 1831.

Art. VII. *On the Habits of the Weasel.* By Scólopax Rustícola.

Sir,

It gives me sincere pleasure to find my observation on the missel thrush (*T*úrdus viscívorus) corroborated by that very attentive observer the Rev. W. T. Bree: as, at the time I advanced it, I felt confident that many would be sceptical, especially those who contend that it has no melody. I shall now advert to a little animal, the weasel, concerning which I am in possession of two or three anecdotes.

The Rev. Gilbert White, in his *Natural History of Selborne*, states, in Letter 40., that "weasels prey on moles, as appears by their being sometimes caught in mole-traps." I believe that people in general are not aware of the fact; but the following will bear it out: —

A neighbour of mine, a man of acute observation, who had set a common spring mole-trap in a field which he occupied, having occasion to go to it to stop a gap in the hedge, perceived that a mole was taken. He took the trap from the ground, and allowed the mole to remain suspended in it. In about a quarter of an hour, whilst working, he chanced to look in the direction of the trap, and, much to his surprise, perceived a weasel very actively engaged in striving to get the mole out of the wires which held it. The animal ran up the stick which formed the spring of the trap, and then

* The *whole* of the answers and explanations which are made in this letter were laid before Mr. Swainson. Nothing, in fact, was left undone on my part to avoid this distressing exposure.

descended on the captive, which he seized, and tried, by wriggling, twisting, and hanging by it, to appropriate to his own use, but without success. When exhausted with his efforts, he relinquished his hold and dropt on the ground, where having taken wind, he ran up the stick again, and renewed his task with redoubled ardour. My old friend, having observed him try ten or eleven times successively, thought that he deserved the mole for his trouble and perseverance, and, taking it from the trap, laid it on the ground ready for him; but, on being disturbed, he retreated, and would not again make his appearance whilst the old man remained.

An instance of the affection of the weasel for its offspring was related to me by one of our labourers. He was standing in a footpath close to a hedge side, when he observed something coming towards him, but till it got close to him he could not be certain what it was; at last he perceived that it was a weasel with one of her young ones in her mouth. The animal was so intent on her burden that she did not see the man till he kicked at her, when she dropt her young one and retreated into the bottom of the hedge. The man then stood over the helpless young one with a large stick in his hand, not with the intention of harming the old one (as he was not a keeper), but merely to see how the parent would proceed. She soon peeped out of her covert, and then made several feints to get her charge; but was obliged to run into the hedge again, apparently intimidated at the stick which he flourished and knocked about. At last she summoned up all her resolution for one grand effort; and, in spite of the opposition of the man, she, after a great deal of dodging to avoid the stick, which he used in every way to keep her off without hurting her, fairly succeeded in obtaining the object of her solicitude, and bore it off in triumph from between his legs.

I am, Sir, &c.

Scólopax Rustícola.

Chilwell, near Nottingham, May 12. 1831.

Art. VIII. *Some Account of a Grampus* (*Delphìnus Orca*) *recently captured in Lynn Harbour.* By G. M.

Sir,

The history of the cetaceous animals, in consequence of their being placed beyond the reach of the naturalist, is so confessedly incomplete, and the interest attached to them, not only on that account, but because of their importance in a

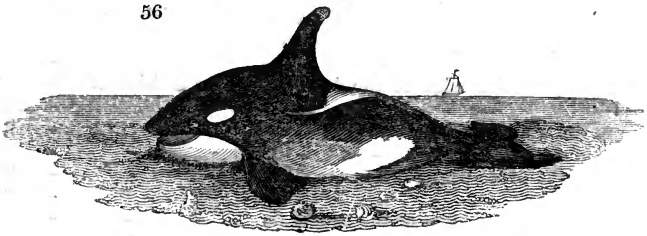
commercial point of view, is so great, that every attempt to avail himself of the few opportunities that are presented will be eagerly seized by the true lover of nature; and his observations, however cursory, readily communicated to those who have not been so favoured.

As it is probable that many of your readers have never had an opportunity of examining any, even of the smaller genera, of the whale tribe, you will, I think, be glad to receive an account of a grampus (*D*elphinus *O*rca) which has been recently captured in Lynn Harbour, about ten miles from the town.

The animal, which is a male, was discovered by some fishermen on the 19th of the last month, with his dorsal fin rising just above the surface of the water. He was immediately driven into the shallows, and attacked by the men; but not being provided with proper weapons, it was with much difficulty they were able to despatch him by the help of knives and sharpened oars. The groans of the poor animal are described as having been most horrible, and the effusion of blood very great. Being at length deprived of life, he was towed up the river to the town, and landed on the quay, whence he was drawn by six horses through the streets, to the place where the carcass was flenched, or cut up.

The accompanying drawing (*fig.* 56.) is a faithful repre-

56



sentation of the body, when lying on the ground; and the dimensions, taken as accurately as circumstances would admit, are given below.

The descriptions of the grampus, in the works on natural history to which I have had an opportunity of referring, do not exactly correspond with the above specimen; but that which approaches nearest to it is the following, taken from the last edition of the *Encyclopædia Britannica.*

4th Genus. — DELPHINUS.

" Maxilla utraque dentata: fistula in fronte.

" Both jaws are furnished with teeth; the spout in the forehead.

"*Delphinus Orca, Grampus.*

"The body is nearly oval. The dorsal fin is very high. The teeth are conical and slightly curved. The profile of the grampus is oval and oblong. The greatest thickness is about the middle of the trunk, from which it gradually diminishes towards both extremities. The snout is short and round. The lower jaw is broader than the upper. Both jaws are furnished with conical teeth, which are unequal and curved at the top, and are from twenty to thirty in number in each jaw. The eyes are situated in the same line with the opening of the mouth. But the most distinguishing mark of the grampus is the dorsal fin, which rises from the middle of the back, and is nearly 4 ft. in height. The pectoral fins are very broad and nearly oval. The tail fin is divided into two lobes in the form of a crescent. The upper part of the body is black, the belly is white. Sometimes white spots are discovered on the head and back. The grampus is the largest fish belonging to the genus. Some have been seen of 25 ft. in length, by 12 or 13 ft. in circumference."

Our specimen varies from the above description in the following particulars: —

Its dimensions are —

	Ft.	In.
From the tip of the upper jaw to the division of the tail, following the curve of the back	21	3
From the tip of the under jaw to the same, in a straight line	18	11
From the tip of the upper jaw to the anterior edge of the dorsal fin	8	2
From the posterior edge of the dorsal fin to the division of the tail	10	9
Base of the triangular dorsal fin	2	4
Height of ditto	4	0
Length of the ovate pectoral fin	3	11½
Width of ditto	2	8
Distance of the two lobes of the caudal fin	7	1
Circumference of the body	14	0
From the tip of the upper jaw to the spiracle	2	7
From the tip of the lower jaw to the anterior edge of the pectoral fin	4	0
From the back tooth of the lower jaw to the same on the opposite side	0	10

The teeth are twenty-four in each jaw, the seven backward ones are cuspidate, the rest appear to have been the same, but are now worn down. Those in the front are nearly concealed, and a few of the central ones are curvated. The upper jaw projects a little beyond the lower. The eye is placed 5 in. above the corner of the mouth. The orifice of the ear is scarcely large enough to admit a pea, and is placed just behind the eye in the white spot. The spiracle was so much

injured by the fishermen in their attempts to kill the animal, that its form cannot be correctly ascertained; but it appears to have been lunated, with its horns turned towards the nose. The skin is a fine glossy black; but the under jaw, the belly, a singular oval spot behind each eye, and a large mark on each side are of a pure white: the saddle-like mark on each side the back is of a silvery grey. The dorsal line is prominent, sharp, and of a jet black. Its weight is computed at about 3½ tons; and it was purchased of the fishermen for 23*l.*: it is not, however, expected to yield a sufficiency of oil to repay the purchaser; but, as he realised something by exhibiting the animal, and afterwards sold its head for 7*l.* to a gentleman in the neighbourhood, he is not likely to be a loser by his bargain.

I am, yours truly,

Lynn Regis, December 1. 1830. G. M.

ART. IX. *Observations on the British Species of Shrikes, their Habits, Nidification, &c.* By J. D. HOY, Esq.

Sir,

I HAVE a few remarks to offer you on the birds of this genus inhabiting or occasionally visiting our island, which may perhaps be not altogether uninteresting to some of your readers.

The Great Ash-coloured Shrike has never, I believe, been known to breed in this country, but it is not unfrequently met with during the autumn and winter, more particularly in the eastern counties: seldom a season passes without my observing the bird in this neighbourhood. A friend of mine assures me he has seen it in Essex, near Colchester, in the month of June; that he had a good view of the bird, and could not be mistaken: but I consider it merely an accidental occurrence. I have occasionally seen the shrike suddenly stop in its flight, and balance itself on wing, in the manner of the kestrel, probably looking for mice, of which it is very fond. I have often found the remains of mice, and sometimes small birds, fastened on whitethorn bushes, near its haunts. It is common in many parts of Europe; breeds most frequently in the heathy and wooded districts, often building its nest on fir trees, which are in many parts thinly scattered over the heathy lands, sometimes in the fork of an oak or other tree, at a considerable height from the ground; it never builds in low bushes or hedges; the nest is large, formed on the outside

with small sticks, pieces of heath, and wool, with a little moss sometimes intermixed, lined with wool, fine grass, and feathers. It lays five eggs, rather less than those of the common thrush, pale bluish white, sprinkled all over with ash-coloured spots running into each other at the larger end. There is not much difference between the plumage of the young and that of the adults.

The manner in which this bird is used by falconers, in assisting them to catch hawks for falconry, shows that the term excùbitor has not been given it without reason. As the method may not be known to many of your readers, I will briefly describe it.

The village of Falconswaard, in North Brabant, has been long famed for its falconers; it formerly sent out men well practised in this art to every country in Europe; and the few efficient falconers still remaining (as this diversion has been of late years almost wholly laid aside on the Continent as well as in this country) are natives of the village of Falconswaard. The hawks are generally caught during the months of October and November, when they are on their passage towards the southern parts of Europe. The falconer constructs a low turf hut in an open part of the country, with a small opening on one side; at about a hundred yards' distance from the hut a light-coloured pigeon is placed in a hole in the ground covered with turf, with a string attached to it which reaches to the hut; another pigeon is placed in a similar situation on the opposite side at the same distance. At ten yards' distance from each pigeon a small bow net is fixed on the ground, so arranged as to be pulled quickly over by means of a piece of small iron wire made fast to the net, and reaching to the hut: the string by which the pigeon is held passes through a hole in a piece of wood driven into the ground in the centre of the bow net. The falconer has also a decoy pigeon in a string at a short distance from the hut; and several tame pigeons at liberty on the outside, which, on sight of a hawk, immediately take shelter within. The butcher bird (Lànius excùbitor) is fastened by a leather thong on a hillock of turf, a yard in height and a few yards distant from the hut; a small hole is made, and a piece of turf laid over, for a place of retreat in case of danger.

The falconer, employing himself in some sedentary occupation, observes every motion of his little watch, and it is almost incredible at how great a distance he will point a falcon in the air. If it approaches, he shows symptoms of alarm, drawing in his feathers, and fixing his eyes in the same direction: on a nearer approach, he screams aloud; the falcon being then,

perhaps, not less than three or four hundred yards distant: on its closer approach, he retreats under the turf, and quite conceals himself. It is then the falconer draws out the pigeons where the nets are fixed, which fluttering round generally tempt the hawk to make a stoop at one of them, which if he takes he is inevitably ensnared. While the falcon is near, the shrike continues in his hiding-place, hardly daring to show his head at the entrance of his retreat; should the falcon be taken or pass over without attacking the pigeons, he cautiously creeps out, yet almost afraid to trust himself on his hillock, looking on every side; and does not during some time recover from his alarm. He is greatly terrified at the sight of the goshawk, screaming and endeavouring to escape; as this hawk would even seize him in his hiding-place, should he catch sight of him, which the falcon would not. He does not show much alarm at sight of the kite and different species of buzzards, unless they are very near to him; so that, by the motions of the butcher bird, the falconer can tell almost with certainty the species of hawk which is approaching him. Were it not for the penetrating eye of the watchful bird, the falconer would sit many dreary hours to no purpose, as he would not know when to pull his pigeons out to lure the hawk.

The Woodchat (Lànius rùtilus) may be numbered among our accidental visitants, and one of the most rare. Nevertheless, it may visit this island oftener than is imagined, as its great similarity to the red-backed species would prevent its being noticed by the unscientific. It is abundant in some parts of the Netherlands. I know of only two instances, within a few years, of its being killed in this country, once near Canterbury, and another time in the neighbourhood of Swaffham, Norfolk; which last bird is in the collection of the Reverend R. Hammond of Swaffham. It differs from Lànius *C*ollùrio in the choice of situation for its nest, placing it invariably on trees, and preferring the oak. The nest is placed in the fork of a projecting branch, composed on the outside with sticks and wool, mixed with white moss from the bodies of the trees, and lined with fine grass and wool. Eggs four and five in number, rather less than those of Lànius *C*ollùrio, and varying much in markings; the ground colour being pale blue in some, in others a dirty white, surrounded near the larger end with a zone of rust-coloured spots; in some, again, the markings and spots are of a paler colour, and more dispersed over the egg. There is but little difference between the plumage of male and female, in the latter the plumage not being quite so bright. The young in first feather much resemble those of the red-backed shrike. It is not a wild bird, often building

close to houses and public roads. It arrives and departs about the same time as Lànius *Collùrio*. I have a female bird of the red-backed species, in the full garb of the adult male. I had found the nest, and observed near the spot apparently two male birds; not being able to discover the female I was induced to shoot both; and, on dissection, one proved the female, with the eggs much enlarged, and one nearly ready for exclusion. I mention this circumstance, as this change of plumage in some species has been attributed to barrenness.

I am, Sir, &c.

Stoke Nayland, Suffolk, March 16. 1831. J. D. Hoy.

P.S.— A stork (*Ardea Cicònia*) was shot near Mildenhall, in this county, in the beginning of July, 1830; and, during the month of December, 1830, six specimens of the waxen chatterer (*Ampelis gárrulus*) were killed in the vicinity of Ipswich. — J. D. H.

ART. X. *On the Black Marten* (*Hirúndo A'pus* Lin.). By W. L.

Sir,

MR. WHITE, in his fascinating letters on the natural history of his district, gives several interesting memoranda respecting the habits of the black marten, and he tells enough to show that, like the starling, it is sometimes capricious, and sometimes exercises a sound discretion in the choice of a place for breeding. In this, indeed, many birds are evidently ruled by circumstances. For instance, I recollect, when a schoolboy, a commonwealth of sparrows that had for generations nestled in the thatch of an old two-storied mill. By their numbers, which probably might lead them to their licentious and irregular mode of occupancy, the roof had become, from eaves to ridges, a mass of holed and perterebrated shapelessness; and, as it had been considered both as "labour in vain" and needless expense to renew it with similar materials, the mill was slated. The kiln had been slated before for a different reason, and the adjoining cottages were too low to be safe in the neighbourhood of a town that, over and above the usual swarms of bareheaded runagates, contained two boarding-schools. The sparrows, seemingly with common consent, removed to a very old garden hedge, that had grown up into hawthorn trees, and there made large clumsy nests of straw, each nearly the size of a magpie's, solid at first, and then they made the necessary holes in them, as they are accustomed to do in the eaves of a house.

But as to the black martens. One of the branches of the river Beauly, or Glass, between Inverness and Ross shires, forms an alpine valley, about twenty-five miles in length, surrounded by rugged conical mountains, upon which the snow often lies until the month of August. Two narrow lochs, through which the stream flows that descends from this glen, extend together, and fill about twelve miles of its length. The whole valley was in former times one continued forest of native fir (*Pinus sylvéstris*), which for many centuries furnished timber for the boats and roofs for the cottages of the south-western part of Ross and the Isle of Skye; and for sixty years, until lately, it has been cut and floated to the Beauly Firth; so that now the extent of the forest in that valley is almost confined to the banks of those lochs: but still, for about three quarters of a mile in breadth, it covers the sloping skirts of the mountains on the southern side, and forms one of the most extensive pine forests in Scotland. Through this the traveller has to fight his way by a track broken, rough, and circuitous in a strange and perplexing degree, and so encumbered by rocks and insulated masses of granite, and huge tortuous roots of trees, that a stranger from the Lowlands, and without experience in such districts, finds it not a little difficult to persuade himself that he actually traverses part of his native land. It was my fortune to pass through this wilderness for the first time alone, and in the close of the evening; and I am not likely to forget the impression. The trees having all been cut over below the main branches, and these being often of great size, and left to remain where they had been severed from the trunks, and the timber being of the hardest and most imperishable kind, the ruins of a hundred years, in all stages of decay, were crowding the long heath in the intervals between the standing trees. Stripped of the bark by time, and bleached white by the storms and weather, they looked like the ribs and bones of immense animals, the race of which had long perished from the earth. Moreover, as none of the hollow, diseased, or crooked trees had ever been felled, most of these had died, and were likewise divested of their bark; and their grey and fantastic forms, between which was at times reflected the snow wreaths of the opposite mountains, added very much to the loneliness and dreariness of this strange scene of desolation.

Since that time it happened to me to be with some friends in a boat upon one of these lochs, and while contemplating the grandeur of such an extent of gloomy forest, and the effect of the broad masses of light and shade, varying from "tufted ridge to hollow glen," I was greatly surprised to

observe hundreds of black martens skimming over the tops of the trees, after their usual manner while eager in pursuit of their prey. No old building or castle was nearer than thirty miles, and Inverness was more than forty; the only place, indeed, from which I could suppose such an unusual number of these birds to proceed. Whilst trying to digest the improbability that the parents should leave their young at such a distance, and considering if it could be at all possible that, with all the remarkable power of wing peculiar to the bird, they should be able to fly back and forward in time to supply their wants, the noise of a woodpecker, labouring for its sustenance after quite a different manner, drew an observation from one of my friends resident in the neighbourhood, that is, some ten miles off. He remarked that the loud tapping sound was not so often caused by their searching the bark for insects, as by their boring holes in the large decayed trees in which they made their nests; and that it was said they never made use of an old hole, but took the trouble of perforating a new one every time they hatched. It immediately occurred to me that the presence of such a prodigious number of swifts could be more easily accounted for than by supposing them to come either from the old monastery at Beauly or from Inverness, to hawk for flies thirty or forty miles from their young: I forthwith requested that one of the shepherds who had most turn for enquiry anent such sort of matters might be set to examine whether the swifts did not occupy the deserted holes of the woodpeckers; and I was gratified by being assured, some time afterwards, that this was found to be the fact.

Selkirkshire, November, 1830. W. L.

ART. XI. *Remarks on the Locomotion and Habits of the Limpet.* By FREDERICK C. LUKIS, Esq.

Sir,

THE opinion that the common limpet (Patélla vulgàta) is stationary, and that the animal remains in the same place, only raising its shell for the purpose of catching food from the surrounding element, has frequently been advanced by superficial observers, who have been deceived by the circumstance of the same individual being seen for days, and even years, attached to the same spot.

The principal object of these remarks is to point out some facts connected with this shell, which may lead to further

observation, and the careful study of this neglected species. Since the observations of Reaumur on the locomotion of the Patéllæ, the general habits of the limpet have not been so clearly known as might have been expected. M. d'Orbigny, junior, indeed, made some interesting remarks on this class of Gasteropodes, from examinations taken on the chalky coast of the Channel, where they are frequently found partly buried in holes in rocks and stones, symmetrically formed by their own shells; and the constant position retained by the shells in these cavities has raised a doubt whether they ever left these favourite spots. It may be observed, that the regularity of the shells of the Gasteropodes is considerably affected by the ruggedness or unevenness of the spot to which they show a predilection to attach themselves; and that the growth of the shell is influenced by it, so that they frequently appear distorted in an extraordinary manner. This singular attachment to a particular spot having commenced during their young state, they seldom seek another, but accommodate their shell, in its after-growth, to all the irregularities of the rock. The first choice of the situation appears to differ agreeably to its distance from low-water mark, those animals most exposed to the rays of the sun seeking a shaded side in preference. The Patélla having the power of raising its shell, and roving about at pleasure, counteracts the influence of the inequalities of the substance to which it is fixed, and does not so frequently exhibit the pattern of the base as the *O*strea, Anòmia, and *L*èpas are seen to do.

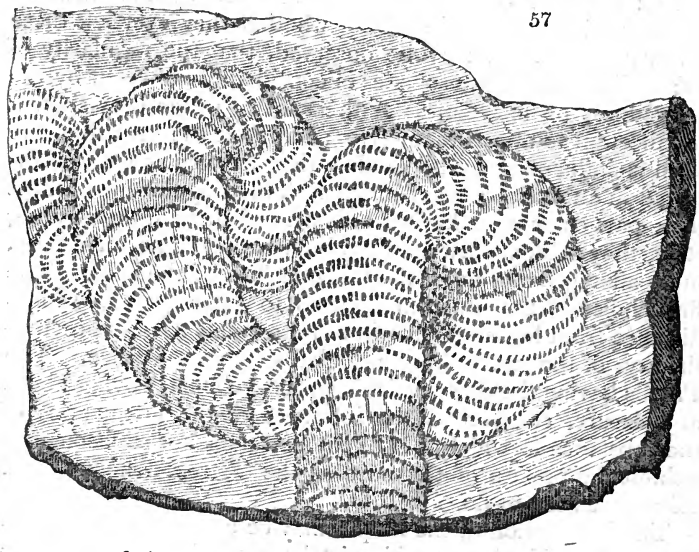
The locomotion of the limpet may be ascertained by marking one individual, to avoid mistake, and then observing its cautious roaming, and regular return to its favourite place of rest, where the shell will be found exactly to correspond with the surface of the rock to which it is attached. Here it will rest, or sleep, and only relax its strong adhesion to the rock when the muscular fibre becomes exhausted by long contraction, in which state a sudden blow horizontally given will easily displace it. A fact known to the fishermen and the poor who use them for food * is, that they are more easily

* Patélla vulgàta seems to have been used by the inhabitants of these islands from the earliest times, as appears from masses of its shells now found in ground which has lain waste and unturned for centuries. In 1829, a large heap of these shells, mixed with ashes, was discovered in a furze field, about 2 ft. below the surface; among which a leathern bag was found, containing near 700 silver and copper coins of the reigns of Edward III., Philippe VI. (de Valois), &c. In the ruins of the oldest buildings are found great quantities of broken limpet shells (many of them retaining the marks of fire) mixed with the mortar used in the building. This, however, will appear the less remarkable in a country destitute of limestone.

collected in the night-time than in the day. May not this be the period of roaming for food, as well as when covered by the tide?

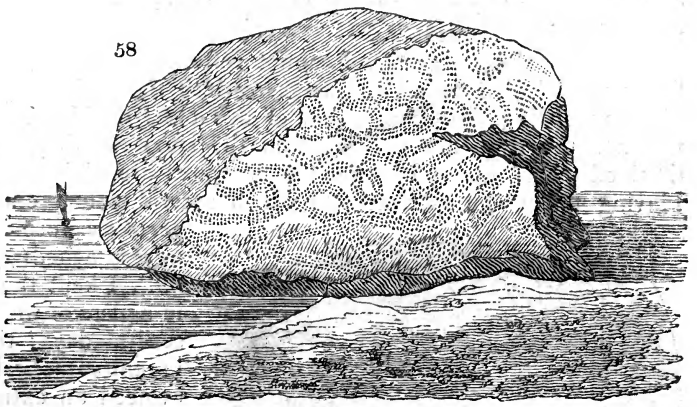
The march of the limpet is slow and formal; and, whenever the cupping process is renewed, the posterior end of the shell is brought in contact with the rock, which, if of a soft nature, will receive the impressions of its denticulations, as seen in the annexed sketch (*fig.* 57.); which exhibits a piece of argil-

57



laceous rock in my possession, on which this operation has taken place. The track of this individual was visible over a space of several yards, possessing the same regularity and disposition, and was further remarkable for the constant revolution on its left.

The tracks of the limpet on granite and other hard rocks present at first sight the same appearances; but on a closer examination they are found to differ, as will be seen by *fig.* 58., which represents a rock of fine-grained siennite on this coast, the surface of which was much worn and polished by the action of the sea. When first observed, in 1829, a large portion of it was traced over by these shells; the remainder was plain, and appeared varnished with a thin coating of some kind of fucus, without any markings upon its surface. As no Patéllæ were at first discovered, and the isolated situation of the rock prevented any from reaching it, I was at a loss to explain these appearances; but, after some search, a fissure was found at the north end, where five or six limpets



had fixed themselves, each having a direct road leading to their pasturage ground. By the help of a glass, the markings visible on the rock were discovered to be the remains of the above fucus, which had been eaten through, or trodden down, by these animals in their excursions, and which retained the indentures of their shells. The edge of the vegetable surface was then examined, and found to be nibbled in a circular manner, resembling the anterior margin of the shells. On comparing this with the above specimen (*fig.* 57.), a remarkable difference was found to exist in the position of the circular traces, which appeared chiefly the work of the mouth or anterior serrations of the shell, and not like the impressions caused by the locomotion of the animal on a soft rock.

This fact tends to prove the species of food eaten by the limpet; although I think it probable that they feed on other substances besides Thalassiophytes, as I have since found similar markings on *Lichen niger*, which covers our rocks below high-water mark.* Whatever doubts may exist on this subject, it may be presumed that, like Patélla lævis and P. pellùcida, their chief food consists of marine plants; and that the cretaceous substances found in their stomachs may be, as in the case of other animals, for some necessary use. The rock has been revisited this year, and the shells observed in

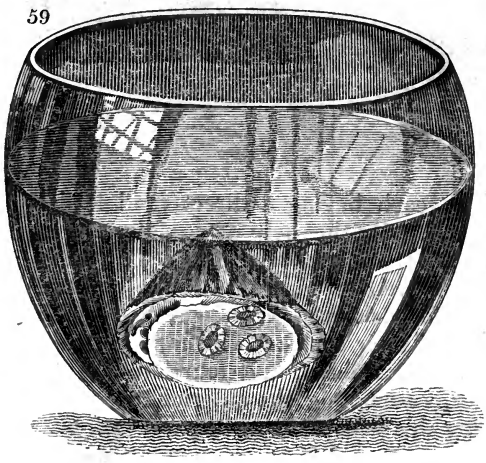
* "L'appareil dentaire des patelles, et leur grande abondance dans les lieux couverts de Thalassiophytes, me fait soupçonner qu'elles doivent se nourrir de substances végétales; mais c'est ce que je ne puis assurer." — *M. de Blainville, Dictionnaire des Sciences Naturelles*, tom. 38.

"The dental apparatus of the Patéllæ, and their numbers in places covered with Thalassiophytes, lead me to suspect that they feed on vegetable substances; but of this I have not been able to satisfy myself."

their former lodging; but the field of pasture appeared somewhat diminished in extent.*

In closing these remarks, I cannot refrain mentioning the following, which I do without entering into the various opinions regarding the propagation of this class of Mollúsca, whether the eggs are deposited in the situation they are destined to occupy, or whether the creatures are viviparous. Having taken one specimen, to which several young ones, perfectly formed, were attached (*fig.* 59.), I kept them in a glass of water several days; the parent (so to speak) evinced an extraordinary care of the young, drawing them about in her march round the glass, and fetching them back again, if any of them moved away from the limits of the shell. As the superior power of suction of the parent was capable of overpowering that of the young ones, I repeatedly reversed their position by placing them foot to foot; the animal, instead of proceeding round the glass as before, appeared in a state of uneasiness, became stationary, and would immediately contract the edge of its foot to replace them in their former and natural position. This operation seemed one of difficulty; but, when effected, the limpet commenced its perambulations as before. This circumstance seems to indicate a degree of sensibility not generally ascribed to this species; and my reason for relating it is to induce others to the closer study of the nature and habits of this common molluscous animal.

59



The limpet has been used as an article of food by the poorer classes in most parts of the world, and in these islands great quantities are daily consumed; scarcely a cottage on the

* Túrbo litòreus and Cárdium edùle have both nearly become extinct on this coast, where they were once abundantly found: in their place, *T*rôchus crássus and Vènus verrucòsa supply our market, and are esteemed by the inhabitants. These last, with Haliòtis tuberculàta, and *P*écten máximus, are the only species of Mollúsca which afford a cheap and wholesome diet.

coast is seen, where a heap of empty shells does not form a prominent feature near the door: but, although they are gathered in vast numbers, their rapid propagation affords a constant supply, and they do not diminish, comparatively, as some other tribes of shells.

Guernsey, Nov. 1830.

ART. XII. *An Introduction to the Natural History of Molluscous Animals.* In a Series of Letters. By G. J.

Letter 7. *On Burrowing and Stationary Mollúsca.*

Sir,

I SHALL continue in this the subject of my last letter, and proceed to make you acquainted with such habits of the fixed and burrowing Mollúsca as have relation to locomotion; and there is more to interest us here than may be at first obvious.

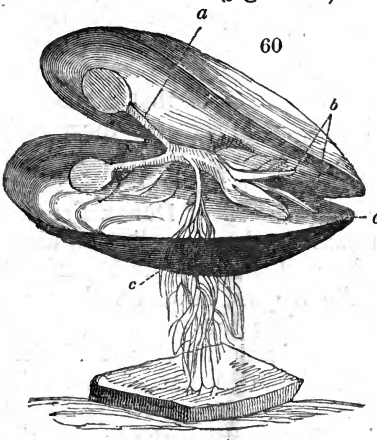
The permanently stationary tribes are to be found only among the bivalved and tunicated classes, and of the latter the greater number are so circumstanced. Some of these (Distoma, Aplídium, Polyclínium, Botrýllus) envelope the stems and leaves of sea-weed in a jelly-like mass, studded over with stellated figures; others (Cýnthiæ) adhere to them or to rocks by a base more or less extended, and, being covered with a rough coriaceous skin, very much resemble large warts or tumours; while a few (Boltènia, Clavelìna) rise on a slender stalk which serves them for a cable, and is fixed to its stay by fibrous radicles, not unlike those of some sea-weeds. The adhesion of all of them is permanent and very strong; so that when you attempt their removal, it must be made cautiously, and with a knife, otherwise their body, tough as it is, will certainly be torn. These Móllusca, however, are born free, and in their veriest infancy even swim at large; but, unapt to roam, and careless of liberty, they soon voluntarily root themselves beside their parents, never again to remove from the natal rock.

The bivalves which are stationary are much less numerous in species than the locomotive tribes; but among the former there are some, as the oysters and muscles, which in the number of their individuals probably far exceed all others. With the exception of the two genera A´rca and *C*hàma, they all belong to an extensive suborder, which has only one, or at least one principal, transverse muscle to close the shell with; and the shell of them all is more or less of the foliated struc-

ture. They are affixed in various ways; for the Author of nature, in accomplishing one and the same end, ever varies his means and workings. The oysters and *Spóndyli*, horrid with projecting spines, adhere by cementation, that is, without the medium of any connecting membrane or ligament; the inferior valve, in its growth, becoming fixed and modelled to the foreign substance on which it lies. The Anòmiæ, which in character much resemble the oysters, are fixed partly in the same way, but their chief hold is effected by the transverse muscle, which, in the form of a round ligament, passes through a hole in the lower valve, and is firmly cemented by the intervention of a calcareous wafer. In a somewhat similar manner the Terrebrátulæ are fixed by a short ligament; while the Língula *a*natìna is raised and supported on a cylindrical cartilaginous peduncle, a few inches long, and capable, apparently, of a certain degree of contraction and elongation. The muscles, the *P*ínnæ, some pectens and A´rcæ, are moored by what is vulgarly called the beard of the fish, but in the language of science the byssus. This consists of a bundle of blackish horny fibres or threads, connected to the animal within the shell on the one hand, and to the rock on the other. These threads are formed, according to Cuvier and most authors, of a glutinous matter, secreted by a conglomerate gland placed at the base of the foot, and drawn out by the evolutions of this organ to their proper length, and moulded to their shape in a longitudinal groove on its surface. Blainville, however, considers this an erroneous account; for, according to him, the byssus is a collection of dried muscular fibres. The adductor muscle, he says, of these genera is at first, like those of other Mollúsca, contractile and living; but, being protruded beyond the shell, and attached to the rock, it becomes dried and inirritable to a certain extent, and the fibres by their exsiccation become loose from the thready cable, such as we observe it.* I know not which of these explanations to

* Manuel de Malacologie, p. 116. — In Fyfe's *Compendium of Comparative Anatomy*, p. 309., the following paragraph occurs: — "Many acephalous Mollúsca have a locomotive power, in consequence of a muscular appendix or foot, having on each side a set of fibres like silk. This body they can protrude or retract, so as to fix themselves to solid substances, or drag themselves along the sand. This substance is termed the beard, and is exemplified in the fresh-water muscle, where it is situated under and near the fore part of the shell. By means of the beard, the animal has sometimes been observed to move to the distance of some yards in a few hours." Indeed! For nonsense and error this passage has no parallel; nor should I have quoted it, had the book not possessed some reputation, and been intended for the "use of students." The author appears to have been totally ignorant of natural history, a study, indeed, which some anatomists affect to despise; and hence such blunders.

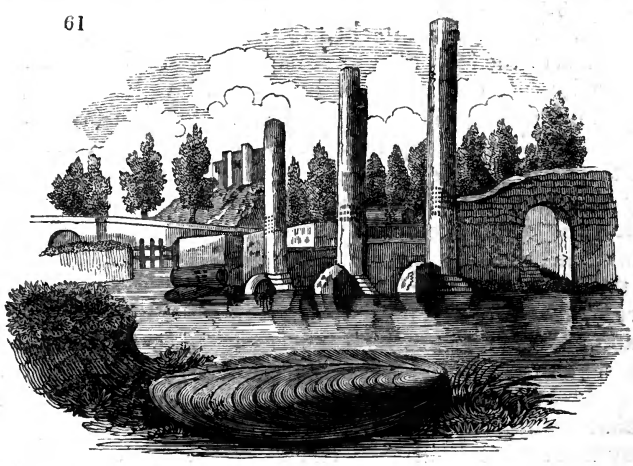
commend to your choice, for neither of them exactly correspond with the observations I have made to satisfy myself; but, my examination having been confined to the common muscle (*Mýtilus edùlis*), I will not aver that the following description of this part is generally applicable. From each side of the shell, in front of the great adductors, a cylindrical tendinous muscle (*fig.* 60. *a*) arises, and, running forward obliquely, it meets its fellow near the centre, and opposite to the hinge, where they unite, and where they are met by other two similar muscles (*b*), which arise near the beaks, anterior to the lesser adductors, and run backward. From the place of union between these muscles originates the byssus (*c*) by a single root or stalk. This is firm, cylindrical, cartilaginous, and of a clear amber colour, continuing simple for a short space, when it divides, in a very irregular manner, into a few branches, which are again divided into numerous entangled threads. These are attached to the foreign external bodies by means of the foot, a tongue-shaped organ lying at the base of the byssus, distinguished by its dark violet colour, and capable of considerable extension and retraction (*d*). There is a furrow drawn along its middle, probably of use in holding the threads while they are fixed without; but I do not perceive any glandular apparatus by which the latter might be secreted, unless this should be a fleshy sheath, which, indeed, does surround the base; and the transition, from the peculiar structure of the muscle to the horny structure of the byssus, is so abrupt, that this looks rather like a new organ than a modification of the one to which it is attached, as Blainville supposes. The accompanying figure will give you a good idea of what I have just described. These byssiferous species cannot voluntarily detach themselves; but if forcibly torn away from their hold they can refix the shell, probably by forming a new byssus; a provision without which they must have become the sport of the waves.



The next tribe to which I direct your attention are of singular habits. They are not mechanically fixed, but they

immerse themselves in cells, whence they cannot again issue or be removed; their house during life, and after death their grave. The *T*erèdo digs his tortuous cell in wood; the Phólades construct their more capacious dwellings in wood or clay; the Lithóphaga and Lithódomi excavate limestone rocks, coral rocks, or the thick shells of other Mollúsca; while the Fistulànæ are said to burrow indifferently in sand, in wood, in rocks, and in shells. In general each species confines itself to one kind of substance, though this is not always the case. Olivi says that he has twice seen Phólades in a piece of compact lava; the common European species of that genus are found as often in timber as in clay, and some of them perforate likewise calcareous rocks. Montagu tells us he had specimens of Mỳa pholàdia in common limestone, in fluor, and in granite*; and Dr. Pulteney speaks of Dònax I*r*us as being plentiful on the Dorset coast in clay as well as in limestone.† They are to be found on all shores, from Greenland to the furthest Ind. Within the tropics, however, they are most abundant, and of the largest size; but the station most celebrated in history is European, viz. in the Bay of Naples, where a colony of Lithódomi had settled themselves in the pillars of the temple of Jupiter Serapis during the period of its submersion. At the height of 10 ft. above the base of the three standing pillars which remain, and in a position exactly

61



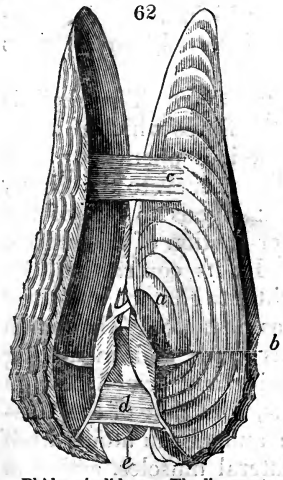
a

corresponding in all, is a zone of 6 ft. in height, where the marble has been scooped into cells by these Mollúsca (*fig.* 61).

* Test. Brit. Sup., p. 21. † Ibid, p. 109.

The holes are to the depth of 4 in.; and it is observed that the nodules of quartz and feldspar, which sometimes occur in the hard limestone of the pillars, are untouched.* In what manner this temple was submerged and again left dry has much puzzled and perplexed philosophers, and the discussion is fortunately beyond our province; but it becomes us to enquire by what means shell-fish make these holes, for which, apparently, they are most unfit.

The point has been much debated, and it seemed so hard to solve, that Rondeletius saw nothing for it but to suppose that the sea water, lodging in the rocks, was itself transformed into Phólades and other saxicavous Mollúsca; and other philosophers, as Mr. Bingley good-naturedly calls them, were driven to the belief that they entered the rock while it was yet in a soft state, which afterwards hardened by degrees around them. Two explanations of the process have divided less imaginative naturalists: the one is, that the creatures bore by the aid of a solvent liquor which they excrete; the other, that they do so by the friction made by semi-rotatory motions of the shell. I will not detain you with a regular defence of either opinion; for it is very probable that neither is applicable to all of these Mollúsca, some of which are certainly mechanical borers, while others apparently operate by a chemical menstruum. This is the view which Mr. Osler has taken of the subject, in a paper of very great extent, from which I shall give you some rather long extracts, the more willingly, as it is contained in a work not easily accessible in remote situations.†



Phòlas cándida. *a*, The ligament and process to which it is attached. *b*, The lateral process. *c*, The posterior adductor. *d*, The anterior adductor. *e*, The accessory valves over the hinge.

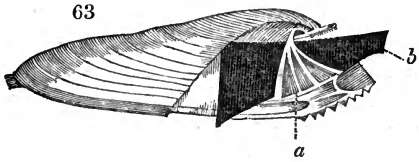
The anatomical structure of the Phòlas leads to the conclusion that it excavates its cell mechanically, by employing the shell as a rasp; and the part which it employs in boring is the anterior and lower portion of the shell, which is thicker and armed with much stronger spines than any other part. Mr. Osler has given a minute account of the peculiarities of

* Brewster's Journ. of Science for Oct. 1829, p. 271.

† Phil. Trans. for 1826, part iii. "On Burrowing and Boring Marine Animals." By Edward Osler, Esq., p. 342. What follows of this letter is almost entirely taken from this admirable paper.

structure which enable the animal to perform the necessary motions, but much of it I must omit. The fish, he tells us, is provided with four sets of muscles, in addition to those belonging to the siphon. The posterior adductor (*fig.* 62. *c*) is a flat muscle, connecting the valves nearly midway between the hinge and the extremity of the shell, and having its attachments at about one eighth of an inch within its dorsal margins. It lies so superficially, that its action is seen when the animal employs it in boring. The anterior adductor (*fig.* 62. *d*) is attached to the reflected folds of semi-perlaceous shelly matter which cover the umbo. It extends, from a point a little before the hinge, nearly to the anterior extremity of the shell, and is covered by the accessory valve. The ventral margins are connected by muscular fibres from the opening in the mantle through which the foot is projected, as far as the origin of the siphon. A pair of muscles, which may be termed lateral, arise from the points of the long hooked processes, which, becoming fan-shaped as they pass over the body, are inserted into the sides of the foot (*fig.* 63. *a*).

63



a, The lateral muscle. *b*, A piece of dark paper introduced to display it.

The offices of these muscles are peculiar. The shell is closed, not by the adductors, but by the fibres which connect the ventral margins of the valves, and it is opened by that part of the anterior adductor which lies nearest to the hinge, and which thus performs an office analogous to that of the ligament in other bivalves. The other portion of this muscle antagonises the posterior adductor. By its contraction, the anterior points of the valves are brought into contact, and their dorsal margins separated as widely as possible. The action of the posterior adductor reverses this state; and, in uniting the dorsal margins, expands the anterior and armed portion of the shell. The foot of the Phòlas, like that of the Gasterópoda, is a flat disc, by which the animal can attach itself firmly. When it is thus fixed, the lateral muscles, acting in an oblique direction, will raise the posterior end of the shell, and press its armed extremity forward and downward; or, if one of them should contract more strongly than the other, it will bring down the corresponding side of the shell, which will be restored to its erect position by the action of the opposite muscle.

The Phòlas, then, has two methods of boring. In the

first, it fixes itself by the foot, and raises itself almost perpendicularly, thus pressing the operative part of the shell upon the substance to which it adheres; it now proceeds to execute a succession of partial rotatory motions, effected by the alternate contraction of the lateral muscles, employing one valve only, by turning on its side and immediately regaining the erect position. This method is almost exclusively employed by the very young animals, and it certainly is particularly well adapted for penetrating in a direction nearly perpendicular, so that they may be completely buried in the shortest possible time; a time still farther diminished by their form: for at this early age the posterior extremities of the valves are much less produced than they afterwards become.

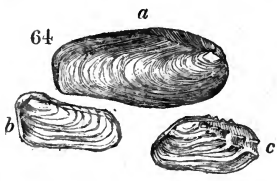
But when the Phólades have exceeded two, or, at the utmost, three lines in length, they change the direction and work horizontally; for the altered figure of the shell, and the increased weight of that part of the animal behind the hinge, prevent them rising so perpendicularly as at first. In the motions required to enlarge the habitation, the adductors perform a very essential part. The animal being attached by the foot, brings the anterior points of the shell into contact. The lateral muscles now contract, and raising the posterior extremity of the shell, press its operative part against the bottom of the hole, and, the moment after, the action of the posterior adductor brings the dorsal margins of the valves into contact; so that the strong rasp-like portions are suddenly separated, and scrape rapidly and forcibly over the substance on which they press. As soon as this is effected, the posterior extremity sinks, and the stroke is immediately repeated by the successive contractions of the anterior adductor, the lateral, and the posterior adductor muscles.

Thus do these creatures mine their cells; the instinct which directs them operating from their earliest infancy: for they are found completely buried, when so minute as to be almost invisible; and the rapidity of their growth, for the first few weeks, compels them to exert themselves perseveringly in effecting the enlargement of their habitation. The particles of clay or wood worn down by their operations, and which, in a short time, completely clog the shell, are removed in a very simple manner. The animal fills the siphonal tubes, which convey water into its body, closes the orifices and retracts them suddenly; by which act the water which they contained is ejected forcibly from the opening in the mantle; and the jet is prolonged by the gradual closure of the valves, expelling the water contained within the shell. The chamber occupied by the animal is thus completely cleansed; but as many of the

particles washed out of it will be deposited before they reach the mouth of the hole, the passage along which the Phòlas projects its siphon is constantly found to be lined with a soft mud.

The *T*erèdo, which, as a British animal, is probably now quite extinct, is also a mechanical borer; and it does its work much in the same manner, and by means of a structure very analogous to that of the Phòlas. The muscles indeed vary in their relative size, because their size is proportioned to the force they are required to exert, which differs in the two genera; but their arrangement and mode of action are so similar that it is unnecessary to enter into the detail. The *T*erédines, it would seem, however, do not eject as useless all the debris worn down in their operations, but turn part of it at least to their nourishment, for Mr. Hatchett found the contents of the intestine to be "vegetable sawdust." It is also worth remarking, that they bore across the grain of the wood as seldom as possible; for, after they have penetrated a little way, they turn and continue with the grain tolerably straight until they meet with another shell, or perhaps a knot, which produces a flexure, the course and size of which depend on the nature of the obstruction, and which, if considerable, causes the individual to take a short turn back in form of a siphon, rather than work any distance across the grain.*

But the Lithóphaga and Lithódomi (*fig.* 61. *a*) have no structure for boring such as I have described in the Phòlas, and yet it were reasonable to suppose for them a structure stronger and more fully developed for the purpose, did they really operate mechanically, seeing that the substances they dig into are harder than those selected by the Phòlas or *T*erèdo. This anatomical argument might be deemed sufficient of itself to prove that the Lithóphaga must work by the agency of other means. Moreover, the texture of the shell is so soft, that it could make no impression upon the stone without being itself acted on; and the effect of this would be permanent, because superficial injuries of the shell are never repaired. But nothing of this kind is met with. Mr. Osler has even found a Saxícava rugòsa (*fig.* 64. *a*), the species on which his observations were made, fixed between two others, which was so compressed that it was quite flat, and little more than a third of its proper thickness; yet neither of the three



* Montagu, Test. Brit., p. 529.

showed the slightest mark of friction, and the cuticle of the sides in contact was as perfect as usual.

What, then, is the power which the Saxícava and its congeners employ? The question has not been perfectly resolved; but it is probably an acid excreted by the animals, capable of softening or dissolving lime. An objection to this may be taken from some facts already mentioned, viz. that these shellfish are sometimes found in argillaceous as well as in calcareous rocks. The facts, however, admit of explanation; for the young animals may be supposed to fix themselves in holes or crevices convenient for their purpose, and which afford them immediate shelter. Hence they are occasionally found lodged among the entangled roots of sea-weed; and they will sometimes find a shelter in rocks upon which they are unable to act chemically. And that this explanation is correct may be proved by the examination of the cells, which are not smoothed and fashioned to the shape, as they are when excavated in limestone: and, indeed, when burrowing in the latter, if the animal meets with a piece of clay or feldspar, its progressis immediately stopped, or the shape of the shell is deformed by the pressure of this insoluble substance. The cells in the pillars of the temple of Jupiter Serapis afford examples of this fact, and Mr. Osler has adduced several others which fell under his own notice.

But this solvent of limestone must, you may still object, act destructively on the shell itself, which is of the same composition, and certainly not more insoluble than the rock? To answer this, you must allow me to suppose, nor is the supposition an unreasonable one, that the animal has the power of applying its solvent to a limited space external to the shell, where it is quickly neutralised and rendered harmless. The instrument of the application I believe to be the foot, an organ which admits of being extended to a length fully equal to that of the shell, and appears to be perforated by a tube, which passes forward from the part where it joins the body and terminates abruptly on the under surface near its extremity. By this instrument the liquid can be applied remote from the shell, which is thus removed from its destructive influence. Where the Saxícavæ are numerous, their holes communicate very freely; and it is common to meet with one which has attached its byssus to another. In this case, it is always found that the shell of the second has been acted on in a direction, and to an extent, which corresponds with the range of the foot of the assailant. The neighbouring shells are very often thus corroded. "On examining a considerable number," says Mr. Osler, "taken indiscriminately from the

same rock, I have found that the shells of more than half had been thus injured. As long as the injury is superficial, no attempt is made to repair it; but, when the shell is nearly or quite penetrated, the breach becomes filled, not with new shell, but with a firm yellow substance, which is insoluble even in a strong mineral acid. It would be difficult to conceive a fact, short of absolute demonstration, which could give a more decisive support to the theory of a solvent. A peculiar provision is given to the animal to preserve it from destruction by an injury to which it is particularly exposed. The supposition of mechanical penetration would require us to believe that a newly formed substance, much softer than that which has been destroyed, can stop the progress of the mischief, and even repair it, under the continued application of the original destructive force.

These arguments seem strong, perhaps conclusive, yet has a solvent never been detected; and every experiment which Mr. Osler has made for this purpose has been quite unsuccessful. Had the question been previously balanced, our inability to detect a solvent would justify strong doubts of its existence: but, while all the facts connected with the natural history of the Lithóphaga afford a strong and consistent support to the theory of a solvent, and are opposed as decidedly to the supposition of penetration by a mechanical force, the failure of the experiment cannot be considered to militate very strongly against the only inference to be drawn from the facts. And it may be observed, that, where the Lithóphaga happen to be lodged in situations which afford them sufficient room and shelter, they make no attempt to enlarge their habitation. Thus Saxícava præcìsa * (*fig.* 64. *b*) is more frequently found among groups of Sérpulæ, or in the roots of sea-weed, than in a hole excavated by its own efforts; and Mr. Osler has obtained full grown specimens of Hiatélla árctica* (*fig.* 64. *c*) attached by the byssus to a *P*écten. It may therefore be presumed that the solvent is secreted only when its agency is required; and this would sufficiently explain why a free acid cannot be detected in the animal by any chemical tests.

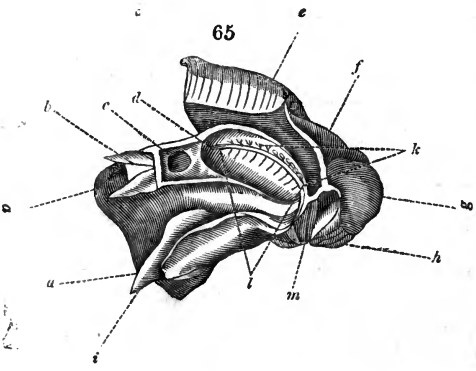
The boring species of Mollúsca are few in number when compared with the hosts which burrow in sand, mud, or gravel; but, as the resistance they have to overcome does not seem disproportioned to their powers, less interest is taken in their proceedings. The *S*olènes and *T*ellínidæ prefer

* These are merely varieties of Saxícava rugòsa; and they are common on most of our shores.

fine sand to work in, the *My*ades coarse gravel, and the Cárdia are often found in sludge. Some dig scarcely deeper than just to cover and conceal themselves; others penetrate to a depth of one or even two feet, ascending and descending in the furrow with a velocity rather surprising for creatures so habitually sluggish. They effect these motions by varying at will the length and form of the foot, the same organ with which they had in the first instance dug their furrow. When the animal would burrow, it projects and elongates the foot, distending it until every part of it, except the point, appears semitransparent. Directing its point downward, it insinuates it into the sand until it is nearly buried. A circular motion is now given to the shell, by which its anterior point is quickly brought nearly into contact with the foot, and immediately returned to its former situation. It thus moves on the foot, as on a fulcrum, with a see-saw motion. The foot, which had been partially retracted, is again gradually projected as far as possible into the sand, when the circular motion of the shell is repeated. When the animal is moderately active, the strokes follow each other at intervals of twenty or thirty seconds. The apparent progress is at first but small; the shell, which is raised on its edge at the middle of the stroke, falling back on its side at the end of it: but, when the shell is buried so far as to be supported on its edge, it advances more rapidly, sinking visibly at every stroke, till nothing but the extremity of the siphon can be perceived above the sand. These motions of the foot and shell are effected by two pairs of muscles, which arise from the shell and are inserted into the foot, which they embrace: but this organ is likewise perforated to near its point with a tube, which, opening just within the mouth, conveys water to distend and stiffen it. In some of the largest species, as in Cýprina islándica, a transverse section of the foot shows a single chain of pores along its whole length, which communicate with this tube, and transmit the water to the cellular portion of the foot; and, when thus distended, a viscid matter is secreted from its surface, which, by agglutinating the sand around it, fixes it more firmly, and thus augments the force of the stroke.

These burrowing tribes never, I believe, voluntarily quit their cells; and, if torn from them by the action of a stormy sea or any other cause, they rarely, at least when full grown, attempt to rebury themselves. But there is a species of Gasteropode which, generally living on the surface, has yet the power to burrow, and does so, it would appear, habitually when in search of prey. This is the waved whelk (*B*úccinum

undàtum), so common on our coasts, and of which Mr. Osler gives the following interesting account. "As in the bivalves inhabiting sand, its foot is the instrument of penetration; and, like them, it has the power of distending this organ to a size nearly, if not quite, equal to that of the shell. A section of the foot shows it to be divided into two nearly equal parts; the powerful muscle which extends from the operculum to the spire forming the upper or posterior half, and a cellular spongy mass constituting the remainder. The lower surface of this portion is the disc on which the animal crawls; and, being considerably longer than the muscle, it is folded upon itself, when retracted within the shell; and the operculum lies flat above it, when it is projected and extended. A transverse section of the foot, near the part where it joins the body, shows four considerable tubes penetrating the spongy portion, and very near each other; three of which are in a line parallel to, and almost in contact with, the muscle; the fourth a little below the middle one of the three. By a series of transverse sections of the foot, parallel to the operculum, we are enabled to trace these tubes; and to ascertain that they become rapidly smaller as they advance, until they are quite lost; the longest of them not admitting of being traced quite to the operculum. All these tubes are given off at the extreme anterior point of the thorax from a considerable one (*fig.* 65. *l*),* which, being situated under the muscular floor of this cavity, takes a direction to the right side, and running just within the organs of the muscles of the trunk (*k*), passes out of the thorax, nearly in contact with, and on the right side of, the œsophagus. It terminates nearly midway between the heart



* "The animal of *Bú*ccinum undàtum; part of the spire of the branchiæ removed; the mantle turned to the right side; the upper part of the thorax cut away to expose its cavity, from which the boring trunk and salivary glands have been taken. *a a*, The foot; *b*, the head; *c*, a kind of platform raised above the floor of the thoracic cavity, on which the point of the boring trunk rests, and which leads to the mouth; *d*, the cavity of the thorax; *e*, the mantle; *f*, the rectum; *g*, the stomach; *h*, the heart,

and the rectum (*m*), opening into a considerable cavity, which has the liver underneath, and the membrane enveloping the spire above it. When the animal contracts the distended foot, the water is seen to flow out between the mantle and the shell on the right side. The tube and cavity are easily inflated by a blowpipe introduced into one of the tubes of the foot.

The moderately distended foot can scarcely be retracted within the margin of the shell; and, when fully injected, it is elastic, and of a very large size. The cavity which it opens into the sand is therefore fully adequate to receive the shell, which is drawn down into it by the contraction of the muscle of the spire. From the attachment of this muscle, the spire is the part more directly acted upon, and which is depressed in the greatest degree. Hence the notch is always uppermost; and the *Búccinum*, when completely buried, is enabled to communicate with the water by its respiratory siphon.* The habits of the Cássides, or helmet-shells, and of several others amongst the carnivorous tribes of univalves, are similar to those of the whelk, and they have probably a foot of similar structure.

I am, Sir, &c.

G. J.

ART. XIII. *An Account of the Discoveries of Müller and others in the Organs of Vision of Insects and the Crustàcea.* By GEORGE PARSONS, Esq.

(*Concluded from* p. 234.)

Vision of Insects and of the Crustàcea, as produced by the Compound Eyes.

THE visual circle of insects, &c., comprises only that part of the whole horizon which corresponds to the extent of surface of the eye; in other words, insects see those objects alone which are situated perpendicularly to some part within the circumference of the cornea: and, as their eyes undergo no changes of form, they consequently have no power of adapting themselves to the vision of objects placed at different distances; they see clearly and distinctly only the nearest objects.

The compound eyes are neither dioptric nor catoptric instruments: animals provided with them see only by means

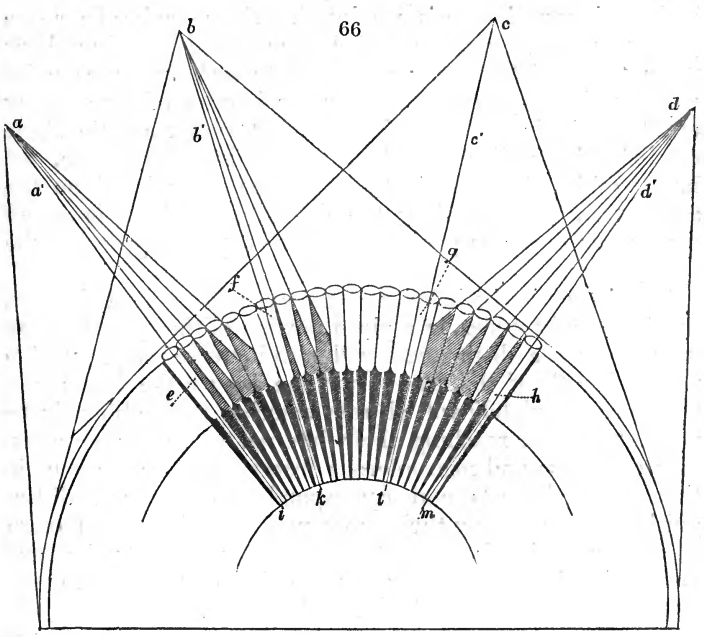
---

thrown below and to the right side of its natural situation, to allow the opening of the tube to be seen; *i*, the respiratory trunk; *k*, the origins of the muscles of the boring trunk; *l*, the course of the tube by which the foot is supplied with water; *m*, its termination." (*Phil. Trans.* for 1826, pl. xiv. fig. 3.)

of the general impression of the light. A spherical visual organ, illuminated by rays of different colours coming from numerous and distinct places externally, will present, in the distribution of the light on its spherical surface, a very imperfect separation of the different colours. One section of the sphere, for example, will be illuminated more by the red, another more by the blue rays. Each set of rays will probably fall upon a large part of the eye; and, even if the mingling of the clear, the shaded, and the coloured rays be not very great, there may, and probably would, be perceived only one intermediate coloured light.

The condition requisite for distinct vision would be, so to insulate and limit the light given out from the different points of the object viewed, that it may fall upon the spherical retina at certain points corresponding to the points of emission. If a certain point of the retina can only receive the rays emitted from a certain point of the exterior object, whilst the rays from this point are excluded from all the other parts of the retina, an image of the object will be formed upon the sentient surface. This is exactly what takes place in the compound eyes of insects and of the Crustàcea, by means of the transparent cones situated between the extremities of the optic filaments and the facets of the cornea. Each of these cones, thus placed on the periphery of a convex nervous mass, conveys to the nervous filament, to which its apex corresponds, that light alone whose course coincides directly with the long axis of the cone itself. The rest of the light given out from some point of the exterior object, falling obliquely upon the cornea, does not penetrate to the internal extremity of the cones, and consequently produces no impression upon other filaments of the optic nerve; for, entering the cones obliquely, it impinges upon, and is absorbed by, the pigment which surrounds them.

Fig. 66. represents the section of a compound eye, in order to show the course of the light. If rays of different colours, given out from the points *a*, *b*, *c*, *d*, fall upon the eye, the cone *h* will be illuminated throughout its whole length by the ray *d'*, which traverses this cone in the direction of its long axis. The other cones situated in the vicinity of the line *m d* will not be illuminated as far as their internal extremity by the rays from *d*, which will penetrate less and less deeply into the neighbouring cones, in proportion as they become more remote from the line *m d*. The nervous filament *m*, corresponding to the cone *h*, is consequently impressed with the ray *d'*; other rays from *d*, being absorbed



by the pigment investing the neighbouring cones, will of course produce no effect on any nervous filament placed out of the line *m d*. The coloured ray *d'* is therefore perceived only by means of the filament *m*, on which latter alone it impinges. So also the ray *c'*, given out at the point *c*, will pass through the whole length of the cone *g*, and will affect only the corresponding nervous filament *l*; the ray *b'* traverses only the cone *f*, and is perceived only by means of the filament *k*; and the ray *a'*, emitted at the point *a*, is perceived only by means of the filament *i*, after having passed through the cone *e*.

The variously coloured rays given out from the points *a*, *b*, *c*, *d*, will thus produce in the interior of the eye a determinate figure, corresponding to the luminous object without; and the same remarks will necessarily apply to any number of points situated between *a*, *b*, *c*, *d*.

Each nervous filament conveys to the bulb of the optic nerve the impression of the ray which it has individually received; and, as all the nervous filaments, at first insulated by the pigment, are at length united together into one common and continuous bulb or nervous expansion, the impression received by each filament is united to those of all the others in the bulb of the optic nerve, and so a common

and continuous image is produced. Rays coming from one point of a remote object will, it is true, illuminate throughout more than a single cone; and then, to each luminous point without, there will correspond in the interior of the eye, not exactly a single illuminated point, but rather a little circle of diffused or dispersed light; and, in consequence, an image of but little distinctness will be reproduced on the sentient surface or retina; the distinctness of the image of course increasing in proportion as the object approaches the eye.

The image in the interior of the eye will be more distinct, precisely as the cones, in a given portion of the eye, are more numerous; the distinctness will also increase in proportion to the length of the cones; for the longer the cones are, the more completely will all rays entering them obliquely be prevented from reaching their internal extremity or apex. The dipterous and neuropterous insects, whose eyes contain thousands of facets and corresponding cones, are distinguished in general by their more powerful sight from other insects; and this is owing to the number of facets, &c., and not to the size of the eyes; for the size of the eye merely influences the extent of their visual horizon.

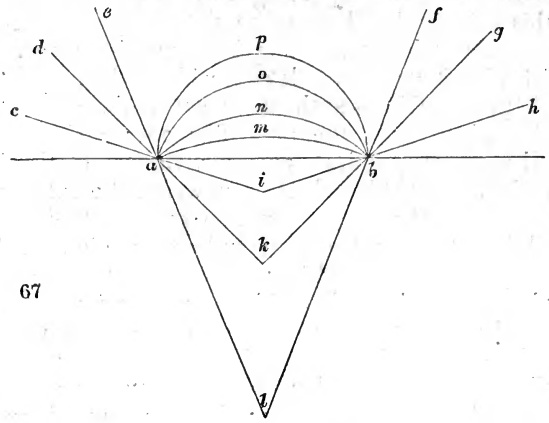
From this statement, it may be inferred that the vision of the compound eyes must be very imperfect and indistinct; but at the same time, no doubt, it is amply sufficient for the wants of insects, &c. The quantity of light which enters into the interior of the eye is also very small; but the optic nerve is probably so constituted as to perceive the faintest differences in the intensity of light and colours. Of the whole light emitted or reflected by exterior objects, we ourselves receive into the eye only that portion which the pupil is capable of admitting; and yet, when the pupil is at its minimum of dilatation, as at the time of our looking at very near or brightly illumined objects, or when we are in considerable darkness with the pupil dilated perhaps to its maximum, the smallest quantity of light will be sufficient to enable us to distinguish the general forms of bodies. A light of moderate intensity, with a mean degree of dilatation of the pupil, seems best suited to the degree of perceptibility of our sense of vision; for, when the pupil is widely dilated, as by means of belladonna, objects at other times moderately bright then become dazzling. As soon as the general sensation of light exists, the local diversities of clear, dark, and coloured parts in bodies will likewise be perceived, provided only those conditions are present which are required for the proper insulation of the different kinds of rays.

The convexity of each of the different facets of the cornea will refract and cause to converge towards the axis of each corresponding cone the rays of light which come in the direction of this axis, and will so make them approximate more closely towards each other in the interior of the eye. The rays which illuminate the whole cone will thus be concentrated to a single point or focus at the apex, and in this concentrated state will impinge upon the optic filament; a circumstance which will necessarily induce greater vividness of the image or impression. But this refracting power of the external and convex surface of the cornea is not so great as to cause each individual facet to form a minute and separate image. Than this, nothing, indeed, could be more adverse to the accuracy of the visual sensation: for, if images were formed at the focus of each facet, the facets acting as so many refracting media or lenses, all the distinct images so produced would necessarily be reversed, without a corresponding reversal of the visual field taken as a whole; the relative position, with respect to each other, of the images of all the facets would be exactly contrary to the relative position of the corresponding points in the external object. Very frequently the facets of the compound eyes have scarcely any convexity; and, consequently, we ought not to attribute to their external and convex surface, even when the convexity is at its maximum, any other effect than that of approximating and concentrating towards the apex of the cones those rays which, according to the known laws of the distribution of light, diverge in their approach towards each of the cones.

At present no satisfactory reason has been given to explain the use of the different layers of pigment between the cones and optic filaments. The pigment between the filaments generally disappears gradually towards the bulb of the optic nerve; its particular use is to insulate the filaments from each other. The filaments themselves are not always arranged in straight lines; but their course, from the apices of the cones to the bulb of the nerve, is often slightly curved: and, without the interposition of the pigment, the rays passing along the axis of any one cone might, and probably would, affect simultaneously several of the filaments which are near to each other, for they are not perfectly opaque.

The compound eyes seeing only those objects which present themselves in the axes of the cones, it must result that the limits of their field of vision will be formed by the prolongation of the lateral boundaries of the eye itself. Thus the visual field is greater or smaller, not in proportion to the absolute magnitude of the eye, but as the form of it is more

or less hemispherical, whether the eye be large or small. The visual field of the hemispherical eye (*fig.* 67. *a p b*) is



67

bounded by the prolongations of the diameter of the hemisphere *a b*; for the eye *a o b* the visual field is limited by the elongated radii *c i* and *i h*; for the eye still less convex (*a n b*), by the radii *d k* and *k g*; and the eye of least convexity (*a m b*) has the smallest field of vision (*e l f*): the axes of the transparent cones seeming in all cases to be, as here supposed, perpendicular to the surface of the cornea. From this it follows that eyes of equal circumference, but of unequal convexity, or forming segments of different spheres, but with equal chords, have a field of vision more extensive exactly in proportion as the angle comprised between the two sector radii is greater. If each of the two eyes forms the quarter of a hemisphere, the internal sides of both being in exact parallelism, the common field of vision of the two ought to equal in its circumference the half of a hemisphere. If the form of the eyes be elliptical, as in the grasshoppers and others, the boundaries of the field of vision will be likewise elliptical, and so with eyes of any other form.

The mode of progression of the animal is undoubtedly influenced by the circumference, the form, and the position of the eyes. Goetze * covered the compound eyes of a *V*éspa *C*ràbro with a layer of opaque varnish, and the animal then flew only in a perpendicular direction; the only one, indeed, in which the stemmata, placed on the upper part of the head, still supplied it with a minute field of vision; the compound eye of one side being covered with the varnish, the animal

* Belehrung über gemeinnutzigt Natur und Lebenssachen, 1794, p. 42.

flew only in the direction of that side in which it still saw. In the experiments of Reaumur *, bees no longer flew upwards when he covered the posterior part of the head with an opaque varnish.

If these observations are correct, the Neuróptera, which have lateral hemispherical eyes, possess a field of vision corresponding in extent almost to the entire circle of the horizon. Such is the case with the genera *Æ'shna*, Libéllula, A'grion, Hemeròbius. In a new genus of neuropterous insects, Holómma, the eyes exceed, even posteriorly, the boundaries of a hemisphere; so that not only a circular horizon, but also the posterior part of the body, must fall within their field of vision. To the Neuróptera most distinguished by the extent and precision of their movements may be added the butterflies, the *Bombỳces*, and *Sphínges*; then, among the carnivorous Coleóptera, the genera *Cárabus*, Calosòma, Cỳchrus, Brachìnus, *Necýdalis*. In these latter the eyes are placed lower, because they have no longer any relation to motion by flight. Amongst the other Coleóptera, the genera most distinguished by the perfection of their vision are Lèma and *Lampỳris*. The insects whose eyes have a more anterior position, and are only separated from each other by a narrow interval, as the genera Naúcoris and Notonécta, move by leaps, which are always directed in front, in accordance with the extent and direction of the visual field.

The eyes of most of the Hymenóptera, on the contrary, are only long and narrow segments of spheres, with the longest diameter directed from above downwards; and such eyes will, of course, have fields of vision equally narrow. The flight of these insects is commonly irregular: leaping, as it were, and only slightly directed laterally; but, in most cases, rather tending upwards. Travellers have found hymenopterous insects on the highest mountains. Deluc observed insects of the genus *Cùlex* at an elevation of 1560 toises; and it appears that they were hymenopterous insects which Humboldt saw flying over Chimborazo, at an altitude of 2850 toises.

The neuters and females of hymenopterous insects often have eyes much smaller, and these separated by greater intervals, than the males: such is the case with the working bees. In most of the orthopterous insects the eyes are segments of very large spheres; they are consequently very flat, and the visual field is small. The movements of these insects, and particularly the apparently timid flight of the

* Mémoires, tom. v. p. 287.

grasshoppers, accord with this organisation. Eyes of greater convexity are met with in the carnivorous tribes, as in the genus Mántis, and still more so in the genera *Á*chèta and Gryllotálpa.

Instances of eyes placed in the under part of the head are rare; the species of Onìtis, however, are examples. The situation of the eyes is also very low in some of the Coleóptera, as in some species of Hydróphilus; but, in many insects with lateral eyes, the lower part of these organs is alone exposed to the light, the superior portion being altogether covered by a projection of the corselet, as in the genera *L*ampỳris and *B*látta, especially in the *B.* gigantèa and *B.* colossèa. Very frequently, on the other hand, the eyes are placed exclusively on the top of the head; such is the case with the species of Forfícula, which, from the subterranean mode of their life, have especial need of the organs of vision being situated in that position.

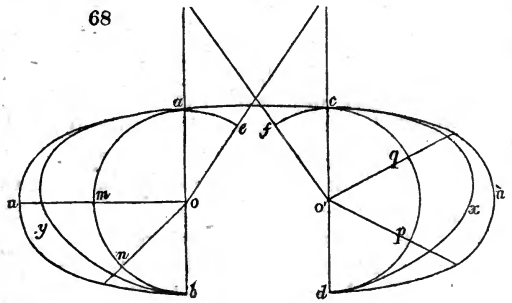
As the complete insulation of the rays of light emitted or reflected from all points of the external object is the chief condition required for clearness or distinctness of the visual image or impression, it must follow that this distinctness will bear a direct relation to the number of facets in equal surfaces of different eyes. A very small and a large eye, each having the same number of facets on an equal extent of surface, will see with equal distinctness any object placed within the limits of the visual field of such surface. The distinctness of the image will, as already stated, increase with the length of the crystalline or vitreous cones; and, indeed, it may be laid down in general terms, that the clearness of the visual impression will be greater in proportion to the size of the spheres of which the eyes form segments, to the convexity of the surface, to the nearness of the object viewed, to the number and minuteness of the facets, to the length of the cones, and (consequent upon this latter circumstance) to the more accurate exclusion from the nervous structure of all those rays entering the eye obliquely and out of the direction of the long axis of the cones.

The laws of refraction not being applicable to the compound eyes of the articulated animals, it follows that there can be no possibility of adapting these organs to see clearly at different distances.

To understand how the crossing of the visual fields of the two eyes is prevented, the reader must bear in recollection what was stated respecting the immobility of the compound eyes. As the cones, when illuminated throughout, convey to the optic nerve impressions of those objects alone which are

situated in the direction of the axes of the cones, it follows, if double vision is to be avoided, that the bases of the cones in the two eyes ought never to be so placed as to have a direction convergent towards each other; for otherwise the same object may be seen by both eyes, and, in consequence of probable inequality of distance, it may appear in different parts of the two fields of vision. If, in *fig.* 68., *a b* is parallel to *c d*, the curves there delineated will serve to indicate all the possible forms met with in nature, as it regards the respective position of the compoundeyes If the eyes form two hemispheres, as in the Hemeròbius pérla, the diameters *a b* and *c d* of these are always so placed as to be either parallel, or divergent from each other in front. In the former case, *a o* and *ó c* must be regarded as the axes of those cones placed most in front, and nearest to the inner margins of the two eyes: they indicate, in consequence, the inner boundaries of the two fields of vision in front; and, of course, the object that is visible to one eye must be invisible to the other. Few insects have perfectly hemispherical eyes; but, when their surface is spherical, they always constitute either the whole, or segments, of the hemispheres *a b* and *c d*; and, in all such cases, the prolonged sector radii show the boundaries of the two fields of vision to be completely distinct. Thus, when the eye, by its position and size, coincides with *m a o*, the lines *m o* and *a o* form the boundaries of the field of vision; for the eye *n a o* the boundaries are formed by the lines *n o* and *a o*; and for the eye *ó p q*, by the lines *ó q* and *ó p*. In no known instances are the hemispheres, or smaller segments of spheres, extended in front and towards each other beyond the parallel lines *a b* and *c d*, for example, to *e* and *f*; for, in this latter case, objects placed in a direction within the visual angles *a o e* and *c ó f*, would almost inevitably be visible to both eyes, and would be seen as double.

68



The lines *a y b* and *c x d* enclose segments of ellipses with the greater curvature a little in front: this is observed in the eyes of many insects, as in the genera Mántis, Lèma, Donà-

cia, &c. The lines *a u b* and *c ú d* mark the boundaries of elliptical eyes with the summits placed laterally. The lines *u o*, *n o*, *q ó*, *p ó*, are the sectors of eyes having the shape of segments of ellipsoids, as *a u o*, *a y n*, *ó c ú*. The sectors in none of these instances converge in front, and an object placed between the two eyes can never be seen simultaneously by both. No example of convergence of the two eyes anteriorly has yet apparently been noticed. When the position of the eyes is rather anterior than lateral, as in many dipterous insects, and, among the Hemíptera, in the genera Naúcoris and Notonécta, these organs, although very close to each other, form segments of only one and the same sphere. There is, also, never any collision between the different fields of vision when there are more than two compound eyes.

Crabs, and a few others of the Crustàcea only, have movable eyes fixed upon pedicles; nevertheless, even these eyes never vary their degree of divergence, their movements being combined and in unison, as is the case with the eyes of vertebrated animals. In the Crustàcea with long bodies, the eyes are very near to, and but little divergent from, each other: the contrary is observed in those whose bodies are very broad.

I am, Sir, &c.

Newhall Street, Birmingham, Jan. 19. 1831. G. P.

ART. XIV. *Observations on the Diluvial Gravel in the Neighbourhood of Birmingham.* By FREDERICK JUKES, Esq.

Sir,

THE late excavations for the line of a new canal between this town and Wolverhampton having been made through a very deep bed of sand and gravel in the neighbourhood of Smethwick, some interesting phenomena in diluvian specimens have presented themselves. This deposit is not only remarkable for the number and variety of organic remains to be found in it, but also from the vast accumulation of detached rocks of almost every description. The circumstance of large rounded blocks of basalt and ironstone being so abundantly dispersed throughout this bed, may be ascribed to the disintegration of the neighbouring trap hills of Rowley and the ironstone of Coseley Hill *, both within the distance of a few

* The section of this hill, which is now in progress for the passage of the canal, presents a good example of the disturbing force to which the vegetables of the coal formation have been subjected at the time of their deposition.

miles; but the varieties of granite, porphyry, and other rocks of a primitive nature, in blocks of considerable magnitude, and rounded by attrition, are referable to a more remote source, as they will bear no relation to any range of rocks in the immediate vicinity. It is not an unfrequent occurrence in some of the beds of diluvial gravel, to find the bones of large carnivorous quadrupeds and other animals, which have in all probability been destroyed and buried at a period when such deposits were formed; but, in the gravel above alluded to, none of these remains *, so far as I have been able to ascertain, have yet been discovered, although the excavation in some places has been made nearly 100 ft. below the surface.

The subject of diluvial deposits has been so ably treated upon by Professor Buckland (in his paper upon the quartz rock of the Lickey Hill), by the Hon. Mr. Strangways, and other gentlemen who have written in the *Geological Transactions*, as well as in the concise and admirable paper inserted in your Magazine (Vol. III. p. 75.), that little farther appears necessary to be said by others, than to offer such remarks as may be essential upon the localities of these beds, and to identify the specimens such deposits contain. Most of the organic remains which have come under my notice are embedded in rounded fragments of rock, which appear to be detached portions of those ancient strata that are so remarkably elevated and exposed throughout the central and western parts of our island.

The vegetable remains, of which there are by far the greatest abundance, have in all probability been accumulated from the outcrops of the neighbouring coal formations, when in a more elevated condition, as they agree in every respect with those which are obtained from the mines; but the specimens of shells, corals, encrinites, &c., are referable to the transition and mountain limestone, as well as to some of the oolite beds and chalk formation. Some few of these specimens I have carefully sketched, with a view to their being more particularly identified, and the names of some of the vegetables are taken from the work of Mr. Tyrell Artis.

Fig. 69. A very perfect specimen of the fern species, from a block of light-coloured ironstone, containing also many flags and reeds.

Fig. 70. A single leaf, in dark-coloured ironstone.

* I am informed that the antlers of a very large species of deer, in an excellent state of preservation, have lately been found in excavating the line of continuation of this canal to Liverpool, near Blakemore Pool, the property of Thos. H. Burne, Esq., of Loynton.

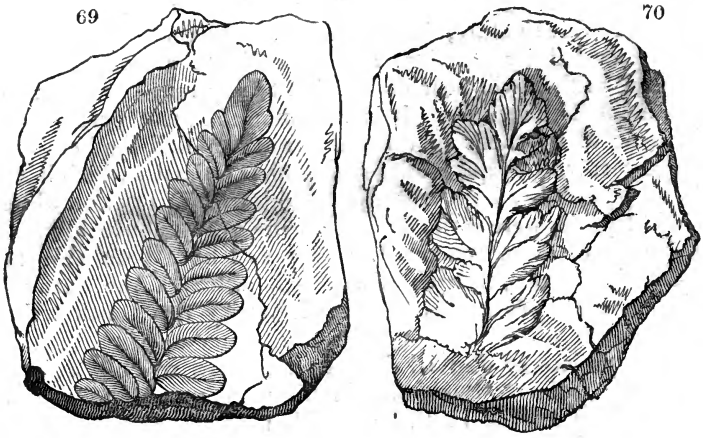


Fig. 71. A reticulated trunk, bearing a number of thin leaves, by which it has been surrounded. Ironstone nodule.

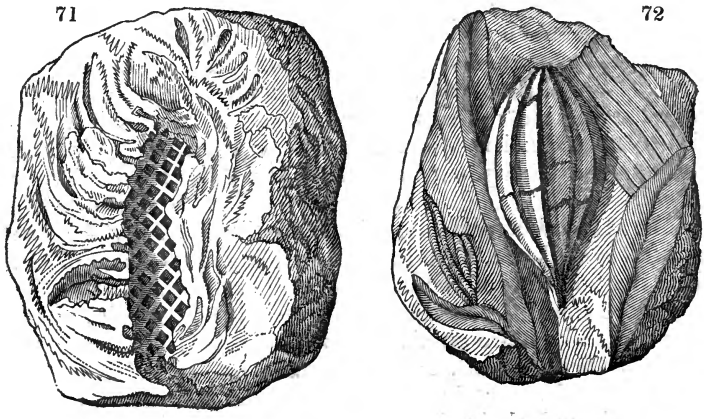


Fig. 72. A seed-vessel of a white sparry appearance, embedded in dark-coloured ironstone, in company with several leaves.

Fig. 73. An ironstone nodule, the fracture of which presents three stems of the calamite species, proceeding from a centre, which appears to have been its root.* Calamites Pseudo-*Bambusia*. The drawing is about half the size of the original.

* Mr. Artis considers the pointed end of this plant to have been the upper termination; but from the specimen before me it appears to have been its base or root.

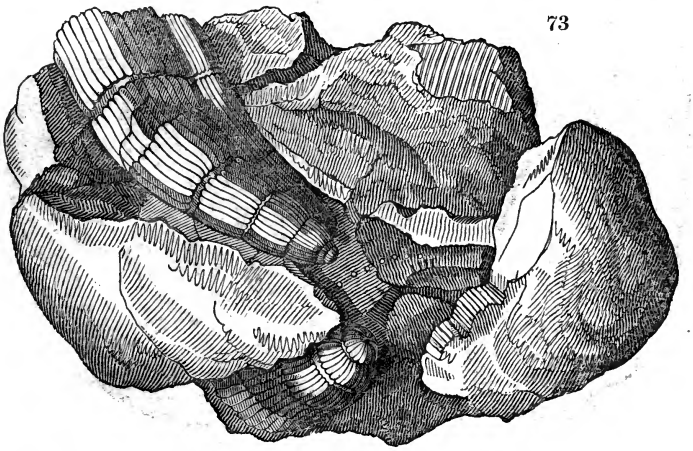
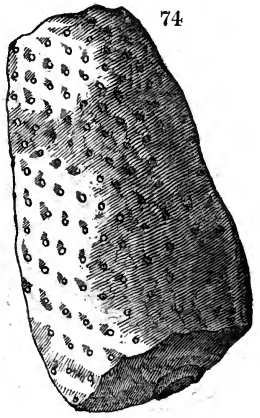


Fig. 74. Ficoïdìtes verrucòsus, in iron sandstone, 9 in. in length. The reverse is tuberculated, with a groove in the centre, enclosing a spike or young stem.



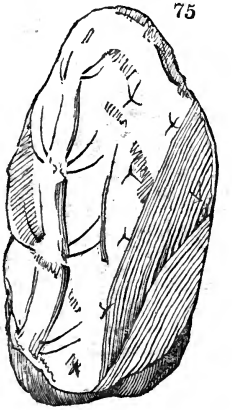
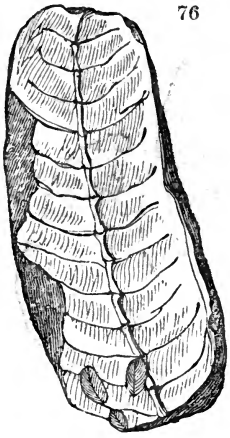


Fig. 75. somewhat resembles fig. 118. *e*, in the Second Volume of this work. The stone is about 5 in. in length, and bears also the impression of a flag species of plant.

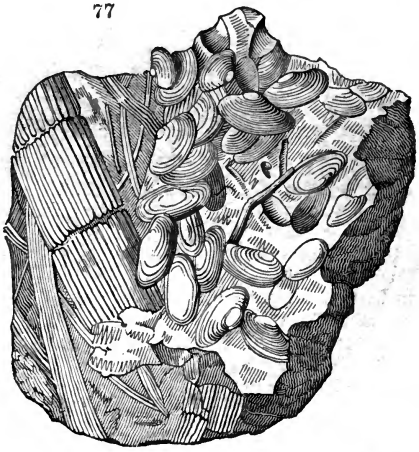
Fig. 76. An ironstone nodule, 6 in. in length, having in its centre a thin stem, with fine leaves proceeding from it.

Fig. 77. A large block of ironstone, 10 in. in diameter, the fracture of which exhibits a bed of shells, much resembling fresh-water muscles, of about an inch and half in length, and covering a quantity of calamites and flags. Some of the same

76



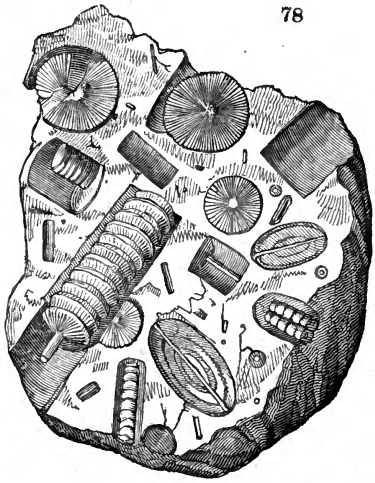
77



species of shells that I have found in the ironstone of this gravel are as small as the drawing represents them.

Fig. 78. Encrinital remains or casts of E'ntrochi in chert, vulgarly called screwstone, of which there are large quantities in this gravel.

78



79

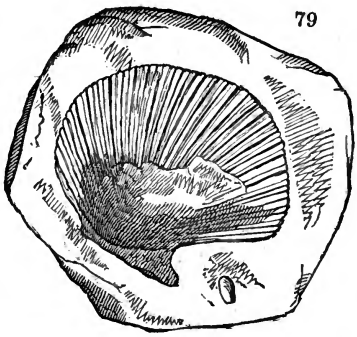
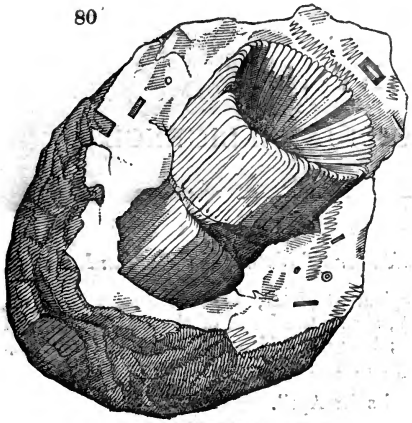
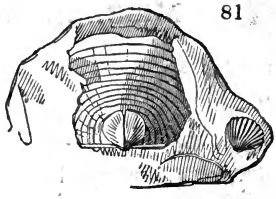


Fig. 79. A shell of the *P*écten species, in a hard siliceous pebble. Another specimen I have found also in flint, together with the impressions of *E*chìni and small Terrebrátulæ.

Fig. 80. Caryophýllia, embedded in a similar kind of stone to *fig.* 78.

Fig. 81. A shell in a brown ferruginous sandstone, mixed with several species of Terrebrátulæ and corallines.





Many other specimens have also been found embedded in rounded masses of various kinds of rock; but they have sustained so much injury in fracturing them, that their characters could not afterwards be satisfactorily exhibited.

The upper surface of this gravel in some places is covered by a bed of fine drift sand to a depth of 20 or 30 ft., dipping occasionally between the gravelly deposits to a still greater depth, and exhibiting in its present exposed condition a striking illustration of diluvial contortions, much resembling figs. 123. and 124. in Vol. I. p. 260.

The low gravelly beds of Warwickshire, particularly in the vicinity of Leamington and Stratford upon Avon, appear to be composed almost wholly from the ruins of the lias and oolitic series of rocks, abounding with rounded fragments of Ammonites, Gryphæ'æ, Belemnites, vertebræ, &c.

The vicinity of Newport, in Shropshire, presents a remarkable instance of the extent and direction to which these last-mentioned fossils have been swept by a diluvial current, as the Gryphæ'æ, in particular, are to be found in considerable abundance in almost every gravel-pit in that neighbourhood, mixed occasionally with large fragments of rocks much resembling the Aberdeen granite.

The scarcity or apparent absence of these fossils in the gravel at Smethwick appears to be somewhat extraordinary, as its position is not very remote from the sites to which they belong; and more particularly so, as it would appear, from the accumulation of flints at this spot, that the lias and lower oolite beds must have been exposed to the same denuding force, as that which had effected such deposits from the chalk formation.

I am, Sir, &c.

Birmingham, May 5. 1830. FREDERICK JUKES.

PART II.

MISCELLANEOUS INTELLIGENCE.

ART. I. *Monthly Calendar of Nature for Scotland.*

EXTRACTS from the Meteorological Register, kept at Annat Gardens, Perthshire, North lat. 56° 23½′, above the Level of the Sea 172 ft., and Fifteen Miles from the Coast; being the Mean of Daily Observations taken at Ten o'Clock Morning and Ten o'clock Evening.

Results for April.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
April 1. to 10.	45·3°	42·6°	37·5°	29·08	·82	·35
10. to 20.	48·8	44·8	40·1	29·37	·12	·46
20. to 30.	48·	44·7	43·2	29·07	·90	·42
Monthly mean	47·3°	44°	40·2°	29·17	1·84	1·23

The average temperature for April at this place is 45·5°. The mean for that month this season is nearly 2° above the ordinary average, and within two tenths of a degree of the temperature in the corresponding month in the years 1824, 1825, and 1826. The depth of rain is two tenths of an inch above the ordinary fall, but 1·83 in. less than fell in April last year.

Results for May.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
May 1. to 10.	46·5°	43·6°	38·2	29·19°	1·5	·62
10. to 20.	52·1	46·5	41·5	29·53	·01	1·54
20. to 31.	57·2	50·7	48·	29·43	·02	1·72
Monthly mean	51·9°	46·9°	42·5°	29·38	1·53	3·88

The average temperature for May at this place is 51·5°; and, notwithstanding the frost in the early part of the month, the mean temperature for May this season exceeds the ordinary mean by four tenths of a degree, and is 1·5° higher than last season. The fall of rain is two tenths of an inch below the ordinary fall; but the dry state of the air, and its consequent capacity for exhaling moisture, has produced more than the ordinary rate of evaporation. It may be proper to remark, that the depth of evaporation expressed in the seventh column is the depth of water evaporated from a basin of water sunk in the ground in an exposed situation, receiving the full play of the winds over its surface, exposed to the rays of the

sun, and protected from falling moisture. The amount of evaporation is what the air has exhaled from a watery surface, and can only show a proportionate power of action on a surface nearly dry.

The coldest day in April was the 3d: mean temperature of that day, 41·5°; extreme cold, 31°; wind E. It may be remarked that the coldest day in April, last year, was the 2d; the extreme cold at that period was 9° lower than on the 3d this year.

The warmest day in April was the 30th: extreme heat, 59°; wind E. A curious coincidence occurs in the highest temperature in the corresponding months of this and last year happening on the same day, the wind on both days of extreme cold and heat being in each case easterly. The east blew from easterly points on 17 days, from westerly points on 8 days, and on 5 days it was variable. There were 9 days of brilliant and 3 of partial sunshine, the rest were cloudy. Peals of distant thunder were heard on the 9th and 10th, followed by light showers. There were no particularly loud winds throughout the month.

The coldest days in May were the 6th and 7th: mean temperature of these days, 41·5°; extreme cold, 31°; wind N. This frost was simultaneous throughout the island; and, from the more forward state of vegetation in the south, it seems there to have done most damage. The warmest day in May was the 31st: mean temperature of that day, 61°; extreme heat, 72°; wind S.E. The wind blew from the E. and S.E. on 20 days, from the N. on 4 days, from the W. on 5 days, on 2 days it was variable. There were 23 days of brilliant sunshine, an unusual occurrence in our northern latitude; 2 days of partial sunshine; and on 6 days the atmosphere was cloudy.

The larch was in leaf on the 5th of April, three days earlier than last season; but the crown imperial, which flowered last year on the 9th, did not blow this year till the 10th. The hawthorn was in leaf on the 12th; the *O*xalis Acetosélla on the 17th, on the same day as in the corresponding month last year. The maple tree was in leaf on the 28th. It may be proper to remark, that in the leafing of trees there is often from 6 to 8 days' difference in trees unfolding their leaves, although belonging to the same species, and apparently under the same circumstances: this is most conspicuous in the beech, maple, ash, and oak; the same plant uniformly exhibiting the same appearance as to time of leafing every season. Those from which observations in the register are taken are the same plants every year, are neither the latest nor most forward varieties, and consequently show the mean time of the species coming in leaf. Oats that were sown in Annat Park on the 8th, appeared above ground on the 23d; a period of 15 days: mean temperature of that period, 48·6°. Oats sown in the same park last season gave a braird in 17 days, under a mean temperature of 47°. The difference of 1·6° of elevated temperature gave a breard earlier by 2 days.

The horsechestnut was in leaf on the 28th; barley sown at Annat Park on the 16th gave a braird on the 26th, being a period of 12 days; mean temperature of that period, 49°. A temperature of 52° gave a braird of barley at the same park last year in 9 days: difference of temperature, 3°; and of brairding, 3 days. The birch tree was in leaf on the 30th. The Scotch damsels of the olden time expected always to have a flower or nosegay composed of the fragrant leaves of this native plant, to carry to the "kirk" on the first Sabbath of May. Severe frost in the early part of May gave a partial check to vegetation. On the evenings of the 6th and 7th georginas were killed down to the ground. The cuckoo was heard for the first time on the 8th; we never hear him in this part of Scotland nowadays in April, although many of our popular traditions for that month are connected with his cry. By the English papers it appears he regularly makes his voice sooner heard in England. Rain and a thunder

storm on the 4th and 5th would have been his ushering speat at the usual time; but the severe frost on the 6th and 7th had made him put off the music till the storm was over. The beech leafing was also retarded by the frost till the 9th. Crawford pears were in bloom on the 5th; Green Yare pears were in flower on the 9th, Green Chisel pears on the 10th, Dutch Bergamot on the 11th; Eve apples in flower on the 14th, Hawthornden and White Codlin on the 17th; the lilac came in flower on the 18th, exactly on the same day as last year; figs and walnuts were in leaf on the 22d, and the oak was in leaf by the 23d; the narcissus was in flower on the 23d. The pupæ of the wheat-fly still exist in the soil; but it is hoped that the unusually high temperature and clear sunshine throughout the day may bring many of them into the fly state before the wheat is in the ear; and that the very dry state of the soil, which is unfavourable to their existence, may diminish their numbers.—*A. G. June* 1. 1831.

ART. II. *Wood-Cuts in the "Library of Entertaining Knowledge."*

SIR, On merely glancing at the new volume of the *Library of Entertaining Knowledge*, which I have only just received, I cannot help noticing with regret a serious mistake, which the author, or the artist who has been employed, has committed, relative to a very common subject of natural history, on which I should have thought none but a mere tyro could well have fallen into error. I allude to the wood-cut exhibited at p. 109. of the volume on the "Architecture of Birds." The cut is inscribed beneath, "The window swallow (*H*irúndo úrbica)," i. e. the marten, or martlet; and the position of the nest in the *corner of a window*, though it is not very well made out or intelligibly represented, would seem to decide it as belonging to that species; whereas the bird depicted in the cut is unquestionably not the marten or window swallow, but the chimney swallow (*H*irúndo rústica). The figure of the nest, too, I must observe, if it be intended to represent the *finished* edifice, is not that of the marten; which, instead of being open at the top, as in the cut, is invariably covered over and all round, with the exception of a small lateral orifice towards the upper part, left for the ingress and egress of the bird. These birds are so well known, and their nests so obvious and conspicuous, that the blunder is the less excusable; and I trust the editors will correct it in a future volume, or at least in a second edition of the work, substituting, at the same time, a fresh and accurate plate in the room of the present one, which is not only a disgrace to the book, but is calculated to mislead and perplex beginners in the study of ornithology.

I may remark, also, that the figure of the jay's nest, at p. 196. in the same volume, appears to me to be represented too deep in the hollow, and the sides consequently too high; the whole is a much more elaborate and neatly finished piece of architecture than the bird is usually in the habit of constructing. I can only say, at least, that the jays' nests which I have examined (and they are not a few) in the woods and plantations in this neighbourhood, are generally very shallow, and, as compared with those of many other birds, by no means very neat—I should say, rather slovenly—performances. One, in particular, which I observed a few years ago in a stool of birch, not above 10 or 12 ft. from the ground, and which is fresh in my memory, consisted of a few dead sticks (like the nest of the wood-pigeon) with a very slight lining of roots, &c., and was so loosely constructed that the light was visible through it to a person who stood on the ground beneath; in which position I could perceive that the nest contained eggs.

Before I conclude, I will briefly advert to another subject presented to us

in this volume. At p. 119. a figure is given of the flamingo, and in the background of the cut the female is represented on her nest, on the authority, I believe, of Linnæus and Dampier. Now, it would ill become me to deny the accuracy of this representation, relating, as it does, to a point of natural history on which I confess myself entirely ignorant; and, besides, from the very construction and length of the bird's legs, it is probable that it must have recourse to some such contrivance while engaged in the process of incubation. Nevertheless, the attitude and bearing of the bird, as represented in the cut, are, to say the least, so *outré*, that it does require no small portion of implicit faith in the authorities quoted, to believe what is here presented to us to be an exact and faithful portrait of nature, and not rather, in some degree, what old Parkinson would call "bombast and feigned." I am well aware that there are many strange and wonderful things in nature; some, indeed, which, did we not know them to be facts, would almost exceed belief: and to give delineations of these "miracula naturæ" cannot but be highly interesting to all who take pleasure in natural history. But let the delineations be made, if possible, from the living subjects, drawn *ad vivum*, not copied, perhaps at second or third hand, from ancient and somewhat questionable authorities, still less made up and concocted at home in the artist's study. Natural history allows no scope for invention; not even the minutest detail must be filled up by the imagination. I feel grateful to the editors of this interesting work, for the mass of valuable and entertaining information they have communicated to the world, and communicated, too, at so very cheap a rate; and more especially are my thanks due to Mr. Rennie, for his excellent volumes on *Insect Architecture* * *and Transformations*. At the same time, I would respectfully suggest to these gentlemen, whether it would not be advisable to refrain from giving figures of such subjects as they cannot have the means of giving with that accuracy and fidelity which are requisite portray the true characters of the animal. Bad figures are worse than none; and all those which are made up from the mere *written* descriptions (however good) of naturalists and travellers must necessarily be deficient in life, and spirit, and character, at least, if not in truth and fidelity. The flamingo may sit astride its nest, like a man on horseback, for all I know to the contrary; I do not feel myself at liberty to call in question that point, which seems to be attested by writers of established credit; but I much doubt the bird's ever assuming such an awkward, uncomfortable, grotesque appearance, as is presented to us in p. 119. of the *Library of Entertaining Knowledge*. In conclusion, I would strongly recommend to the editors of this delightful little work (for such it is, in spite of minor blemishes) the inimitable wood-cuts of Bewick, as the models of their future illustrations. Yours, &c. — *W. T. Bree. Allesley Rectory, April* 5. 1831.

Art. III. *Retrospective Criticism.*

New Mode of examining Birds, &c. (p. 145.) — Sir, I cannot forbear expressing the high gratification that "the new mode of examining birds, &c." has occasioned to myself and others of your constant readers. Indeed, so many instances of useless cruelty continually occur among amateur naturalists, that the whole body almost merits the epithet of *destroyers* of *nature*, rather than *lovers* of nature. Young collectors would do well to consider whether they may not pursue the study of insects to some extent by confining the object for examination, and then freeing it. It is

---

* See a review of *Insect Architecture*, p. 39. supra.

delightful to witness the fly issuing from its chrysalis; would not the pleasure be increased by seeing it at length "sail away on silken wing through the soft air, rejoicing in its new being?"—*A Constant Reader. March* 29.

Dried Plants not to be bought in London. — Sir, At p. 178. a correspondent observes, that "in London there is no place where botanists can obtain dried specimens." I beg leave to state, that small portfolios, prepared with a view to assist young students in ascertaining cryptogamic plants, especially mosses, may be obtained of Messrs. Harvey and Darton, 55. Gracechurch Street, and small collections of grasses, and of other plants, with or without the rarer species, may also be had. To those who are beginning the study of botany, such collections might afford great assistance at a small expense.

A short and familiar introduction to the natural system, appended to a new edition of Wakefield's *Botany*, is published by the abovementioned booksellers. I am, &c. — *Id.*

Auditory Aperture in the Skull of the Hedgehog. — Sir, In a paper in your Magazine by Dr. W. Farrar, "On the Auditory Apertures in the Skulls of Quadrupeds and Birds, as Auxiliaries in Classification," he states that he discovered in the hedgehog a singularity of construction which much surprised him. His words are: — "External ears he certainly had; and these were placed forward in the skull; but, as for any external aperture communicating with the brain for the purpose of hearing, not the slightest opening could I discover." So strange did this state of things seem to me, that I quickly sought an opportunity to examine the part myself; the result of which examination was so completely different from what Dr. Farrar's paper had led me to expect, that I feel bound to communicate it to you, lest any of your readers who may not possess the means of seeing for themselves should go away with what I conceive an erroneous idea on the subject. I found the external ear large in proportion to the size of the animal, terminating inferiorly in an open external auditory tube, which tube was formed by a continuation of the cartilage of the ear extending spirally to the bony ring, over which the membrane of the tympanum was stretched. The membrane of the tympanum was capacious; the chain of bones from it to the expansion of the auditory nerve was beautifully formed; and the little muscles connected with them remarkably developed, clearly showing they were in frequent use. The semicircular canals, the cochlea, in fact every part of the internal ear was peculiarly perfect. Instead, then, of regarding the organ of hearing in the hedgehog of no use to it, I believe it to be exquisitely suited to convey to the sensorium of the animal the slightest vibrations of a sonorous body. I am, Sir, yours, &c. — *C. S. E. Cromer, April* 24. 1831.

Hares taking the Water. — Sir, Some misrepresentation, it seems, has crept into your Magazine by mistake, on the subject of hares taking the water, and colonising the Island of Havergate. (p. 143.) This unintentionally erroneous statement is corrected (as it ought to be) by a subsequent communication from another correspondent, on the authority of the proprietor of the island. (p. 274.) I was once, however, witness to the fact of a hare taking the water without being driven to do so by any emergency, so far, at least, as I was able to discover. When a youth, I was walking one day by the side of a river with my gun; and, about fifty yards before me, I heard something plunge into the water from the opposite bank; on proceeding towards the spot, I perceived that it was a hare, which by that time had advanced into the middle of the stream or beyond it. I confess that I was guilty of the unsportsmanlike act of shooting the poor animal in this situation. No dogs, certainly, were in pursuit of the hare, or I must have seen or heard them; but it is impossible for me to say that she might not have been pursued by some stoat or other vermin, though nothing of the kind was to be perceived. And this supposition is the more pro-

bable, as the hare, regardless of mypresence, continued to advance towards me, right across the river; and, after having received the contents of the gun, actually landed on the bank, in a wounded condition, close to the spot where I was standing. It seems probable, therefore, that she was endeavouring to escape from some imminent danger from the opposite shore. I have occasionally, when snipe-shooting, found hares lying in very wet marshes, much wetter, indeed, than one would suppose they would voluntarily select for that purpose. Yours. — *B. Coventry, May* 10. 1831.

The Snipe's Beak. (Vol. III. p. 449.) — Sir, I beg to assure J. Hayward, that snipes do actually bore in soft mire for their food. Like Mr. Hayward, I had an opportunity of watching two through a powerful glass while feeding close to the edge of a small lake, and I distinctly saw them pushing their bills into the thin mud, by repeated thrusts, quite up to the eyes, often, as your correspondent observed, drawing them back with great quickness, and every now and then shifting their ground a little. I may also mention that snipes arrive in Southern India very lean, in prodigious numbers, about the end of October, and depart fat in March. Stragglers, however, remain the whole year, and during the hot months are to be found; for I have often seen them, not in marshes, but on dry stony hills or high grounds thinly clad with withered grass and leafless bushes, without one drop of water near. This shows that snipes, like the woodcocks mentioned by Mr. Hayward, may and do support themselves where food is not to be obtained by boring. I am, &c. — *A Subscriber. March* 16.

Poisonous Plants. (p. 188.) — If I remember rightly, Smith combines the character alluded to with another, viz. that the plant is of the artificial class Icosándria, which *D*áphne is not. — *J. S. Henslow. Cambridge, April* 9. 1831.

The Sandstone of the Isle of Sheppey (p. 137.) I presume to be the embedded ferrugineo-calcareous nodules from which the Parker's cement is made. There is no sandstone in Sheppey, but the above nodules abound in the clay. — *Id.*

The Potato-stone of the Mendip Hills (p. 190.) is a nodular concretion of an impure kind of cherty-chalcedony, studded with crystals of quartz on the inside, among which are occasionally seen crystals of carbonate of lime. — *Id.*

The Constituents of Bezoar. (p. 287.) — Sir, One little word in my article, misprinted by you, makes a very great error. You say, line 17., "the gall bladder of a mare," which animal has no gall bladder: I wrote the gall bladder of a *man*. — *H. T. C. East Bergholt.*

Calendar of Nature in England for 1830. — In the table, p. 168., the columns representing the rainy and snowy days are evidently misplaced in reference to the headings they bear. — *J. S. Henslow. Cambridge, April* 9. 1831.

Art. IV. *Queries and Answers.*

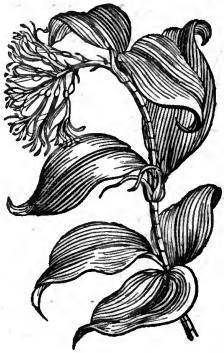
Additional Facts on Goître. (p. 86—90.) — Sir, A. B., a woman living on the borders of Derbyshire, had, when a girl, the glands of her neck somewhat enlarged, which have gradually increased to the present time. She is now thirty years old. The enlargement is greatest on the right side, and protrudes of the size of her fist; on the left side not so much. The whole, she remarks, is larger at some times than at others; but how far this is correct I am not able to say. It causes her to cough and breathe thick, but has no farther inconvenience. She enjoys good health. All the usual remedies gave no relief, nor did they appear to check it in its growth. She has had four children, the whole of whom when born had the neck swelled, and as large as her own, in proportion to their size; they exhibited

the same peculiarity both in coughing and breathing, and were, in fact, perfect models of their mother in miniature; this swelling, however, gradually decreased in a few months, and also lost its attendant unpleasantnesses; but in the whole of them there is still evident enlargement. At the present time the eldest is eight years old. How far this deformity may become hereditary I can form no opinion; the evidence to the full establishment of its being so is so contradictory. Neither the grandfathers, nor grandmothers, nor fathers, had the least deformity; her own mother had some little, but not perceptible without close examination. She has two sisters, both younger than herself; one, married, with a swelling larger than her own, has two children, but neither show any disposition to swell at present, nor were they born with any; her younger sister, not married, has her neck swelled, but not to such a size as that of either of the others. The whole generation have always lived in their present neighbourhood. The water they drink is perfectly clear, though impregnated with a little calcareous matter and iron; it is what all the inhabitants drink; and goître is not a general deformity. I am, Sir, &c.—*D. N. Worksop, May* 12. 1831.

A Marine globular Substance.— Sir, I have observed, when walking by the sea side, a substance of a globular form, colourless, transparent as jelly, with four circles (small) in the centre. It appears to be convex on one side. If you or any of your correspondents could favour me with a description of it, it would greatly oblige — *A. Z. May* 3. 1831.

The two drawings sent appear to be the following; but they are not, as M. A. Brown supposes, very rare. They were figured and described three years ago in the *Botanical Register*. Eriophýllum (*erion*, wool, *phyllon*, a leaf; woolly foliage) cæspitòsum; Compósitæ. (*fig.* 82.) A

82



83

plant found by Mr. Douglas in North-west America, from the sea to the valley of the Rocky Mountains, in dry situations. Dracæ'na (*drakōn*, a dragon; some of the species having been supposed to produce the drug "dragon's blood") surculòsa, Long-shooting Dracæna; Hexan. Monog. and *A*sparàgeæ. (*fig.* 83.) A monocotyledonous shrub, from Sierra Leone, "exhibiting, in a small space, what may be termed a model of the plan upon which the gigantic palms of the tropics are formed. It rarely flowers, and has never yet produced fruit; it is probable that the latter will show that it constitutes a genus distinct from Dracæ'na, to which it is referred on account of its habit rather than of its fructification, which approaches that of Sansevièr*a*." (*Bot. Reg.* 1828.) — *Cond.*

THE MAGAZINE

OF

NATURAL HISTORY.

SEPTEMBER, 1831.

ART. I. *An Essay on the Analogy between the Structure and Functions of Vegetables and Animals.* By WILLIAM GORDON, Esq., Surgeon, Welton, near Hull. Read before the Hull Literary and Philosophical Society, November 19. 1830. Communicated by Mr. GORDON.

PHILOSOPHERS have divided the immense variety of objects presented to us in nature into three grand classes or kingdoms; the mineral, the vegetable, and the animal. The substances belonging to the first of these divisions, in consequence of their not being actuated by that incomprehensible principle denominated life, have been termed unorganised; while plants and animals, which are influenced by vital laws, are distinguished by the name of organised beings. Although the distinction between organic and inorganic bodies is universally acknowledged to be sufficiently clear, yet there are some physiologists who contend that the boundary between them is less extensive than it is generally represented to be, and maintain that there is considerable analogy between crystallisation and the growth of animals. I shall not occupy time by discussing this subject at present. I will merely remark, that it is not improbable that all the phenomena of physiology are the result of physical causes; and at some future period I may perhaps discuss the subject of the similarity that appears to exist between chemical and vital action. Notwithstanding, however, that there may be a much nearer approximation between minerals and organised substances than seems to be commonly imagined, yet it must be admitted that each of these two orders of bodies possesses characters so conspicuously distinctive, that the one cannot easily be confounded with the

other. On the opposite hand, the line of demarcation between plants and animals we find it extremely difficult to trace, for the individuals belonging to these two kingdoms approach each other so closely, both in their organisation and their functions, that it is next to impossible to describe their respective characteristic features. To so great an extent is this correct, that there are many substances having qualities so peculiar, that philosophers can scarcely determine whether they belong to the vegetable or to the animal part of creation. Zoophytes, for instance, were considered by Ray and Lister as vegetables; but they are now regarded as productions of the animal kingdom. The object of the present essay is to describe the structure and functions of vegetable bodies, and to endeavour to point out in what respects they resemble, and in what they differ from, those of animals.

The first and most essential mark of resemblance that appears to exist between the vegetable and animal kingdoms is the possession of life. With this principle they are both equally endowed, and by its presence they are distinguished from inorganic substances. What life is, I am unable to define; for all the researches of philosophers have hitherto proved inadequate to discover in what it consists, or from what source it springs. Some have conceived that it depended upon a nicely adjusted combination, or a harmony of actions going on between the different organs of a living being; others have supposed that it is an element residing in the blood; and others, again, have identified it with caloric, with oxygen, and with electric fluid. If, however, we are ignorant of the nature of life, and are incompetent to decide whether it be a real and distinct agent or not, yet we are perfectly acquainted with the phenomena that indicate its existence. Observation has taught us that there are certain properties attached to living beings, of which inorganic substances are totally destitute. We observe, for instance, that the latter are incapable of assimilating foreign materials to their own nature; that their bulk is enlarged only by the external accretion of new particles; that they are under the continual influence of physical agents; and that their destruction is never effected, except by some mechanical force separating their integrant particles, or by some chemical agent producing an alteration in the arrangement of their ultimate elements.

On the other hand, we perceive that organised beings have the power of converting substances of almost every variety of composition into the tissues which compose their organs; that they can resist, to a considerable extent, the action of the ordinary laws of matter; that they are produced, by the pro-

cess of generation, from pre-existing germs; and that they terminate their existence by death. Such are the distinctive characters of life; and these characters we find as strongly exhibited in the vegetable as in the animal world. In the next place, when we take a plant for examination, we observe that, like an animal, it is composed of solid and fluid parts. The former are fixed and permanent, and constitute the receptacles in which the latter are contained. The fluids, on the other hand, are generally in motion, and are undergoing some change, either in their quantity, their mechanical admixture, or their chemical composition. The solid parts both of vegetables and animals, great as their number and varied as their characters are known to be, are all derived from a few primitive or elementary forms. In vegetables, these elementary forms are found to consist of membranous and fibrous matter; and from these two substances alone the roots, the stem, the branches, the leaves, the bark, the sap-tubes, and the pith are all produced. The elementary solid materials of animals, like those of vegetable bodies, consist of membrane and of fibre; the former constituting what is termed the cellular tissue, the latter forming the muscular and the nervous tissues. From these three tissues, the bones, the muscles, the ligaments, the cartilages, the nerves, the skin, and all the other animal solids, derive their formation. As we proceed farther in our investigations, we discover that membranous matter is a less elementary form than fibrous matter, for all the membranes belonging both to vegetables and animals are composed of fibres, regularly arranged and united together. As we advance still farther, however, we find out that even the fibrous structures are not the real primitive forms of organised bodies, but that they also are produced from other forms, which possess a structure much more simple than that which they present. If we go on another step, we ascertain that the true primitive forms, whence all the elementary tissues to which I have referred are produced, consist of extremely minute spheres or vesicles, and of spicular-shaped bodies. They are seen to be evolved from every organising fluid, vegetable as well as animal, while it is passing from the fluid to the solid state. It is therefore evident, from what has been advanced, that every organised structure, whether it be of vegetable or of animal origin, is composed either of membrane or of fibre. It is likewise evident, that every membrane, both vegetable and animal, is formed of fibres disposed in a regular manner; that the fibres themselves consist of vesicles and spicula; and that these two last are to be regarded as the true elementary organised molecules, because we can only

carry on our analysis of the living solid until we have arrived at these spherical and spicular bodies. Such is the wonderful and striking resemblance of the vegetable and animal world, in the origin and form of their primitive molecules, in the composition of their elementary tissues, and in the formation of their different organs.

Although I have stated that both the spheres and the spicula are the primitive forms of every organic mass, yet perhaps, strictly speaking, the former are to be considered as the legitimate primitive corpuscules; because when an organising fluid, either vegetable or animal, is assuming the solid state, they are *first* evolved, and the spicula *afterwards;* and because they are found to constitute the structure of the lowest tribes both of plants and animals, while the spicula are only to be detected in the higher orders of organised beings. For example, in the simplest kind of vegetables, as the Coniomycètes, and also in the lowest species of infusory animalcula, we detect the vesicular structure existing *alone;* but, when we ascend to a superior order of organic bodies, we discover in their composition that the spheres are never solitary, but always associated with spicula. It cannot, then, but excite our astonishment, as well as our admiration, when we observe that there exists so great a similarity in the ultimate structure of *all* bodies that are endued with the vital principle; and that we find the same characters of life in the polypus, and in the lowest species of vegetables, as we find in man, and the higher classes of animal beings.

I have already remarked, that the elementary solids of plants are membrane and fibre. The former, however, exists in the greatest quantity, and is the most extensively diffused. It is found in the roots, the stem, the branches, and the leaves; in short, it exists in every vegetable organ. It forms the whole of the cellular and the greatest part of the vascular tissues; and these, the common organic structures, as they have been termed, by their varied combinations, give formation to the bark, the wood, the pith, the medullary rays, and other parts: so that membrane, under some modification or other, seems to constitute entirely, or to enter largely as a component into every variety of vegetable texture. When very much condensed, we observe it forming the epidermis; under a less degree of condensation it composes the coats of the sap vessels; and in its simplest state it forms the sides of the cells of the cellular tissue. It is extremely thin, and of perfect transparency, and, according to Du Hamel, it consists of small organic parallel fibres. It is cohesive, extensible, flexible, and elastic; but it is perfectly

insensible and incontractile. Its ultimate chemical elements appear to be oxygen, hydrogen, and carbon.

In animals we perceive the same extensive diffusion of the membranous tissue as we find occurring in plants. Membrane forms the principal ingredient of every part belonging to the animal frame, and exceeds in quantity all the other structures of the body taken together. It not only affords a complete envelope to the exterior of the body, but it covers the whole of its internal surfaces. It forms the solid part of all the viscera, it covers every individual organ, and lines every cavity in which the organs are contained. It composes the chief bulk of the bones, and enters largely into the composition of the muscles. It constitutes nearly the whole mass of the tendons, the ligaments, and the cartilages. It composes the cellular texture, and is the chief ingredient in the structure of the glands. It envelopes the brain, the spinal cord, and all the nerves. It composes almost entirely such organs as the stomach, the intestines, and the bladder; and it forms the principal part of the tubes and vessels, whose office is to convey the fluids to every part of the animal system. According to Haller, animal membrane is composed of a vast assemblage of small and extremely delicate fibres. Its ultimate elements consist of oxygen, hydrogen, carbon, and azote. The tardiness, however, with which it undergoes the putrefactive fermentation, indicates that its proportion of azote must be exceedingly minute. Animal membrane, like that of vegetables, is possessed only of physical properties; it exhibits cohesion, flexibility, extensibility, and elasticity, but it is totally incapable of spontaneous contraction, and is likewise devoid of all sensibility. It therefore appears, that animal membrane is not only the most abundant, but the most simple, of all the organised parts of the body; and, that in its chemical composition, in its mechanical structure, its universal diffusion, and its uninterrupted continuity, in its being endued only with physical properties and in its wanting those which are vital, it bears a most striking resemblance to the membranous matter of plants.

If we cut from the stem of a plant a thin transverse slice, and carefully examine it by means of a microscope, we shall find that it is composed of a number of minute cells. This structure constitutes what is termed the cellular tissue. It is formed entirely of membranous matter, and possesses the same properties. It enters, as a component, into the structure of almost all the vegetable organs; it likewise envelopes them, and connects their several parts together. The cells of the cellular tissue seem in most instances to communicate with

each other, but in some cases they do not appear to do so. Their shape is extremely irregular, although they are said to be hexagonal. Some of them are thought to contain air, others contain the oily and resinous secretions, but by far the greater number contain a watery fluid.

Now, dissection demonstrates to us, that a cellular tissue exists very abundantly in every part of the animal frame; and in its character and uses it bears the strongest analogy to that which I have just described, as being diffused throughout the vegetable structure. We see it, for instance, surrounding every organ of the body, and uniting together their several parts. Its cells, according to the best anatomists, are of an irregular shape. Most of them contain an albuminous fluid, and others are filled with a peculiar oily matter, termed fat. The former of these communicate with each other; but the latter have no such communication. The cellular tissue of animals is composed entirely of membrane; and, like this substance, it exhibits no vital properties, and is therefore neither contractile nor sensible. Besides the cellular tissue, or membrane, as it is sometimes called, animal bodies possess other kinds of membrane; the chief of which are, the serous, the mucous, and the fibrous. Although there is nothing at all similar to these in plants, so far as I know, yet they are all, according to Haller, composed of condensed cellular substance, which, as I have just shown, is equally abundant in vegetables as in animals. The integument, however, or outer covering, of plants, bears the strongest similitude to the skin of animals; which by the most eminent physiologists is considered as one of the principal membranes of the body. The outer investment, or skin, if it may be so termed, of vegetables consists of three distinct layers. The most external of these is called the epidermis; the second is called the cellular integument; and the third the true bark.

The epidermis is a thin membrane, which is spread over the surface of every part of the plant. It covers the roots, the stem, the branches, the flowers, and even the fruit; and it enters into and even lines the pores which exist in the leaves, the stem, and other parts. It is formed only of a single layer. It is generally so transparent that the colour of the parts beneath it can easily be perceived. In some cases, however, it is somewhat opaque, and occasionally it exhibits a certain degree of colour. Although it gives free transmission to moisture, vapour being not only exhaled but absorbed through it, yet no pores have been detected passing through its substance. Its thickness varies, not only in different plants, but in different parts of the same plant. In the fir, it is hard

and scaly; in the birch, it is soft and smooth. On the stem of plants it is thick and tough; but on the leaves, flowers, and fruit, it is thin and delicate. The epidermis is continually being renewed; the old membrane falling off in small scales as soon as the new one is formed. When destroyed by accident, it is regenerated with surprising celerity. Its use is to defend from injury the parts over which it is spread, and to prevent too speedy exhalation from the surface. The cellular integument lies immediately under the epidermis or cuticle. It is an extremely succulent substance, and is the part in which the colour of vegetables resides. It is white, for instance, in the stem of the birch, and green in that of the apple tree. In most leaves it is green; in some it is yellow, and in some red or brown; but it is in flowers that it displays its most diversified and matchless hues. The true bark or third tegumental layer of vegetables is situated beneath the cellular integument. It is composed of innumerable vessels, and after maceration it exhibits a reticulated structure. The inner surface is softer and less dense than the outer one, and is called the liber. Such are the characters of the external covering of vegetables. How very closely they resemble those belonging to the skin of animals will be seen in the description which I shall now give of the latter substance.

The cutaneous system of animals, like that of plants, is composed of three separate laminæ, which have received appropriate appellations: the first, or outermost, is termed the epidermis, or cuticle; the second is denominated the rete mucosum; and the innermost is called the cutis, or true skin. The epidermis is a thin semitransparent insensible substance, of a very light grey colour; readily separated from the subjacent parts, by the application of boiling water and by blisters. It not only covers the whole of the external surface of the body, but is reflected into and lines the large passages; as the mouth, the alimentary canal, the trachea, &c.: so that it is the most extensive membrane of the body, and is the only organ, except the teeth, which comes in contact with the atmospheric air. It allows free passage to the cutaneous perspiration and to the absorption of substances from without; and yet anatomists have expressed themselves unable to prove that it is perforated with pores. It exhibits different degrees of thickness in different parts of the body. On the inner edge of the eyelid, for example, it is very thin and diaphanous; while on the palms of the hands and the soles of the feet, it is found, even in the fœtus, thick and of great density.

In almost every species of animal it presents some peculiar modification. In the human race it is smooth and glossy;

but in the elephant and rhinoceros it is thick, glabrous, and coarse. The animal, like the vegetable, epidermis is undergoing a constant renewal, and when detached by injury is very speedily reproduced; indeed, its reproductive power is greater than that of any other animal solid. Its use is chiefly to protectthe delicate structures, over which it is extended, and to regulate the quantity of the cuticular exhalation.

The rete mucosum, which is analogous to the cellular integument of plants, is situated immediately under the epidermis. It contains the colouring principle of the skin, which, by its different shades, distinguishes mankind into five principal varieties. It is likewise the cause of the difference of colour in different parts of the body of the same person. In the European it is of a light hue, in the Asiatic it is olive; in the aboriginal American it is red; in the Malay it is tawny; and in the negro, in whom it exists in the greatest quantity, it is black.

The cutis, or true skin, is composed of a number of small fibres, or plates, closely interwoven together; and has attached to it a vast quantity of nerves, blood-vessels, and absorbents, which are minutely ramified over every part of it. The blood-vessels form innumerable plexuses, and give it a reticulated appearance. The external surface of the cutis is compact, while the internal is loose and irregular. Bark, it may be observed, is a very slow conductor of heat; so that the more internal parts of plants easily preserve their warmth during winter, and during summer receive no injurious effects from the high temperature of the surrounding atmosphere. The cutaneous laminæ of animals, especially the epidermis and rete mucosum, are, like the bark of vegetables, media through which heat is transmitted with great difficulty. Hence the parts adjacent to the skin are prevented from suffering by the extremes of temperature to which the body is so constantly exposed. From this account it will be perceived, that the cutaneous tissue of vegetables possesses so exact a similitude to that of animals, that a description of either will answer to both.

The surface of plants is often destitute of covering; but generally it is clothed either with down, hair, or wool, all of which are productions or modifications of the epidermis. The hair is of various descriptions, being sometimes long and flexible, at others short and bristly. The woolliness, too, differs considerably in its character. In some cases it is extremely delicate and easily detached, as on the leaves of the coltsfoot; in other instances it is of a coarser texture, as on the skin of the peach. Sometimes, as in the Poten-

tilla Anserina, it is silky; and in the *Verbáscum Thápsus*, or great mullein, it is so thick and tough as to bear a strong resemblance to flannel. The clothing, or, as it is termed, the pubescence of plants, is evidently intended as a protection against cold: for we find that the plants which grow on mountains or in cold situations are always clothed with a woolly investment; and it is remarked that this investment is generally thickest on those parts which are most exposed to the winds. The pubescence of vegetables falls off at certain seasons of the year, and its original appearances and character are considerably changed by cultivation. In animals, as in plants, the surface is sometimes naked; but for the most part clothed with a variety of substances, such as down, hair, wool, quills, and feathers. These investments present every variety of character that can be imagined; being adapted not only to the peculiar nature of the animal itself, but to the climate which it inhabits. In cold regions, where the injurious effects of a low temperature are to be guarded against, the hair is thick and long, and the plumage is downy; while in warmer countries, where the temperature of the body is more upon an equality with that of the surrounding atmosphere, the hair is thin and short, and the feathers almost destitute of down. The clothing of animals is cast off once or twice in the year, and by domestication its original qualities are remarkably altered. The surface of plants, besides the pubescence, is also furnished with prickles, stings, and thorns, which may be considered as organs of defence. The first two, like the wool and hair, are modified from the epidermis. Animals are provided with similar weapons, most of which are derived from the cuticle. It is from this substance that the claws of the tiger and the cat, the talons of the eagle, and the quills of the porcupine, are all produced. The sting of the nettle, and that of the wasp, are not only composed of nearly the same materials, but are constructed on precisely the same principle. The former, when examined with a microscope, appears to be a stiff, highly polished tube, possessing an extremely fine point: at its base is situated a small bulb, which secretes the venomous liquid. When the sting enters the skin, the bulb is pressed upon; the poison rises in the tube, escapes through an aperture in its point, and is instilled into the wound. To this, the sting of the wasp presents an exactly corresponding formation, except that the channel along which the poison passes does not open at the very point, but at a short distance behind it.

(*To be continued.*)

ART. II. *Some Account of a Russian Natural History Expedition in Brazil, during the Seven Years preceding April,* 1831. By M. F. FALDERMANN, Curator of the Botanic Gardens, St. Petersburgh.

Sir,

THE imperial Russian expedition for exploring the natural history of Brazil, under the direction of the Consul-general Chevalier Langsdorf, has returned, after seven years spent in the interior parts of that extensive empire. M. L. Riedel, who was attached to that expedition in the quality of botanist, has consequently returned to the imperial botanic garden at St. Petersburgh; and, from his intimacy here, I have had opportunities of learning the facts narrated in the following sketch. Up to the present time nothing has been published respecting the vast and interesting enterprises of this expedition: I have therefore judged it useful to send a short statement of them for insertion in your esteemed Magazine, as even such a statement will give at least an idea of the main course of the expedition, and of the principal vegetation of this rich empire, so little frequented by naturalists.

M. Riedel embarked at the port of St. Petersburgh in the autumn of the year 1820; and, in the beginning of 1821, after visiting several ports on his voyage, reached Brazil. He extended his first researches into the province of Bahia, and directed himself particularly to the Comarca dos Ilheos. Thence he travelled on the shores of the rivers Una and Itahypé, until he came to the immense native forests inhabited by the wild Kamakans. After a very successful journey, he left this province in October, 1822, and arrived, loaded with rich collections, particularly of dried plants, at Rio de Janeiro.

In the capital of the Brazilian empire he joined the imperial Russian expedition. In the year 1823 he confined himself to excursions in the province of Rio Janeiro, and directed his exertions particularly to the mountains surrounding the port of the capital; he examined most attentively the lofty and seldom accessible trees of the native forests, and found them to be chiefly such as Bignòn*iæ*, Terminàliæ, Lécythis, *Vochýsiæ*, Hymen*æ`æ*, *Fi*ci, &c. Below these trees, in very moist shade, he noticed in particular abundance, and growing most luxuriantly, Begòn*iæ*, shrubby Oxálides, many ferns, *Galipèæ*, Peperòmiæ, Melástomæ, &c. The lower places of the hills and mountains, particularly toward the shore of the ocean, are characterised by Coccólobæ,

Myrti, Ecastaphýlla, *Cácti*, Tillándsiæ, and the shore palm, Diplothèmium littoràle, &c.

In the following year, M. Riedel undertook a journey into the province of Minas Geraes. He visited there first the immense and imposing forests of the Puris; and afterwards he ascended the mountains, from 4000 to 5000 ft. in height, of S. Joao d'el Rey, S. Jozé, Marianna, Villarica, Serra da Caraça, S. da Piedade, Serra da Lappa, and the other mountains of the famous diamond districts. To the distant traveller, accustomed to see only amazing native forests, these high regions appear desert-like and poor, and the plains arid and sterile; but a nearer approach will soon convince him of the contrary, by presenting a great and rich diversity amongst the dwarfish vegetation. Every where even the dry rocks are crowded with beautiful Vellòsiæ, Barbacèniæ, Pitcaírniæ, Gesnèriæ, *Fí*lices, &c. The arid and sandy hills and plains are clothed with rich-flowering *Rh*éxiæ, Kielmèyeræ, *Vochýsiæ*, Luxembúrgiæ, Lavràdiæ, Lusàdiæ, *Cá*ssiæ, Evólvuli, *Cr*otònes, &c. A great many of the *Gra*míneæ cover the soil, and protect it from the excessive rays of the sun. In the valleys and low places, where the soil in general is found to be more moist, and consequently cooler, are many Eriocaúla, Lisiánthi, Burmánniæ, *Xý*rides, Sauvagèsiæ, and Mimòsæ. The trees appertaining more to the native forests, such as Malpíghiæ, *Ac*àciæ, Geoffròyæ, *Anònæ*, Erythróxyla, occur in these places, but in a creeping and completely dwarf state; and such as belong to the lofty kinds of trees, as Xylòpiæ, *Str*ýchni, Bignòniæ, *Mý*rti, *La*úri, *Quàleæ*, *R*ubiàceæ, Leguminòsæ, Contórtæ, Sapindàceæ, Synanthèræ, &c., are stunted, and have quite a shrubby appearance. The palms he most frequently here met with were:—*Còcos* flexuòsa, Acrocòmia sclerocárpa, Astrocàryum *Ayri*, Astrocàryum campéstre, and Báctris *maràja*. M. Riedel observed that the considerable luxuriance of the vegetation, in such an arid soil, may be chiefly attributable to the heavy dews, and the moderate temperature during the night, upon these elevated regions.

In the year 1825, M. Riedel, having returned from Minas Geraes, started from Rio de Janeiro to the province of St. Paul; he preferred to take the less frequented roads of the native forests. Following, therefore, the river side of Parahyba (Paraïba), he came to Rezenda, Lorena, and Tauboté (Taipa-été); and arrived, after leaving the river beyond Tauboté and crossing Mugy das Cruzes, at the town of St. Paul. After this very interesting journey, he rejoined M. Langsdorf at the latter place, and directed his researches to the environs

of Campinas, Itu, Sorocaba (Surucava), and Ypanéma. In the year following, our traveller took his course to the southern parts of that province, in the progress of which he passed Itapitininga, Fachina, and Castro. As soon as he had crossed the tropic of Capricorn, he observed a gradual change in the vegetation. The country began to be more bare; the shrubs were few and scattered; and the ground, being covered with *Gramíneæ* and other low-growing plants, had, at a distance, the appearance of cornfields or meadows. A few roundish little woods (capao) sometimes limit the almost infinite plains. The tropical vegetable productions, such as sugar, coffee, bananas, &c., here cease to be cultivated; even the mandiocca (*Janìpha Mánihot*) is seldom successfully planted; the inhabitants pay more attention to cattle-feeding, in consequence of which animal food is in general more plentiful than in the beforementioned places. The European husbandry might be practised here with great success, if the people would but be more industrious. Farther still to the south, great forests of the *Araucària* brasiliénsis begin to predominate in the country. At the time of ripening, various animals, particularly birds of many descriptions, are seen in great numbers feeding on the seeds upon these lofty trees; and even the Joyanazes Indians partly subsist on the pinhaes (pine nuts). Amongst the *Gramíneæ*, in the campos or plains, *Lantànæ*, *Hýptides*, *Polýgalæ*, *Verbènæ*, *Hypérica*, *Erýngia*, *Plantágines*, &c., are frequent. On the shores of all the rivers and rivulets grows the *Ilex paraguaiénsis*, from which the famous matte tea is obtained. Although this tree belongs to a cooler region, it is here abundant. In the valleys, protected from the severe winds by the high mountains, tropical trees are still to be seen, intermixed with beautiful tree ferns. The short stay of M. Riedel did not allow him to pursue his enquiries toward the south; and circumstances obliged him to return to St. Paul by the way that he came.

In April of the same year, he again passed Ypanema, and arrived at Porto Felix; where he joined M. Langsdorf in the month of July, and embarked with him and the whole expedition upon the Tiété, the banks of which are magnificently ornamented with immense native forests. A number of dangerous cataracts obliged them very often to have the boats carried by their negroes some distance even beyond the waterfalls; under such circumstances they could advance but slowly, and it was not till after a two months' voyage that the expedition reached the more navigable river Parana, which takes its rise in the province of Minas Geraes, not far from S. Joao d'el Rey. They now directed their course to the

great cataract Urupupunga (Salto de Viubu-Pungu), one of the largest they ever met with; its total breadth is more than an English mile. M. Riedel was fortunate enough to find there several kinds of that most singular water-plant Làcis, growing alongside of the rocks near the cataract, in shallow water. The prevailing trees on the shores of the fall are Tríplaris, Heliocárpus, Hermèsia, and two kinds of Xylòpia. The huge rocks of the cataract are partly overgrown with *P*sídia, *P*hyllánthi, and Cnemidóstachys. Thence the travellers went down with the stream until they came to the river Pardo, one of the tributaries of the Paraná; and, leaving the Paraná, they rowed with much difficulty against the current of the Pardo. Coming gradually up into the more elevated country, the large woods disappeared by degrees, and the landscapes changed into open campos, exhibiting a rich vegetation on a dry sandy soil. Here were chiefly, but in a dwarf state, Bauhín*iæ*, Byttnèr*iæ*, *Simarùbæ*, Turnèr*æ*, Gómphiæ, Córd*iæ*, Celòsiæ, a species of Játropha, *Janìpha*, and some creeping *M*yrtàceæ. After a successful voyage of two months against the stream of the Pardo, they arrived upon the ridge of the mountain Camapuam. This ridge divides the Pardo, which takes its course to the south into the Paraná, from the river Cochim (R. Cuchu, Cuchim), which runs to the north into the Taquari. Though these two rivers in their beginning take their course in opposite directions, they subsequently unite with the Paraquay; after which this mighty stream, under the name of La Plata, empties its waters into the Atlantic Ocean. The ridge of the Camapuam extends itself into large sandy plains, on which grow in a dwarf state, generally not above two feet high, but with most perfect and large flowers, such plants as, Lécythis, Anacárdium, Ephièlis, Caryòcar, *Copaífera*, and Aspidospérmum. The lower damp and marshy places are covered with palms, chiefly Maurítia vinífera. The Indian tribes, Cayapos, Guaycurús, and Guaxis, inhabit, in a nomadic state, several hundred miles of these elevated countries; hunting being their principal exercise, and wild fruits their chief nutriment.

After a month's stay in the interesting environs of the Camapuam, where M. Riedel found a very rich collection of plants, he embarked upon the river Cochim, and came, after a fortnight's very tiresome travel, on account of many cataracts, into the river Taquari. Arrived there, he visited the Xarayas (Lacunes das Xarayes), low plains of great extent, which are inundated by the overflowing river in the time of the heavy rains, something like the shores of the Nile; after which, when dried up again, they have the appearance of

endless meadows covered with beautiful Scitamíneæ, *Cyperàceæ*, and many singular Gramíneæ. Amongst them he remarked a particular kind of *Oryza* (rice) of uncommon height; even when the river, swollen with torrents of rain, overflows these places, the spike appears still above the water, and ripens its nutritive seeds. The Indian tribes, Guaycurús, Guanás, and Guatos, in the vicinity of Albuquerque and Coimbra at the boundaries of the Brazils, row their canoes, made of hollow trees, upon that large temporary sea, and harvest the floating rice, which nature has given them without any labour save the gathering.

After descending the Taquari into the Paraquay, M. Riedel took his course up the latter river, till he arrived at the mouth of the S. Lorenzo, where he left the Paraquay; and, after a seven months' voyage up the S. Lorenzo, arrived in January, 1827, in the river Cujaba. He could ascend these rivers but slowly, as they were in an overflowing state, and consequently the current much more violent than usual. The shores of the foregoing rivers were chiefly clothed with Gardèn*iæ*, S*à*pia, Cecròp*iæ*, and amongst others a new species of Hermèsia. The prodigious masses of the Pontedèr*ia* crássipes *Mart.* were often a great and troublesome impediment to their canoes; and thick clouds of musquitoes pursued and tormented these enterprising travellers day and night.

Arrived at the town of Cuyaba, M. Riedel made excursions most carefully in the vicinity, and very much enriched his collection. He started afterwards for a few months to the famous mountains where, in former times, the goldwashers procured quantities of that noble metal. There he discovered many scarce and new plants, among which he mentioned in particular, — Salvért*ia*, *C*néstis, *Simàba*, Phæocárpus, Dípterix (the Tonquin bean), Chrysophýlla, Cinchòn*æ*, Pterocárpi, Lùhe*æ*, Helícteres, *Norânteæ;* shrubs of Hippocratè*æ*, A´nthodon, *M*yrísticæ, Hóst*a*, *A*sclepià*deæ*, *A*pocýneæ, Dilleni*àceæ*, Guttíferæ, and a beautiful kind of Terminàlia. Amongst a number of different palms which adorn the native woods and campos or plains, he noticed chiefly Attàlia speciòsa, Attàlia compácta, Maurít*ia* armàta, Maurít*ia* vinífera, Córypha cerífera, Œnocárpus *Bataúa*, Eutérpe, Astrocàryum, and *Còcos*. By a digression to the diamond districts, thirty leagues from Cuyaba, he came to the source of the Paraquay, and found that this river did not, as formerly stated, take its origin out of seven lakes (seven lagoons); he met with merely a large bog, out of which arises, in the shade of Maurítiæ, that river which, in its course, increases so enormously.

This bog, in his opinion, may be changed in the time of inundation into a large lake, which afterwards, by drying up again, may exhibit in the lower places, but certainly for a very short time, several small lakes; and these most likely have caused the tale that "the Paraquay springs out of seven lakes." It flows, a small rivulet, upon the ridge of the mountain for the distance of above two leagues, and falls thence over a high rock into the Valley of Diamonds. In its crystal water were frequently found some precious diamonds. Its current is here often stopped, and led into the diamond-washes; and, at a distance of a few leagues farther, it becomes navigable for small canoes. On the south side of these mountains (Serra dos Parecis) is the source of the river Preto, which communicates its waters to the river Tapajos, which, in its turn, is a tributary to the Amazon. A very lofty tree, with beautiful large blue flowers, a species of the genus *Quàlea*, distinguishes itself here in all the native forests, and is even seen at a considerable distance. In the same elevated plains he found a tree closely related to Pterocárpus, covered entirely with abundance of odoriferous flowers; it produces a kind of shell, with a single seed in it, from which the inhabitants extract a bitter aromatic oil, which they call Fava de S. Ignacio. This oil is by them highly esteemed for its great power as a remedy in different diseases, particularly in colic, and many other stomachic cases.

In September, 1827, M. Langsdorf determined to make a voyage upon the rivers Arinos, Tapajoz, and the Amazon; but, to extend this new enterprise on a larger scale, M. Riedel agreed with him to undertake a separate tour to Matto-Grosso, and thence to take his direction upon the rivers Guaporé, Mamoré, and Madeira, to the Amazon; they intended to unite, after a seven to ten months' separation, at the Villa de S. Joze do Rio Negro. Having made their preparations, M. Riedel, according to proposal, left the town of Cuyaba in the month of November, crossed the Paraquay by Villa Maria, not far from the mouth of the river Jauru, and at a little distance from the place where the pyramid in commemoration of the definitely decided boundaries between the dominions of Portugal and Spain is erected. Once on shore again, he traversed arid campos, and arrived at the Indian tribe Bororos. Amongst them he noticed, as remarkable, that their principal nourishment consisted of the flesh of the caimans (crocodiles), and the fruits of the Acrocòmia sclerocárpa *Mart.* Only a few low hills varied the surface of these vast plains. He arrived at length, in a gently ascending manner, at Matto-Grosso, by which name the principal town and the

whole province are designated. Hence take their origin the Aguapeky (Agoapiki) and Guaporé, the first a tributary to the Paraquay, and the latter to the Amazon. Arrived at the town of Matto-Grosso, he extended his researches even to the confines of the Brazilian empire. On his way thither, he came to the village Cazalvasco, where he met with the Xiquitos (an emigrant mission from Peru); several of them, he remarked, were able to write and read their language; and in their religious service, instead of an organ, they use violins, which several of them played tolerably well. Having much enriched his collections, he returned again to Matto-Grosso, at a short distance from which he was overtaken by a terrible thunder-storm. After his arrival, he had to deplore the loss of his very dear friend and fellow-traveller M. Adrian Taunay, the painter to the expedition. Trying to get under shelter before the storm reached him, this gentleman rode off from the rest of his companions, who were yet at a considerable distance from the town; and in his hurry he lost the footpath, and came to the bank of the river Guaporé, but on the side opposite Matto-Grosso. Having passed the ferry a good way, and finding at the moment no boat to bring him across, he was seen, by an old woman on the other side, to drive his horse before him into the river. The animal got safely over; and, shortly after, his master threw himself, clothed as he was, into the current, at that time very rapid, but, losing his strength about the midst of the stream, he was drowned. He was seen by no person but the old woman, who chanced to be at the same time on the river-side, and she was unable to render him any assistance. She immediately alarmed a great many of the inhabitants; but they could not find him sooner than the third day. After this melancholy accident, M. Riedel experienced many difficulties; besides, his health was impaired from the putrid atmosphere at that unwholesome place, inundated, in general, about four months in the year.

The vegetation of Matto-Grosso M. Riedel states to be little different from that of Cuyaba, notwithstanding many rare and new plants were discovered. Amongst others, he found in the native woods a most singular plant, in size a large tree (Calycophýllum): one phyllum or leaflet of the calyx grows into a large heart-shaped petiolate leaf, of a bright crimson colour: giving the tree, at a distance, the appearance of being covered with large beautiful crimson flowers. He likewise discovered at that spot a curious kind of the numerous Leguminòsæ, which had a trunk quite flat, about 1 ft. broad, and but 1 in. thick, climbing up to the

very tops of the most elevated trees. In the campos he found a singular Melastomàcea, certainly of a new genus; some *Quàleæ*, Calystègiæ, Malpíghiæ, *Anònæ*, Turnèræ, and many of the Gramíneæ and *Cyperàceæ*. On the banks of the Guaporé he noticed an *Ilex* n. sp., which produces the matte tea in the same manner as *Ilex Congónha*, and *I.* paraguaiénsis (or, as it ought to be, *I.* paraquaiénsis). In the current of the river he gathered many Pontedèriæ, Heteranthèræ, *Tonìna*, and a very curious Jussieùa, something like our *Trapa nàtans*, which entirely covers the stagnant pools.

In April, 1828, our traveller embarked upon the Guaporé at Matto-Grosso, and arrived in a fortnight's time at the fortress Do Prinzipe Imperiale (Fortalezza do Prinzipe da Beira), being carried there very quickly by the rapid current of that river. Shortly afterwards he came upon the river Mamoré, and reached, in three days' voyage, the river Madeira; down which, on account of the dangerous navigation, he could proceed but very slowly. The woods bordering this river were yet for the most part inundated, and consisted principally of [Theobrómata?] *Cacàos*, Berthollètia, Cæsalpínia, *Copaífera*, Carolínea, Cedrèla, Spóndias, *Aroúna*, *Bixa*, and Cratæ'va. Arrived at the great cataract of Salto do Ribairao, he fell ill of a putrid fever; and, although cured in a short time of that dreadful illness, he was shortly afterwards confined by an intermittent fever, with which he was afflicted continually and very severely for about five months. Notwithstanding his ill health, he made small excursions into the very extended and lofty native woods of the Madeira. The different palms exceeded in height the rest of the forest trees, and seemed to reign, with their grand and beautifully formed leaves, over all the rest. He noticed amongst them particularly the gigantic Astrocàryum *Murumùru* Mart., Maurítia aculeàta, several Báctres and Geónomæ; various kinds of Helicòniæ, *Marántæ*, and Costi grow in the dark shade below these lofty trees; but the tree ferns, as M. Riedel observed, seemed not to like that place. A new and most splendid kind of *Ravenàla* (Uránia) attracted his attention at a great distance; on closer examination, he found it of an immense height, and at the same time in seed. Some seeds and specimens of it he afterwards forwarded to St. Petersburgh; but, unfortunately, the seeds, which were of a bright red colour, had, by the period of their arrival at the garden, lost entirely the power of vegetation.*

* There being a good quantity of seeds, I tried them in different modes; but my exertions were, to my great sorrow, in vain: therefore, it is to be feared that this plant will be, for some years, one of the beautiful deside-

In the month of January, M. Riedel arrived at the Villa de Borba, where he attempted to cure himself of the intermittent fever. For this purpose he made a stay of seven weeks, and collected, notwithstanding his fever, many new genera and species of plants; he noticed amongst them principally, *Mà-bea*, Schwártz*ia*, Myrística, *Caraípa*, Móll*ia*, Vísme*a*, Cinchòn*a*, *Humíria*, Gustàv*ia*, Abròma, Caryòcar, Stercùlia, *Inga*, *Achras*, Bómbax, Francísc*ea*, a new and very distinct Cochlospérma, *Laúrus*, *Smilax*, Bignòn*ia*, several of the *Tiliàceæ*, Guttíferæ, Leguminòsæ, *Myrtàceæ*, and many officinal as well as economical plants. Amongst the latter, the Paull*ínia* sórbilis *Mart.* (Gaurana) is, perhaps, the most remarkable, as the inhabitants prepare with its seeds their favourite (and even by travellers much praised) beverage gaurana.

At last M. Riedel was again a little recovered from his disease, and had made preparations for his departure to the Rio Negro, when he received the melancholy account of M. Langsdorf's arrival at Santarem, dangerously ill.

The bark that had been hitherto used being too small for the voyage upon the Amazon, M. Riedel was obliged to go to S. Jozé do Rio Negro, in hopes to find there a larger vessel for Santarem or Para; but finding no ship ready to sail at that time, and being less troubled by his illness, he employed himself in making researches in the environs of that place, and gathered many undescribed and scarce plants, such as species of *Amyris*, *Icica*, *Caràpa*, Alsodèa, *Rhopàla*, Lùhe*a*, &c. Here he remained nearly two months; when, having no longer any hopes of a departing vessel, and receiving no further news of M. Langsdorf, he was obliged to buy a kind of large bark, and sailed in September from S. Jozé. Passing the small towns of Serpe, Villa Nova de Rainha, and Obidos, he arrived, after a seventeen days' passage, upon the mighty Amazon, at Santarem. Here he was very much astonished to learn that M. Langsdorf had left this town and gone to Para about four months before. M. Riedel remained several weeks, visiting the environs, which consist principally of campos, and found them not less rich in beautiful plants than Borba and St. Jozé. He embarked at Santarem on the 15th of December, and arrived on the 10th of January, 1829, at Para. His voyage upon the Amazon was very troublesome and disagreeable; even not far from Santarem he was nearly shipwrecked: and the great many shelves and daily storms upon that immense stream caused him to be in continual

---

rata produced in the Brazilian empire. Dr. Fischer named it Urània Riedel*iàna*, in honour of this indefatigable traveller.

anxiety. The enormous trees of the native woods bordering the sides of the river, the grandest of the vegetable world, he could only admire; and, certainly, many naturalists must yet be content to view them at a distance.

The great diversity and magnificence of the palms are inexpressible; he met with all the kinds described by Dr. Martius, and even with many more which had escaped the searching eyes of that famous traveller and noted botanist.

At Para our traveller found M. Langsdorf very ill, and completely unable to continue their proposed voyage upon the Amazon and Rio Negro: therefore, the whole of the expedition embarked at the end of January, and, after a seventy days' passage at sea, arrived again at Rio de Janeiro.

All their rich collections, obtained in their extended and painful journeyings through so many uninhabited arid campos and native woods, were then put in order, and sent to St. Petersburgh, the place of their destination. M. Riedel remained a few months longer at the capital of the Brazilian empire, and prepared during that time a collection of live plants for the imperial botanic garden at St. Petersburgh, with which he embarked in May, 1830, at Rio de Janeiro, and arrived, after a happy and quick passage of sixty-four days, safe at the port of St. Petersburgh.

Of the rich collection of live plants which we received through M. Riedel's great care, in very good condition, into the imperial botanic garden, I will give you some account in my next letter, especially of the most remarkable for novelty and interest.

I am, Sir, yours, &c.

Imperial Botanic Garden, F. Faldermann.
St. Petersburgh, April 18. (*N. S.*) 1831.

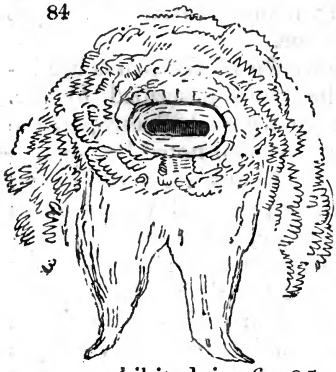
Art. III. *Instances of Monstrous Productions.* Communicated by C. B. Rose, Esq.

Sir,

The following descriptions of monsters possessing curious and rather unusual deviations from the natural developement of certain parts, I am desirous of having inserted in your instructive and highly interesting Magazine, that these strange examples of nature's freaks may stand recorded for the information of those philosophers who in after times may be anxious to collect facts, in order to elucidate (if it be pos-

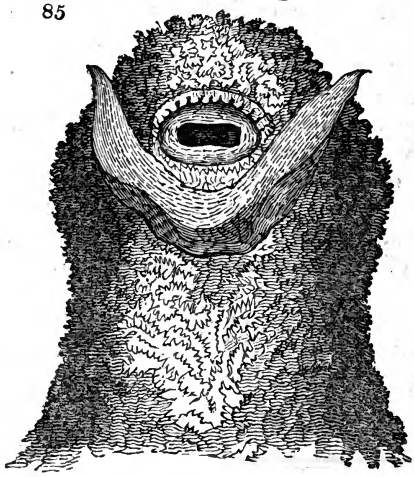
sible) the occult cause of these anomalies in the generative and nutritive processes.

84



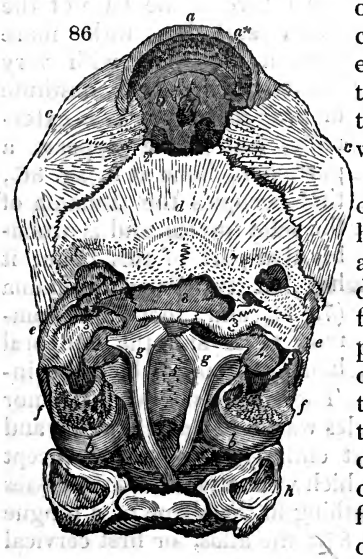
The first instance of deformity I have to notice, is that of a lamb exhibiting considerable deficiency in the facial portion of the head, which was small, and had no vestige of the projecting portion of the face. It had but one eye, and that placed in the centre of the forehead; its two ears were confusedly united into one, as shown in *fig.* 84., and formed one impervious concha placed immediately beneath the eye, as exhibited in *fig.* 85.; below these there was nothing visible, more than a regularly enlarging neck. Dissection showed the following disposition of the soft parts: — The eye was rather large in proportion to the size of the head, but in every respect a single eye; the optic nerve passed into the cranium in a straight line backwards from the retina; the eye was covered by the tunica conjunctiva, which was reflected, and lined the upper eyelid, but was below united to the very edge of the skin that formed the inferior border of the opening for the eye: indeed, there was no lower eyelid; the superior palpebra was perfectly formed, except that there was neither punctum lachrymale nor canalis lachrymalis, and consequently no saccus lachrymalis, nor ductus ad nasum: it had a tarsus, cilia, and glandulæ Meibomianæ. There were muscles attached to the eye and also to the ear, and nerves and arteries, but I had not time to trace them. I observed that the arteries, veins, and nerves which supplied the imperfectly formed parts that I am about to mention were remarkably small. The ear had no meatus externus, nor auditory canal. Below this misplaced double ear, and hidden beneath the common integuments, were observable the rudiments of

85



a mouth wanting its upper border; a line formed by the inferior half of the orbicularis oris muscle showed where the opening for a mouth would have been, had not something arrested the farther developement of the parts; it was placed at the upper part of the pharynx, but was completely shut by cellular membrane: attached to the angles of this inferior labium were two very small buccinator muscles; and it had two depressors very well defined. There were myo-hyoidei muscles; and the muscles situated between the os hyoides, thyroid cartilage, cricoid cartilage, and sternum, were distinct and perfect. The larynx and trachea were also perfect. The œsophagus was large, and commenced from a circular and muscular bag (the pharynx), which was supplied with nerves by two large branches on either side from the par vagum. The stylo-pharyngei muscles were large. Ninth pair of nerves very small. Internal carotid arteries small, and entered the cranium through the foramina, 7, 7, *fig.* 86. All the parts below the os hyoides were perfect.

86

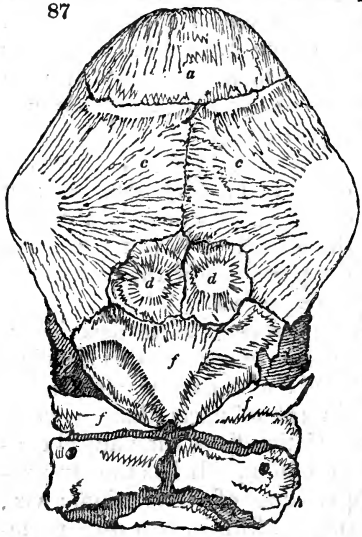


I now come to the description of the bones of this faceless head: and here we find more a want of parts than a great deviation from the natural conformation. It has the six proper bones of the cranium; viz., one os frontis, two ossa parietalia, two ossa temporum, and the os occipitis; it has also two ossa triquetra. Of the bones common to the cranium and face, it has the os sphenoides only.

I shall endeavour to describe individually the bones of this monstrous part: and, first, the os frontis (*a*, *figs.* 86. and 87.) is situated in front; its superciliary arch (*a**, *fig.* 86.), prominent, is nearly a semicircle, and projects so as to form the anterior margin and extremity of the head. A thin plate of bone (*b*, *fig.* 86.), the orbital plate, has a large oval foramen (1) in its centre, for the passage of the optic nerve; between this plate and the sphenoid bone (*d*) is a lacerated foramen (2) for the passage of the nerves to the eye and its muscles. The ossa parietalia (*c*, *c*, *figs.* 86. and 87.) are not very unlike the natural form, and have nothing peculiar to

them worthy of notice. The ossa temporum (*e*, *e*, *figs.* 86. and 87.) are very small, made up chiefly of the petrous portion, possessing scarcely any squamous plate; they have very small zygomatic processes (3, 3, *fig.* 86.) and no mastoid processes; the petrous portion is formed as if it contained the organs of hearing, for the bulla ossea (4, 4) are very distinct; but there is no meatus auditorius externus. The os occipitis (*f*, *f*, *f*, *figs.* 86. and 87.) lies much more horizontally than natural, and the ridges and tuberosities are small; it has a cuneiform process (5, *fig.* 86.) passing up to meet the sphenoid bone and (6, 6) condyloid processes; and there are two anterior condyloid foramina. The sphenoid bone (*d*) forms the centre of the base of the skull, and has little more than a flat body with very limited alæ; it is destitute of prominent processes externally, but there appears a portion of bone at 8, *fig.* 86., that occupies the situation of the sella turcica, and is probably that part of this bone; it has but two large foramina (7, 7) and they are common to it and the temporal bones, through which the internal carotid arteries passed. There were neither upper nor lower jaw-bones. The os hyoides was in its natural place, and appeared to be perfect; almost entirely cartilaginous except its appendices (*g*, *g*, *fig.* 86.), which were attached to processes at the base of the skull; but nothing in the shape of a tongue was visible. *h*, *h*, *figs.* 86. and 87., the atlas, or first cervical vertebra, attached to the occiput.

87



The next example of deformity I shall relate, is a single lamb with two heads and necks united about the first dorsal vertebra. The mere occurrence of this duplex formation excited but little notice, from its not being at all an unusual circumstance; but upon dissection, a singular adaptation to the plurality of parts was discovered, as evinced in the origin and distribution of the bloodvessels supplying the supernumerary and other parts of this animal. It was not in my power to do more than trace the larger vessels of this monstrosity, although I succeeded in injecting the arteries; for it had been

suspended in front of the shepherd's house for at least three weeks before I became possessed of it, and consequently so far advanced in putrescence as to render minute dissection out of the question.

Upon opening the chest, I found two hearts; the one in the left cavity (your general readers must observe that the chest is divided into the two cavities by a partition called the mediastinum, passing from the breast-bone to the spine) of the chest was of the natural size and construction, having two auricles and two ventricles, commonly called a double heart, in contradistinction to the heart of fishes, which possesses but one auricle and ventricle, and is therefore denominated a single heart. The other heart, situated in the right cavity of the chest, was remarkably small, and upon examination proved to possess but one auricle and one ventricle, and consequently may be termed a single heart. The left or natural heart gave off from its right ventricle the pulmonary artery, which was distributed to the left lobe of the lungs only; the pulmonary veins returning to the left auricle. The aorta, arising from the left ventricle, gave off from its arch four arteries, viz., the right subclavian, the right carotid, the left carotid, and the left subclavian: the right subclavian, usually supplying the right fore extremity, was in this instance distributed to the muscles, &c., situated between the junction of the two necks; the right carotid passed up the right side of the left neck to its head; the left carotid to the left side of the same neck and head; and the left subclavian to the left fore extremity. From the aorta, and posterior to its arch, arose a large artery, which, crossing the spine, passed behind the right heart, and united itself to the subclavian belonging to that heart; from this large communicating branch arose an artery that passed towards the junction of the two necks, and divided into two vertebral arteries (usually arising from the subclavians), one passing along the left side of the cervical vertebræ of the right neck, and the other in a similar situation on the right side of the left neck. The remaining two vertebral arteries were supplied to the left neck by the left subclavian artery, and to the right neck by the subclavian belonging to the small heart.

The aorta of the right heart gave off the right subclavian artery, which supplied the right anterior extremity of the animal, after having become united with the large branch from the left aorta. The aorta then gave off a single branch that soon divided into the right and left carotid arteries of the right neck and head; it then passed towards the right lobes of the lungs, ramified through them, and performed

the office of a pulmonary artery. The pulmonary veins of the right lobes of the lungs united with the jugulars of the right head and neck to form the vena cava, and terminated in the auricle of that heart.

The venæ cavæ of the left heart were natural, and terminated in its right auricle; but the external jugular vein from the right neck fell into the anterior vena cava of the left heart. The animal had two tracheæ, that of the left head going to the left lungs, and the other of the right head going to the right lungs. There were also two œsophagi; the left terminating in the stomachs of the animal, the right appearing to terminate in a cul-de-sac in the right cavity of the chest.

I shall offer but few remarks. In relation to the first example, where there was but one eye, and that placed in the middle of the forehead; it has been observed, that, "in all the instances, there have been more or less plain marks of the apparently simple organ being composed of the parts of two eyes*;" in my specimen, the eye, although somewhat larger than natural, was not deformed; and the writer just referred to, says, "This kind of deformity is not uncommon in animals: it has been met with in the lamb, pig, dog, and cat." He also observes, "The united fœtuses form a very numerous class of monsters, both in the human subject and in animals." Haller has collected many instances of this malformation in the human subject and in animals, as the dog, cat, goat, horse, hare, rabbit, fowls, &c. They occur also double behind and single before, and *vice versâ*: I have seen them thus in the calf and lamb.

Now that I am writing on the subject of malformations, I shall trespass on your pages a little farther, to state two instances of unnatural developement of parts, that I have met with in the human subject. The first occurred in one of twins born prematurely about the seventh month: they were boys, and the brother of my subject was a perfect fœtus. The external deformity was very unsightly, for there was no contraction between the head and shoulders to form the neck; the left arm was entirely wanting, and the right unusually short, terminating in a stump at the wrist, from which projected one finger only: its lower extremities were perfect, except that there were but three toes to each foot. The most extraordinary deficiencies were met with in the cavities of the chest and body; for the former contained neither heart nor

* Vide an elaborate paper "On Monstrous Productions, by William Lawrence, F.R.S.," in vol. v. of the *Medico-Chirurgical Transactions*.

lungs, and the latter no stomach, but a very small liver, and a few turns of the small intestines. I am sorry I cannot give you a more minute description of this little monster, for I have mislaid the notes relating to it, and cannot now find them. I recollect that the aorta and venæ cavæ were in their usual situation; that where the latter terminated the former originated; and that no vestige of a heart was to be found. Should the general reader wonder how an animal of this class can live without a heart, let him observe they can only live *in utero*. There are instances of this deficiency already on record; the above example also may be added in confirmation of an observation of Mr. Lawrence, in his paper before referred to: "I know of no instance of want of the heart without considerable deviations from the ordinary structure in other parts of the body."

My second instance of malformation in the human species was a case of preternatural origin of the great vessels of the heart, producing the disease called morbus cæruleus (blue disease). The subject was a boy, very jolly at birth, but he never became of a healthy colour: he sucked heartily, but wasted daily, and died in about eleven weeks. As usual in these cases, the child was purple-coloured, cold, and its lips and nails particularly livid, from so small a portion of its blood passing through the lungs, and receiving due oxygenation. On dissection, I found the heart large, and the right auricle and ventricle very much distended with blood: these cavities were unnaturally large, and the right ventricle thicker in its muscular walls than the left, the reverse of which obtains in the ordinary construction; the left auricle and ventricle were much smaller than usual, particularly the auricle; the walls of the left ventricle were as thin as the right is usually found to be. The foramen ovale (an opening between the two auricles, which should close immediately after birth) was quite open. The aorta commenced from the right ventricle instead of the left, and took its natural course: the pulmonary artery commenced from the left ventricle instead of the right; was smaller than usual; it branched off to ramify through the lungs, which were found remarkably collapsed. The ductus arteriosus, that becomes impervious shortly after birth, was small but pervious. Mr. Abernethy notices a similar origin of the aorta, in his lecture on the anatomy of the heart. My communication has extended to such a length, that I shall add no remarks to the brief statement of this case; indeed, those persons who are conversant with the fœtal circulation will readily see the consequences necessarily resulting from such

an origin of the aorta and pulmonary artery as above described. I also refrain from offering any observations upon the cause of these deviations from the natural construction and arrangement of the organs in animals, because they could but be mere speculations; but as the opinion of one of the ablest physiologists of our day would undoubtedly be interesting to some of your readers, and as that opinion has been published in a work seldom read but by medical men, I shall conclude my paper by transcribing Mr. Lawrence's words from the paper before quoted: — "I ascribe, then, the aberrations from the usual form and structure of the body which constitute monsters, to irregular operation of the powers concerned in generation, and place them on a level, with respect to their cause, with unhealthy executions of the nutritive, secretory, and exhalent functions."

I am, Sir, &c.

Swaffham, June 11. 1830. C. B. Rose.

Art. IV. *The Robin.* By Von Osdat.

"Secure his suit will be preferr'd,
No fears his slender feet deter;
For sacred is the household bird
That wears the scarlet stomacher."

Charlotte Smith.

Sir,

Grateful for the pleasure I have received in contemplating the elegance, cheerfulness, and familiarity of the robin (*Mo*tacílla Rubécula), I am induced to ask a small portion of your publication for a few observations on his amusing manners and habits. Much has, indeed, been written by naturalists and poets on this confiding little bird: for who with a poet's eye or heart could disregard him? He has been embalmed in the sunny pages of the immortal bard of Avon, and had marvellous foul usage in the poets' corner of every provincial newspaper. This, I conceive, must be in part the reason that no one of your correspondents has yet thought proper to dedicate the scrattle of a pen to his honour, though many other birds have found in your pages a local habitation and a name.

His spring and summer habits, when he leaves the household gods for the haunts of the hamadryads, are quite as interesting to the naturalist who strolls the fields as his winter ones, when we watch him skipping about the door, or fluttering on the ledges of our frosted windows; indeed, I would

say more so; for, when sunshine and love call him to the grove, we see him all animation and song, his scarlet stomacher more bright, and his form more graceful; busily preparing for the great work of increasing his kind. In the winter, I conceive his habits to be unnatural, if I may be allowed the expression: we then see him a bird of sorrow, obliged, from scarcity of food, to leave his sylvan recesses and frequent the haunts of man. Brooding on a solitary post in the snow, he looks unhappy, and his slender pipe and chirp seem the wailing of his starved, forlorn, and half-domesticated state.

In the spring-time he is a constant companion of the gardener, and seldom have I witnessed him with more delight than when engaged in this healthy and rational recreation. Perched on the bough of a neighbouring apple tree, his prominent black eye keenly bent on the earth as it is turned up with the spade, and his head twisted aside, he watches the writhings of some poor worm or insect larva disturbed from its place of repose; briskly pouncing on it, he regains another situation, to wait and anticipate a fresh supply.

When the brood of the robin first leaves the nest, the young ornithologist will be very apt, from their mottled breasts and great difference of plumage from the old ones, to imagine them another species of bird; particularly the young of the redstart (*M*otacílla *P*hœnicùrus), but from which they may be readily distinguished by the peculiar horizontal movement in the tail of the latter. This difference of plumage, by the by, in old and young birds of the same species, has often misled even the experienced naturalist, and has rendered rather incorrect some of the genera of our British birds. The young of the robin, too, are perhaps the silliest and most stupid of all young birds; easily falling a prey to the cat, weasel, &c.; and though numbers are produced at every incubation, of which there are sometimes two, or even more, during the breeding season, they are comparatively scarce, from the above cause.

Few observers of nature, I suppose, can have passed unheeded the sweetness and peculiarity of the song of the robin, and its various indications with regard to atmospheric changes: the mellow liquid notes of spring and summer, the melancholy sweet pipings of autumn, and the jerking chirps of winter. In spring, when about to change his winter song for the vernal, he for a short time warbles in so unusual a strain as at first to startle and puzzle even those ears most experienced in the notes of birds. He may be considered as part of the naturalist's barometer. On a summer evening, though

the weather be in an unsettled and rainy state, he sometimes takes his stand

" On the topmost twig that looks up to the sky,"

or on the " house top," singing cheerfully and sweetly. When this is observed, it is an unerring promise of succeeding fine days. Sometimes, though the atmosphere be dry and warm, he may be seen melancholy, chirping and brooding in a bush, or low in a hedge: this promises the reverse of his merry lay and exalted station.

During the last winter I availed myself of the ingenious contrivance suggested by Mr. Dovaston, in a note to the preface of the first volume of *Bewick's Birds*. By placing what he there facetiously calls an ornithótrophè, well supplied with bones and other food, before my sitting-room window, I have been enabled to scrape acquaintance with some of the more scarce birds, as well as with my old familiar, the robin. In the early part of the winter, my ornithotrophe was frequented by two or three robins, who seemed to agree tolerably well, yet not without occasional bickerings; but as the frost became more intense, and the ground covered with snow, my visiters increased greatly in number. Now ensued a perpetual scene of warfare; not, as would be imagined, for the food, as there was plenty, and room enough, but, oh! it must be confessed, sheer jealousy.

I must not, however, take leave of my amusing friend by relating a fault, without some attempt to justify him. By my last observation on his habits, I am confirmed in the opinion advanced by an ingenious friend, that each bird of this species has a regular beat of his own, to which he thinks himself justly entitled, and the pugnacity which he exerts is to expel some daring intruder's raid on his own personal property.

Yours, &c.

Montgomeryshire, Feb. 14. 1831. VON OSDAT.

ART. V. *Some Account of the British Song Birds.* By Mr. J. MAIN, A.L.S. &c.

(*Continued from* p. 124.)

HAVING given some account of the warblers * (Sylviæ), I now proceed to notice the other birds of song, beginning with the —

* In that communication, the grasshopper lark is called Sylvia trivialis: it should have been S. locustella.

Hirúndo rústica, Common Chimney Swallow. — This, though rather low on the scale as a vocalist, few will deny but that it is amusing to hear

"Twittering from his clay-built shed,"

or while perched on the house top near his nest, especially at early dawn. His song consists of a strain about one minute in continuance, prettily enough modulated, repeated at intervals, and always ending with a shrill note, rapidly shaken. He also sings on the wing in fine weather when the hen sits, seldom after the young are hatched, nor until they are able to fly; when, congregating on fine evenings, they all join in a joyous twittering chorus, in which the young ones assist.

The swallow is a companion of man, and one of the most vigilant videttes for the safety of the feathered race. No sooner does a hawk or other bird or beast of prey come in view, than he raises his shrill note of alarm *chee chee;* and while almost all other birds, pigeons, poultry, &c., fly or run to covert, the swallow dauntless mounts aloft to meet the foe, menacing and attacking with fury, till he drives the intruder from the neighbourhood. In this attack, the crow only has the courage to assist. I have often noticed that the swallows, on returning from the pursuit, unite in a song of gratulatory exultation. Gnats (*C*ùlex pípiens et bifurcàtus) are the favourite food of the swallow. In this respect, the latter may be regarded as a friend to man; not only in tropical countries, but in every place it visits, as the former inflicts the most venomous bite of any British flies.

The interior ledges which are left by the bricklayers in laying the weather-courses at the tops of chimneys, are the places usually chosen by swallows for nestling in; but since the introduction of cowls and ornamental chimney-pots, these poor sociable birds have been mostly driven from London, and from every place or house where these ornaments have been put up. The adoption of Grecian façades for town houses, offers some inviting coignes for swallows as well as house martens, if the audacious citizen sparrows would but allow them to keep possession; but as soon as they have, with much labour, completed their "procreant cradle" they are turned out of house and home by the overbearing cits. Old farm-houses and castellated mansions are now their only haunts. None of the other *H*irúndines are musical: the house and sand martlets have only faint calls of a note or two, and the shrill *swee ree* of the swift can hardly be called song.

Alaúda arvénsis. — This is a justly celebrated bird of song. Though monotonous, it is cheerful, and imparts a gaiety to

the mind of even the most serious. His joyous matins and heavenward flight have been aptly compared to hymns and acts of adoration and praise. No bird sings with more method: there is an overture performed *vivace crescendo*, while the singer ascends; when at the full height, the song becomes *moderato*, and distinctly divided into short passages, each repeated three or four times over, like a *fantasia*, in the same key and time. If there be any wind, he rises perpendicularly by bounds, and afterwards poises himself with breast opposed to it. If calm, he ascends in spiral circles; in horizontal circles during the principal part of his song, and zigzagly downwards during the performance of the *finale*. Sometimes, after descending about half way, he ceases to sing, and drops with the velocity of an arrow* to the ground. Those acquainted with the song of the skylark can tell without looking at them whether the birds be ascending or stationary in the air, or on their descent; so different is the style of the song in each case. In the first, there is an expression of ardent impatience; in the second, an *andante* composure, in which rests of a bar at a time frequently occur; and in the last, a graduated sinking of the strains, often touching the subdominant before the final close. The time and number of the notes often correspond with the vibrations of the wings; and though they sometimes sing while on the ground, as they are seen to do in cages, their whole frame seems to be agitated by their musical efforts.

The lark roosts and nestles on the ground, most commonly among standing grass or corn, in open fields, or on downs covered with low bushes. Hence they evade the search of the nest-seeking boy, and also of the more fell destroyers, polecats, stoats, and weasels, that seek their prey in hedges. They are consequently numerous; and, congregating in winter in great flocks, are easily caught by the fowlers' snares, who send them to poulterers for supplying the tables of the epicure: cruel return for their summer harmony!

Alaúda arbòrea, Wood Lark. — This bird, though it mostly lives and breeds on the ground like the preceding, often sits on trees; hence its specific name. His song is peculiarly soft and pleasing, consisting of a few passages repeated from time to time, beginning high in double slurred notes, and descending plaintively *diminuendo*. They also sing on the wing; but neither rise so high as the skylark, nor sing with half its

* Of this familiar fact the poet Gay has made a beautiful application in his popular ballad of "Black-eyed Susan;" founding on it an apposite and admirable simile. — *J. D. for Cond.*

power. They also differ from the last, in continuing their song, sometimes, throughout the night, especially if two or more are singing together; as if excited by a kind of rivalry. I have noticed that this bird is capricious as to its breeding habitat. In some years they are met with in every field of a large district: in others, not a pair is ever seen or heard. They are not so plentiful as many others field birds; owing, perhaps, to the little care they take to conceal their nests. Exposed on the surface without even a screening leaf, they are easily spied out by the owl, crow, magpie, and sparrow-hawk, all of which will take their young.

A*'nthus* (*heretofore* Alaúda) *praténsis*, 1. *Titlark, or Lesser Field Lark.* — This little emigrant arrives about the same time as the swallow. Like other larks, they nestle on the ground, and always near a high hedge or tree, on the top of which the cock sits and sings, and whence he frequently springs silently up in the air to the height of 20 or 30 ft., and then slowly descends with extended wings, singing his peculiar *tit tit tit* song, by which he is readily distinguished.

A*'nthus* (*heretofore* Alaúda) *praténsis*, 2. *Smallest Field Lark.* — This small bird, in his manner of singing, resembles the titlark in the breeding season; but for the rest of the year (for he does not migrate) has only a shrill chirp or call, especially when disturbed and taking wing. This is also called the titlark; but the birds are very different in habits, size, and colour. This last is always found on waste ground and commons, among furze and low bushes, where it breeds.

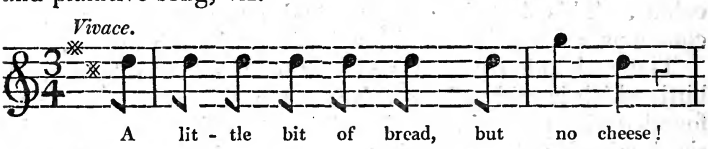
The cuckoo is constantly, at least often, followed by a small bird, which is said to be a titlark. On this circumstance is founded the proverb, on describing two disproportionately sized animals; they are said to be "like the cuckoo and titlark." From repeated observation it has appeared to me that the purpose of the small bird is to watch the motions of the cuckoo, and to drive her away; because, when on wing, the titlark is seen to dart on the cuckoo, as the swallow does upon the sparrow-hawk; and if the tit has any instinctive jealousy for the honour of his bed, his aversion to the cuckoo is naturally justifiable.*

* It has not yet, I believe, been ascertained by naturalists whether it be the male or female bird that gives the well-known call, or whether they do not both sing the same notes. If, as it is suggested above, the titlark has any instinctive perception of the imposition intended by the cuckoo, the object of the small bird's attack must be the female; and, if the female, then I am certain that she sings the peculiar note; because I have seen her repeatedly struck at while singing it. Besides, the cuckoo, male or female, I know not which, has another note, as distinct from the common one as two sounds can well be, and which I never remember to have seen noticed

The other larks common in the south of England are the larger field lark and the yellow lark. The first is almost mute, very like the titlark in colour and form, but nearly twice the size. The second is an elegant little bird, having somewhat of the appearance and action of the yellow-wagtail, but of a much brighter yellow. Both make their nests in fields of peas or vetches, and both migrate. There is also what is called the red-legged or Yorkshire lark, sometimes met with near London: but of its notes I am ignorant. The two field larks, and the yellow one, have a habit, after alighting, of moving their tails vertically, like some other soft-billed birds: not in jerks, like the redbreast; nor quivering, like the redstart; nor so quick as the wagtails; but more gracefully, like the wheatear.

Emberìza Miliària, Corn Bunting. — This is a songster, but of a low grade. He does not, however, seem to be aware of this himself; for, like many pretenders of the superior creation, he seats himself conspicuously on high, and boldly reiterates his twittering unharmonious song. He also sings it as he flies from spray to spray.

Emberìza Citrinélla, the Yellowhammer, is very little superior to his congener preceding; but, as he assists in the general chorus, deserves to be noticed. The cow-boys, from their own feelings, no doubt, have composed words to his short and plaintive song, viz.



Emberìza Schoéniclus, Black or Coal-hooded Bunting. — This quiet little bird pretends to sing, but his vocal powers are very inferior indeed. Perched on a tuft of rushes he essays at a few notes of feeble melody in a peculiar style: his rests between each two notes being twice as long as the notes themselves.

Fringílla Carduèlis, Goldfinch. — The brilliant colours, elegant form, and constitutional delicacy of this beautiful little bird make it universally noticed and prized by every lover

---

by any writer. This other note is chiefly given when the bird is seated on the top of a tree. It is a loud, liquid, guttural, quickly-shaken note, somewhere about A in alt. It is but seldom heard, and does not appear to be a response to the common call. There is no way of ascertaining these matters but by the cruel expedient of shooting both birds, and dissecting them to find the ovary.

of animated nature. Although his notes are neither remarkable for their variety nor compass, yet there is a richness of tone highly pleasing; a gentility of enunciation which seems to indicate that the bird is designed to be an inmate of the sylvan palace, rather than of the rustic bower. The goldfinch is serviceable to man, in choosing as food the seeds of some of the worst weeds; and, as if relying on this piece of service, fearlessly trusts to his protection by nestling in some fruit or other tree* near his dwellings.

Fringílla Linòta, Common Linnet. — Next in quality, but superior in powers and variety of song, to the preceding, is this common bird. The song is not easily described, but he has some charming passages, very attractive to a musical ear. The linnet is a rustic, but always chooses the most flowery and sweetest parts of rural scenery for his abode and breeding place; viz. the open woodlands, that are based with blooming furze and broom. He is also a favourite cage bird, and well repays the care of keeping; being teachable, and when young readily learns whatever is taught him.

Fringílla cannábina and *Fringílla Linària*, Greater and Lesser red-headed Linnets, or Redpoles, resemble the foregoing in their action and habits; but they are both inferior in song, being scarcely audible among others.

Fringílla Spìza, Chaffinch. — The musical powers of this well-known bird are not great; consisting only of a short and rather sprightly strain of a few notes, somewhat in the style of the yellowhammer; but being a bustling early singing bird, and frequenting gardens (where they are useful, being, during summer, entirely insectivorous) and shrubberies in great numbers, their united songs make up a considerable accompaniment in the woodland concert. The chaffinch has a peculiar call when alarmed for the safety of his nest, or when the clouds threaten rain; in the latter case, he is said to pronounce the words, "wet, wet, wet," sometimes for an hour together.

Pyrrhùla vulgàris (*heretofore Lóxia Pyrrhùla*), *Bullfinch.* — This bird scarcely deserves to be ranked as a vocalist, as his natural notes are only a few amatory calls: but having a good mellow pipe; tractable to learn little arts, as drawing his own water; and teachable to pipe any short musical measure; he has always a place in the aviary.

* "I love to see the goldfinch twit and twit,
And pick the groundsel's feather'd seeds;
And then, in bower of apple-blossom perch'd,
Trim his gay suit, and pay us with a song."
Hurdis's Evening Walk. — *J. D*

Lóxia Chlòris, Greenfinch. — This is a common bird, and a far better songster than the bullfinch, with which he often associates; both living on the same kinds of seeds, and, in defect of these, on the flower-buds of fruit trees. His song consists of four or five passages, repeated in succession, and in very different tones; some of them deep and guttural. The cock diverts himself by sometimes singing on the wing in breeding time; flying, not in his usual graceful manner, but with his wings awkwardly extended, and swaying from side to side, as if badly wounded. This action I suppose to be some blandishment of affection.

It may be noticed in this place, that the families of Lóxia, *P*yrrhùla, Emberìza, and *F*ringílla have all a peculiar manner of flight; it being performed in graceful bounds or curves; the wings being rapidly moved at the end of each, to enable the bird to perform another; and at the same time each flap of the wings is accompanied by a soft note during the whole flight.

Stúrnus vulgàris, Starling. — This bold active bird has no regular song, but has great powers of voice. Some of his calls are not only amusing, but truly musical. His slurred octave, both up and down, is admirable; and he has several other calls in perfect intonation, and easily imitable on a small flute. He has also a confused chatter, like that of a magpie, which has no semblance of song; though, from his affected action at the time, it appears a soliloquy of much self-complacency.

Túrdus mùsicus, Song Thrush, or Throstle. — Here we have one of the most musical of British birds. He is one of the first harbingers of spring, and his loud and powerful pipe is always hailed with pleasure. His song is continued for hours together, and consists of short passages, each repeated two or three times. Some of these passages are very fine, and true to the chromatic scale. The song thrush has certainly more variety in his notes than any other British bird, the nightingale not excepted. Breeding twice in the season, their song is continued throughout the greater part of the year; and even the young ones begin to sing inwardly during the autumn.

Túrdus Mérula, Blackbird, or Ousel. — A constant companion and rival of the throstle. Though inferior in sprightliness and variety, he excels in melodious depth of tone, with fewer repetitions; and, while "whistling from the thorny brake," is one of the most interesting and distinguishable in the woodland choir. The blackbird does not begin to sing so early as the thrush, but continues quite as late in the

summer. His young also sing faintly in the autumn. Both these birds evince their fears by a low chuck-chucking note; and the last his surprise, by a loud scream of shrill notes, while he retreats from the object of his alarm.

Túrdus ilìacus, Redwing. — This bird not breeding in this country, we are ignorant of his love-song, or of his powers as a solo singer: but, before the vast flocks of them leave us in the spring, they treat us with many concerts. Assembling on the tops of tall trees, they commence *viva tutti* a soft chorus of agreeable sounds, even approaching to harmony. Hence they are called by the country people "harmony birds." The *T*úrdus pilàris (fieldfare) often joins those assemblies.

Yúnx Torquílla, Wryneck. — This bird has a kind of song. Seated on a topmost bough, looking every way around him, he utters, every now and then, a short strain of uniform notes. He is called "the cuckoo's mate," because they generally arrive with us about the same time. His call is probably an invitation to his own mate. This bird is nearly allied to the woodpeckers. They live chiefly on the larvæ of insects which breed in decayed wood. For the purpose of seizing their prey, they are furnished with a long elastic tongue, barbed at the end; which, being insinuated into the perforations made by worms, readily draws them forth to be devoured. The larger spotted woodpecker (*P*ìcus màjor), in order to rouse the insects from recesses beyond the reach of their tongue, give the dead branch a vigorous jar with their strong bill, and then watch to seize them as they escape. It has been questioned whether this tribe of birds damage timber. I think they do not, because they never wound sound timber; their borings and eyelet holes being only made to reach their food, or to form avenues into the hollow trunk to nestle in. I also think that the recent failure of many ornamental trees, in populous places, is mostly to be attributed to the absence of these insect-eating birds, which, no doubt, prey on the perfect insects as well as on their larvæ.

Túrdus viscívorus, Missel Thrush. — This is said to be our largest singing bird; and so it is, strictly speaking, though it is well known that both the rook and jay, "in the gaiety of their hearts," as the Rev. G. White says, "try to sing." But the missel bird has a set song, which he gives with more force than effect. The fact is, he is a mere babbler, repeating his three or four notes incessantly for an hour at a stretch; and just as tedious as the old laconic song of

> "At the siege of Belleisle,
> I was there all the while,"

sung for an equal portion of time. He, however, begins his song early in the year; and every such sound at that time is agreeable, merely from its being associated with our ideas of another summer, and also because he is sometimes mistaken for the song thrush. Our present subject is also called the storm thrush, and not without some reason; because in severe winters the frost is usually broken up by a gale from the S.W. This brings milder air, and a thaw, together with the vernal song of birds; the missel thrush being the most conspicuous of the whole. During the equinoctial gales, too, in the month of March, this thrush is often seen perched on the highest branch of a tree, braving the blast, and bawling forth his monotonous song. His nest is frequently robbed of the eggs or young by the audacious crows or magpies; but this can only be done with impunity in the absence of the old ones, who, if present, defend their nest courageously, and with loud cries drive the cruel pilferers from their prey.

It has been matter of doubt whether the peculiar song of birds be innate, or only acquired. Conflicting opinions are held. Mr. Sweet brings forward strong proof that young birds never gain the song of their parents if they have never heard them; while, in respect to a tame young cuckoo, brought up by hand, and which never heard the voice of its parents, it sung, nevertheless, its proper call in the winter. This tells the contrary way.

In conclusion, it may be added, there are many other birds than those mentioned, that assist to diversify and fill up "the music of the groves;" but, separately considered, their notes are only calls expressive of amatory or social invitation, joyous feeling, parental solicitude, surprise, fear, &c. Such are the notes of the greater titmouse, the garrulous prating of the smaller species, the crowing of the domestic cock, the partridge, pheasant, quail, and corncrake; the notes of the nuthatch and cuckoo; the cawing of the rook and jackdaw; the laugh of the green woodpecker, and the plaintive cooing of the turtledove and woodpigeon: all these are the chanted language, though not exactly the songs, of the feathered race, and give that delight to the ear, that is experienced by the eye while contemplating the various forms and beauties of sylvan scenery.

J. Main.

July, 1831.

PART II.

REVIEWS.

ART. I. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

DRUMMOND, James L., M.D. Professor of Anatomy and Physiology in the Belfast Academical Institution: Letters to a Young Naturalist on the Study of Nature and Natural Theology. London, 1831. Small 8vo.

This is a valuable little book, and the fittest possible present to the youth of both sexes: it is written in a popular manner, is very readily intelligible, and is illustrated with several wood-cuts. Considerable originality, too, pervades the book; in the facts and materials, we mean: the author's deductions are necessarily his own. His "Letters" embrace the whole range of nature, and expatiate by turns on quadrupeds, birds, fishes, reptiles, insects, plants, &c. We quote one beautiful passage: —

"Societies which would devise means of giving stated lectures on subjects demonstrative of the wisdom and other attributes of God as discovered in his works, whether in the structure of the heavens, or in the history and conformation of organised nature, or of the great features of our globe, would, I am convinced, do an incalculable good. There is one recommendation of natural theology not a little powerful; which is, that men, by attending to it, would become possessed of more and more knowledge as long as they lived. So long as a man retains his faculties, there is still something more in it to be acquired; and a discourse on science in connection with it, though attended to but once a week, would gradually bestow upon the hearer a large fund of knowledge which would still be increasing, and which none, I presume, will dare to say would be a useless or unimportant acquisition. I again assert, what I am most assuredly convinced of, that the imparting a knowledge of the works of creation to mankind at large would prove to them a most valuable gift. I would like that a lecture-room, a museum, and a library, should be attached even to every village as regularly as its church or chapel; and that part of some set day or days should be appropriated to the demonstration and teaching of the works and wisdom of God in the great subjects of natural theology, whether in the sublime science of astronomy, or in the leading branches of natural philosophy, or in the economy, fabrication, and history of the individuals of the animal and vegetable kingdoms; in short, the wide and glorious field that occupies every page of nature's stupendous volume. This would be teaching men of every creed and every faith a kind of knowledge which must of necessity be useful to them. Let it not be said that such is taught! — the case cannot be made out; the people are taught no special knowledge of these things in any country upon earth." (p. 318.) — *J. D.*

Timbs, John, Editor of "Laconics, Arcana of Science and Art," &c.: Knowledge for the People; or, the plain Why and Because, familiarising subjects of useful curiosity and amusing research. Zoological Series. London, 1831. 12mo. 4*s*. 2d edition.

Excellent; worth double the money: the information it contains has been derived from works which, taken altogether, are doubtless fifty times its price. The diligence of the research, the judgment in the selection of the matter, and the ingenious adaptation of it to the reader's apprehension, which the book evinces, all attest that the editor is master of his business. To be practically versed in every detail of his subjects no one expects him. Hence we notice in p. 281., that the dog's-bane's (*Apócynum androsæmifòlium*) power of entrapping flies is attributed to the elasticity of its filaments. This is wrong; the filaments have no elasticity but detain the flies by their mechanical position only. See Curtis's *Botanical Magazine*, 280. the account whereat is practically accurate.

The Zoological Series of *Why and Because* embraces quadrupeds, birds, amphibia, fishes, worms, and insects; and explains the adaptation of their structure and habits to the ends and offices for which they are destined, in the general system of usefulness which fills nature, in aid of man, and of each other.—*J. D.*

Rennie, James, A.M. A.L.S. Professor of Natural History, King's College, London: Montagu's Ornithological Dictionary of British Birds. Second edition: with a Plan of Study, and many new Articles and Original Observations. London, 1831. 8vo. 1*l*. 1*s*.

Sir, I take the liberty of sending you a few remarks on the new edition of Montagu's *Ornithological Dictionary* by Mr. Rennie, a work which has been lauded by reviewers, &c., sufficiently; my object, though certainly less agreeable, but not less necessary, is to point out a few of its faults.

His "plan of study" is no doubt very good; but the supposition that the student possesses such a variety of books as those referred to is altogether erroneous. Instead of having Linnæus, Latham, Willughby, Ray, Brisson, Fleming, Goldsmith, Griffith, Jennings, Belon, Gesner, Aldrovand, Jonston, Drapiez, Buffon, Hill, &c., the probability is that the book under consideration is the only one he has. If the books are necessary, the "plan of study" must be defective; but I should suppose they are not, and that we are treated with all this array of names respecting the nest of a dabchick, more to show the author's research than as an example he would recommend to be followed.

After the plan of study, the author proceeds to "the use of system;" and it is in this that I entirely disagree with him. It is well known that Montagu's work has for a long time been very scarce, proportionately dear, and eagerly sought after by ornithological students. But why? not because it was the best book to enable the student to discover what a bird was which he might have before him, but because, when he had ascertained its name from some system, it contained more information respecting that bird than any other single book which he could find, supposing, of course, that the bird had come under Colonel Montagu's notice. I was, therefore, amongst others, much rejoiced to see a new edition of the *Dictionary* advertised, by such an acute observer as Mr. Rennie; fully expecting that a systematic compendium of the birds would precede or follow the other matter. My disappointment has been fully equal to my pleasure: on opening the book, instead of finding a system, I find all systems abused; instead of finding the due praise bestowed upon our zoologists, for leading the way to more extended knowledge by means of systematic arrangements, I find them nearly all abused for it; and some of them for casually making use of expressions which, in the opinion of Mr. Rennie, derogate from the

power and goodness of the Creator. Of this part of his assertions I shall say nothing at present. Mr. Rennie considered a sketch of the various systems necessary in the introductory chapter of his *Architecture of Birds*, where it certainly was not wanted; but in the case of Montagu, I consider a systematic appendage absolutely necessary; or you must possess some other work: a circumstance, to say nothing else about it, which may not suit every one who studies ornithology.

Mr. Rennie ought to have stated explicitly whether *he* made use of *no system* in acquiring his own knowledge of natural history. He appears to be a very good naturalist; and if he is *not* indebted to any system for such knowledge, then the public have still a claim upon him for his "plan of study:" for the one published supposes the student to know the subject he is looking at (as in the case of the grebe's nest), which is not likely to be the case without previous study, and that study systematical.

I shall beg to ask one question:—Can any person having a British bird, of which he knows nothing, make it out by the new edition of Montagu? If he cannot, its boasted superiority over the first shrinks into insignificance: and that he can do so, no one will, I think, have the hardihood to advance.

The book, viewed in this light, appears to be a complete failure. Had the original edition of Montagu contained a systematic arrangement with short specific characters, it would have been reprinted before now. I am sorry, for myself and others, that Mr. Rennie has so uselessly devoted his time: half the space in his book which is occupied in abusing systems, would have held the necessary compendium, and then the work would have been what it ought to be.

If Professor Henslow, Hooker, or Lindley, were to publish alphabetical lists of British plants; or if you had made your own *Encyclopædia of Plants* alphabetical, of what use would such books be? Mr. Rennie, however, seems to have great faith in such arrangements, for to his alphabetical book he has added an alphabetical index.

I shall conclude by giving you a specimen of Mr. Rennie's criticism. It is on our poet Southey, and is contained in the article on the bittern: and while it shows very clearly that Mr. Rennie is no poet, it certainly does not prove that Mr. Southey is no ornithologist. After mentioning the booming of the bittern, he says—"Its lofty spiral flight, indeed, is a matter of common remark—

'Swift as the bittern soars on spiral wings.'

Southey.

A line which, I may remark, is not very ornithological, inasmuch as neither the bittern nor any other bird has spiral wings." *

No one would for a moment imagine that Mr. Southey thought the wings of the bittern spiral; but, knowing that it raised itself into the air in this peculiar manner, he, by a figure, conveyed the idea to his reader in the shortest and best manner he could: and Mr. Rennie ought to have known that such figures are by no means uncommon in all our best poets. I am, Sir, yours, &c.—*D. S. Bungay, July* 12. 1831.

However defective the omission of all means of determining the name of an unknown British bird (at least, without a great sacrifice of time and labour) from this "alphabetical book" may be, the "alphabetical index" added to it should not be censured. The arrangement of the body of the book is alphabetic according to the English names of the birds; the alphabetic index is one of their systematic names: both, therefore, are intended to facilitate the researcher's attainment of the information the book may

* This remark, and others on the habits of the bittern, occur in our Vol. I. p. 495.: supplementary ones on p. 464. of the present volume.—*J. D. for Cond.*

contain on the subject of his enquiry, but both clearly suppose the researcher to know either its English or systematic name. Under these circumstances, the technical descriptions of the species seem almost superfluous. But they serve two purposes: one, that of assuring the student of the accuracy or inaccuracy of the bird's name; the other, that of retrogressively (if we may so express ourselves) familiarising him with systematic technicalities, should he have not previously been acquainted with them.

The *Ornithological Dictionary* is a copious accumulation of synonymes, of definitions, of delightfully interesting narratives of the habits and manners of our feathered natives, and of reasonings and speculations on the ends and offices of their structure, habits, and instincts: all these, of course, being derived from successive writers and observers of repute in British ornithology, from the earliest records to the hour of printing the book; on perusing which, it is, however, clear that Mr. Rennie is in himself a host. "With all its imperfections on its head," the *Ornithological Dictionary* is perfectly indispensable to every student of British birds. Not wishing, however, to assume the critic in the case, we leave the work to its merits, and present our readers with a few improvements in nomenclature which Mr. Rennie has devised: —

"Recently," he observes, "it has been the chief business of those who call themselves naturalists to alter and invent names, sometimes with, but often with no advantage. Having small inclination to employ myself in such task-work, I have made extremely few alterations in this respect; and I have only changed five names which served to propagate error or absurdity: such as Anorthùra for Troglódytes; *F*ringílla *S*pìza for *F.* cœlebs; *M*otacílla lòtor for *M.* álba; *C*órvus prædatòrius for *C.* frugílegus; and Nyctichelìdon for *C*aprimúlgus. To say that these erroneous names are only distinctive appellations, implying no more error than the surname of White to a negro, or of King to a scavenger, is at once to confess the imperfection of what is called scientific nomenclature."

In the body of the book, Mr. Rennie gives his reasons for these changes in detail, which we here present: —

Wren (Anorthùra commùnis *Rennie*, Troglódytes europæ'us *Cuvier*). The meaning of the name is not explained; but it is probably from *anorthoō*, to erect, and *oura*, a tail: expressive of the perpendicular carriage of the tail, for which this bird is remarkable. "I have thought it expedient to substitute a new name for this genus, instead of the received one (Troglódytes), which is taken from a false notion that the wrens live in caverns, as the ancient people named Troglodytæ are recorded to have done."

Chaffinch (*F*ringílla *S*pìza *Rennie*, *F.* cœ'lebs *Linnæus*). As the Linnean name of "Bachelor" (cœlebs) appears to me very inappropriate, when applied to a bird so remarkable for the neatness of its nest and for domestic attachment, I have restored the name of *S*pìza, given it by Aristotle in his *Hist. Anim.*, viii. p. 1."

Pied Wagtail (*M*otacílla lòtor *Rennie*, *M.* álba *Linnæus*). "It being manifestly absurd to name this the *white* wagtail, as Linnæus does, I have changed the specific name to lòtor, in accordance with an expressive provincial name" [viz. Dish-washer, or Washerwoman].

Rook (*C*órvus prædatòrius *Rennie*, *C.* frugílegus *Linn.*). The reason of this change is not palpably given; but as the bird preys more on insects than on corn and fruits, the old epithet "frugilegus" is scarcely requisitely expressive.

The Nightjar, Fern Owl, or Goatsucker, &c. (Nyctichelìdon [*nyx*, night, and *chelidōn*, a swallow] europæ'us *Rennie*, *C*aprimúlgus europæ'us of others). "The name of goatsucker, which it has received in all languages, [and which is] most absurdly continued by systematic naturalists in the term *C*aprimúlgus, shows the opinion entertained of it by the vulgar. It is, however, as impossible for the nightjar to suck the teats of cattle (though most birds are fond of milk) as it is for cats to suck the breath

from sleeping infants, of which they are popularly accused; inasmuch as the structure of their organs would baffle any such attempt." *

The pectinated Claw of the Nightjar or Goatsucker. This subject has been discussed in our Vol. III. p. 30. 188. 296. 449., and Vol. IV. p. 275.; and the views exhibited in these places are conspectively noticed by Mr. Rennie in his *Ornithological Dictionary*, where he replies to Mr. Swainson's criticism at p. 276. of our current volume, in the following words: — "Though [Mr. Swainson] smiles at my 'simplicity,' and alleges that I am 'sometimes very unfortunate' in my 'speculations,' the simplicity must, in the present case, rest with himself; for, if the pectinated claws are bestowed on the nightjar and the heron to secure their prey, he ought, by his own argument, to be able to show that all birds which feed on similar prey, such as the swifts, have pectinated claws."

Besides these changes devised by Mr. Rennie, he adopts others from recent authors, which we also, on future occasions, may use in our pages. For information to our readers, and as proofs of Mr. Rennie's ardour for accuracy, we quote further: —

Bohemian Waxwing (Bombycívora gárrula *Temminck*, *A*'mpelis gárrulus *Linnæus*). "This genus has been established by Temminck, who has very judiciously removed it from the genus *A*'mpelis (chatterer), where it was left by Linnæus and Latham; but which possess distinct and peculiar characters, and belong to a different order."

Guernsey Partridge (*P*érdix rûfa). "Why this should be called Guernsey Partridge we cannot imagine, since we are credibly informed it is very rare in that island. The common species breeds there, but is scarce; whether this ever bred there is uncertain, though it is known to breed in the Island of Jersey. It is also found in various parts of Asia and Africa, and is called by the name of the Red-legged Partridge."

The White-headed Eagle is frequently called the Bald Eagle, and excites from Mr. Rennie this remark: — "The epithet *bald* applied to this species, whose head is thickly covered with feathers, is equally improper and absurd with the titles goatsucker, kingfisher, &c., bestowed on others; and seems to have been occasioned by the white appearance of the head when contrasted with the dark colour of the rest of the plumage."

Heron (*A*'rdea cinèrea). "'Not to know a hawk from a *heronshaw*' (the former name for a heron) is an old adage, which arose when the diversion of heron-hawking was in high fashion. This phrase has since been corrupted into the absurd vulgar proverb, 'Not to know a hawk from a hand-saw.'" We quote this remark for the sake of observing that heronshaw is the prevailing name for the heron in the fens of Cambridgeshire, where this bird is frequent, but that the name is there pronounced as if spelled herringshaw. "Absurd" and "vulgar" as may be the proverb alluded to, Shakspeare has stereotyped it; and it, therefore, is not likely to become soon obsolete. He makes *Hamlet* say — "I am but mad north-north-west; when the wind is southerly, I know a hawk from a hand-saw." † Mr. Hoy's clear description, at p. 342, 343. of our current volume, of the mode of capturing the hawks for heron-hawking; and J. C.'s account, at p. 431., of a late practical instance, in Norfolk, of that diversion, explain, or contribute to explain, the whole process of heron-hawking.

---

* In Cambridgeshire and Suffolk there are those to be found who still gravely assert, and pretend to have witnessed, that the hedgehog sucks the teats of cows by night.

† An identification of the particular objects in natural history to which Shakspeare has made allusion, with the species of modern systematic naturalists, would form a welcome addition to British literature. Smith, in his *English Flora*, has identified a few: see under Lonicèra *P*erıclymenum, vol. i. p. 326.; and *O*'rchis máscula, vol. iv. p. 12., in that work.

Mr. Rennie, in his remarks on system, takes occasion to reply to the article occurring in this Magazine at p. 273.: — "It is," says Mr. Rennie, "pitiful to hear the querulous tone in which the manufacturers of words and systems complain of their 'legitimate' productions, as they call them, being 'unworthily neglected,' and 'left to languish and decay;' 'because the grown-up public are satisfied with infants' food in the shape of cheap compilations, crude translations, *wonders of the insect world*, &c. &c., with such like amusing trifles, fit only for children.' This may be taken, indeed, as the creed of each and every systematist, who looks upon details of the wonders and wisdom displayed in creation as amusing trifles, fit only for children, while the 'legitimate science' of names, grouping, and affinities, is fit to 'reflect honour upon any age and country.' I, on the contrary, claim no merit for looking upon this so-called 'legitimate science' as far below the level even of an amusing trifle; since, to every rational reader, not infected with the mania for this sort of frippery, arrogantly and falsely called science, it must appear in the same light. Pitying the dry drudgery of the authors who have spent their hours in thus nibbling down nature to their own narrow measurements, and laying their works on the shelf, where they are destined to remain unopened, I bid them a long farewell; and hurrying 'forth,' as Solomon did of old, 'to the field,' I can revel with 'ever new delight' in

> 'The boundless store
> Which bounteous Nature to her vot'ries yields:
> The warbling woodland, the resounding shore,
> The pomp of groves, the garniture of fields;
> All that the genial ray of morning gilds,
> And all that echoes to the song of even.'" *Beattie.*

As an instructive admonition to our young readers, and as an instance of Mr. Rennie's candour, we quote the following: —"Recent observations, by extending our views, have shown that, in several instances, Montagu was led into mistakes. Although I have corrected many of these, it does not follow that all my corrections are themselves correct; for subsequent observation may in the same way prove at least some of them to be wrong: as the youngest naturalist who will pursue the plan I have recommended may, perhaps, discover, if he examine Nature for himself, and not allow his thoughts to be trammelled by the leading-strings either of the present work or of any other." — *J. D.*

Rennie, James: Architecture of Birds. London, 1831. 12mo. 2*s.* and 4*s.* 6*d.*

The reading public are laid under further obligations to the Society for the Diffusion of Useful Knowledge by the publication of another most interesting volume, entitled the *Architecture of Birds*, which is likely to afford to the ornithologist, as well as to the casual reader, a large fund of information and amusement. The volumes sent forth to the world as the *Library of Entertaining Knowledge* well deserve that title; for I deem them, at the present time, to be not only the most entertaining, but at the same time the most useful works that are issued from the press. They might, in comparison with the other series published by the same Society, be more justly called "useful" as well as "entertaining" knowledge; for the deep, and I had almost said abstruse, sciences published under the title of the *Library of Useful Knowledge*, are of such a profound character that they require a person with a collegiate education before one fifth of them could become serviceable: and, consequently, the ostensible object for which they are put forth, viz. the affording information to the poorer classes, is com-

pletely nullified by publishing such works as the *Polarisation of Light, Hydrostatics, Pneumatics,* &c. &c.

In the 28th number of the *Westminster Review* is an admirable article, setting forth, in no measured terms, the extreme inutility for the proposed purpose of such publications. The writer very justly observes, at p. 372. :— "If the observations above hazarded on the matter of instruction to be conveyed to the people be just, a series of treatises, pretending to be for their use, of a more preposterous description, can hardly be conceived. What, for example, could be expected from a treatise on dynamics being read by one of the poor labourers of Kent who clamorously demanded a rise of wages? What instruction, moreover, could be conveyed to him by a treatise in which the subject-matter is conveyed after the following fashion: 'The orifice of discharge, as indicated by the dots in B, was an hyperboloid of the fourth order.' 'In rivers or open channels, the velocity and quantity discharged at different depths would be as the square roots of those depths.' From these passages alone (and, be it remarked, they are a fair example of the style displayed throughout the whole article) one of two things may be fairly concluded: either the committee were totally ignorant of the people to whom they were addressing themselves, or, if they were not so ignorant, they were totally incapable of judging of what was required to instruct them. Here, in the very outset of their career, they committed two gross and palpable errors: first, they made choice of the wrong matter; secondly, from the manner of their instruction, they were utterly incomprehensible to nine hundred and ninety-nine out of every thousand of the labouring classes."

The object for which I have taken up my pen is not so much to make a comparison between the two publications, as to point out to the directors of them, that, without caution, the same evil will befall the "entertaining" as has befallen her sister the "useful," viz. an overweening show of learning; but, I trust, it is from a better feeling that we have evidences of it in the "entertaining," than what, I suspect, has produced the same effects in the "useful:" it is, I conceive, a laudable desire of showing the researches of the compiler more than a wish of exhibiting his learning. The particular portion of the work that I wish to bring before their notice is, the quoting of nearly every author that has written on the subject of ornithology. It is seldom that the same author's name is quoted consecutively; but, with a strange affectation, a series of generic and specific names are given, from different writers, all "good men and true," doubtless, in their vocations; but, as the more numerous class of readers of the volume in question are seldom possessed of more than one work on ornithology (if even that), the names of so many different authors, without a clue to finding the original, renders the *Architecture of Birds* almost a sealed volume as to its usefulness.

I have every reason to believe that the intention of the compiler has been to give what he conceives to be the best names, and from the best authorities; and which, doubtless, is the case. But he would afford a most incalculable advantage to those persons whose means do not allow of their possessing many works on natural history to refer to, if he had given, in a note at the foot of the page, the Linnean name of the bird, which would be the means of readily elucidating most of the mysteries (to the unlearned) of his very excellent book. The above improvement would be of great service; but I will mention a plan that I deem much more advantageous and interesting still; which is, that, at the end of the next volume (for, of course, on so delightful a subject as the economy and habits of the feathered tribe we may hope to have several volumes), a synoptical table, if not of the whole family, at least of those mentioned in the volume, should be attached. — *R. H.*

Anon.: The Observations of a Naturalist; contained in the "Companion to the Almanack for 1829."

Sir, My present communication will consist of the promised strictures on the work mentioned by me (p. 184.); I mean, "The Observations of a Naturalist," contained in the *Companion to the Almanac for* 1829, published under the superintendence of the Society for the Diffusion of Useful Knowledge. It will, probably, be thought presumptuous in so young a naturalist as myself attempting to refute assertions emanating from such high authority; but facts, Mr. Editor, are stubborn things.

It would, probably, have been better had they been noticed before; but as I did not see the book in question till a year and a half after its publication, I trust that will be sufficient excuse. It is, however, "better late than never" to correct an error; and one or two have gone forth to the world under the sanction of this Society, which, no doubt, stamps every article proceeding from it with the air of correctness and truth; which might mislead young beginners and people who are not in the habit of investigating for themselves. First, then, under the head of birds, in the remarks for January, the following passage occurs: — "Some gardeners who know no better" [forsooth!] "accuse many birds of destroying the buds of their trees at this season, because they are seen continually nibbling about them. The truth is, however, that it is not the buds, but the insects frequenting them, of which the birds are in search." Will the would-be-naturalist tell me that the bill of the bullfinch looks like one of the insectivorous tribe? I have shot these birds in the act of *eating* the buds from cherry trees, and which they destroyed in such numbers as to render the attendance of a man with a gun indispensably requisite, if the owner wished to have any crop. When I had killed them, I squeezed the buds out of their throats which they were in the act of swallowing. I have likewise examined their crops, and found them to contain cherry buds divested of their outer husks; and the ground underneath the trees was always profusely scattered with the husks refused by the birds. This, from actual observation, negatives what the "naturalist" asserts as truth.

I do not mean to deny but many birds may pick insects from the buds; but I know the bullfinch actually to subsist at the spring of the year on them. Sparrows, tomtits, &c., are great frequenters of gooseberry bushes, and certainly pick the buds off; but I have never examined them so as to state positively whether they use them as an article of food or not. I have known people, who, to prevent the ravages of the tomtit, have dressed a piece of raw meat with arsenic, and fastened it securely in an apple tree, in the vicinity of their gooseberry trees. The rapacious tomtits would eat the flesh in preference to searching or eating the buds, and consequently pay for their feast with their lives. I next proceed to the note on the owl. In his remarks for March, he asserts again: — "But the truth is, that the owl only utters her cry while on the wing." Now, this again (though I acknowledge it is not very polite) I am obliged decidedly to contradict, as owls which build in Attenborough Church, in this parish, sit on the turrets, and hoot fearfully; an old white owl used to frequent a dovecot not two hundred yards from where I am writing this, and, late in the evening, would sit at the top, and utter its doleful cries. What it came to the dovecot for, I do not pretend to say, unless it might prey on the young pigeons, or suck the eggs. I notice these two observations merely to set the author right; and, as he says, "the truth is," he is incorrect. I see many quotations, likewise, from White's *Natural History of Selborne:* I fancy, the observations should have been original. I am, Sir, yours, &c. — *Scolopax rusticola. Chilwell, April* 19. 1831.

Hewitson, William C.: British Oölogy; being Illustrations of the Eggs of British Birds, with Figures of each Species, drawn and coloured from

Nature. To be continued periodically, in 8vo Numbers, 3*s.* 6*d.* each. Newcastle upon Tyne and London, 1831.

This is an original work, both in its scope and objects, as also in the descriptive remarks of its author, who is rich in out-of-door observations on his subject. Besides the neat and pretty pictures which the plates constitute, the text supplies, incidentally, valuable notices of the habits of the birds to which the eggs depicted belong. Of these notices, we hope subsequently to avail ourselves.

It is the opinion of M. Glöger, a German naturalist, that the eggs of birds are coloured by nature, so as to render them in the least degree distinguishable from surrounding objects, and this to deceive the eyes of carnivorous birds or other plundering animals. Mr. Rennie, in his *Ornithological Dictionary*, under the "Eggs of Birds," notices M. Glöger's theory (or rather our Darwin's, as Mr. Rennie represents) at some length, thinks it "much more beautiful and ingenious than true," and cites not a few refractory reasons and instances. We particularly refer our readers to Mr. Rennie's interesting article.

The present work on British oology will tend to accumulate a rich store of facts appertaining to the eggs of our native birds; and which facts will be of the greatest possible utility as data by which to confirm or confute the theory alluded to; as well as conducive to numerous other, some of them at present unconceived, inferences. The very great value of departmental works is cordially acknowledged by every systematic student of nature. The work in question already exhibits an extensive "list of subscribers." — *J. D.*

Curtis, John, F.L.S.: A Guide to an Arrangement of British Insects; being a Systematic Catalogue of all the named Species hitherto discovered in Great Britain and Ireland. London, 1831. 8vo. 8*s.* 6*d.*

The name of the excellent author of *British Entomology* is a sufficient guarantee for the accuracy of this Catalogue; and it is well for the interests of Science, that men of high talent are to be found in her train, willing to incur the drudgery and expense of a work like the present. "Upwards of one thousand names are included in this list, which are not to be found in any other;" and it forms a Systematic Index to the *British Entomology*, and also to Gravenhorst's *Ichneumónidæ*. We regret that the words are not accented, for the benefit of the unclassical. This is in all cases an improvement, in many indispensable, and in no department of natural history more requisite than in entomology. Numbers of the softer sex engage in it, allured by the surpassing beauty of its objects; and collections for sale are made by many persons whose knowledge of the learned languages is bounded by the names of their insects. If the wants of such should be considered in any book, it is assuredly in a scientific catalogue. The work is, nevertheless, a valuable one, and may be confidently recommended to every person who has made, or is making, a collection of British insects. — *W.*

Banks, George, F.L.S.: The Plymouth and Devonport Flora; or, a Description of Plants indigenous to the Neighbourhood of Plymouth and Devonport. Devonport, 1830. In 8vo Numbers, 1*s.* each.

Of these we have seen seven, and can say of the work, that it excels any local Flora we have previously seen. It gives, as usual, generic and specific diagnostics, references to authors, and the topographical stations; but it gives, moreover, and these we deem the superior features of the work, detailed descriptions in the manner of those in *English Flora*, but always with a careful avoidance of unnecessary technicality; the etymologies and meanings of the generic terms, and glossarial explanations of all others; and, lastly, the uses to which the plants are applicable in the arts, in medicine, in domestic economy, and in their subservience to the embellishment of poetry and of literature. — *J. D.*

PART III.

COLLECTANEA.

ART. I. *Zoology.*

THE domestic Cat diving for Fishes. — Sir, In reading that delightful little work of Mr. White's, *The Natural History of Selborne*, the propensity of cats for fish, and their repugnance to wetting their feet, are remarked by the intelligent author. An anecdote or two of these beautiful but maligned quadrupeds, proving their piscivorous natures in the one case, and in the other a strong natural antipathy overcome by a still more powerful propensity, will perhaps be amusing to some of your readers, who, like myself, have a regard for every thing "which lives, and moves, and has a being." In the centre of my father's garden was a fish-pond, stocked with various kinds of fish. Many a time and oft have I witnessed puss (and a very pretty tortoiseshell puss she was, and a great favourite withal) watching at its brink for its finny inmates, and on their appearing at the surface darting on her prey, and in spite of the wetting and ducking she encountered, bringing them in triumph to the pond's edge, and regaling on the delicious fare. This sport, I believe, she continued in the enjoyment of till the day of her death; and so amused were we with her angling powers that no obstruction was ever thrown in her way. The pond, moreover, was not, as some may imagine, sloping in its bottom and picturesque in its appearance, but it was completely a cockney pond in its *tout ensemble*, octangular in its shape, of precise equality in its depth, with a pavement smooth and regular both in the sides and base; therefore, before this puss could gratify her taste, a plunge was to be taken which was sufficient to make the stoutest cat's heart tremble.

The other anecdote relates to a cat of more extraordinary acquirements, which belonged to one of my workmen. In a large and deep pond at my premises in the Green Lanes, a stock — not of fish, but of rats — had accumulated, the destruction of which was undertaken by this uncommon cat. He was daily in the habit, for nine or ten years, of stationing himself on the margin of the water, and of jumping into the liquid element on the appearance of his game. A day seldom closed unsuccessfully, and he has been seen and known to catch and bring from the watery deep four of these vile vermin betwixt sunrise and sunset. As I said, this amusement was kept up by him for the space of nine or ten years, in fact until his rat-catching powers deserted him; and when his teeth became all extracted in the performance of his daily feats, his master had him killed, that the miserable death of starvation might not await him. This cat was truly a sportsman, and pursued the sport solely from the love of it; he caught his game with avidity, but never eat a morsel; so that the pleasure of the chase alone had charms enough in his mind to vanquish one of the strongest antipathies of his nature.

Should these trifling tales of the members of a race hated and persecuted without cause by some, and too much loved and fondled by others,

be thought worthy of being inserted in your Magazine, I shall be happy that I have communicated them to you. I am, Sir, &c.— *William Scales. Stamford Hill, April* 13. 1831.

Monstrous Lamb. — Last week, a ewe sheep, the property of Mr. Connop of Fownhope, in Herefordshire, yeaned a lamb with a perfectly formed mouth within the natural one. As it could not take nutriment, it was destroyed. (*Hereford Journal*, June 22. 1831.)

Unusual Appearance of the Redstart. — Having lately spent a few months at Ramsgate, in the Isle of Thanet, a circumstance rather contrary to the common course of nature came under my observation. I was walking by the sea-side on the 1st of December last, with my gun, when, in passing a breach in the cliff, or rather a road cut through it, called Dumpton Stairs, a small bird flew from a projection in the cliff's side, and picked up something from off the sands, returning to another projecting crag a little farther on. At first sight I had nearly mistaken it for a redbreast; but, as it seemed to move with greater activity in returning to its perch than is usual with the robin, I approached as near as possible, in order to discover what species it might be; and on viewing it through my pocket spy-glass, I saw, by the motion and colour of its tail, that it was a female redstart (Sylvia *Phœnicùrus*), which very much surprised me, as the season was so far advanced. The weather had previously been, upon the whole, rather mild, and flies were at times numerous; but I cannot account for its staying so long after the usual period of migration, which is about the end of September. In hopes of ascertaining what it had fed upon, as well as with a view to preserve it (being a *rara avis* at this season), I followed and shot at it, but missed my aim. On the 23d of December, walking under the same cliff, I observed it again (at least, in all probability, the same) near the spot where I first found it. A slight snow-storm fell in the morning, and the day was cold. I saw it again on Christmas-day, which was very cold, with a severe frost and strong north-west wind. I watched its motions for some time: it appeared to possess its usual activity, but seemed rather more tame, and permitted me to approach very near. It would fly down on the sands, pick something up, and return to the cliff's side again; shaking its tail in the usual manner, and seeming to be but little affected by the severity of the weather. How this little summer visitant is supported during so cold a season, when the greater part, if not all, of its insect food must be in a torpid or hidden state, is to me very strange. Perhaps some of your more experienced correspondents may be able, in some measure, to account for it.—*T. G. Chipping Norton, April* 1. 1831.

Late Appearance of the Swift, Swallow, and Marten. — On reference to my journal, I find that I saw the swift so late as the 27th of September: the swallow on the 10th and 12th of November; and a person told me he saw a swallow fly past him, while shooting in the marshes, on the 24th of November: the marten on the 29th of October and 3d of November; and on the 18th of November, which was a remarkably fine day, I saw two martens flying to and fro beside the chalky cliff, on which the sun shone brilliantly and warmly. These are late instances, compared with those mentioned in the *Natural History of Selborne.* — *Id.*

On Falconry.— In June, 1825, happening to be in Norfolk, I became an eye-witness to that most ancient and now very rare sport of falconry; and I now relate what I actually saw, and which was to me most novel and entertaining. The place fixed upon for the spot was in the intermediate country between the fens and the heronry, and in the afternoon of the day, with the wind blowing towards the heronry. There were four couple of casts of the *female* Peregrine falcon carried by a man to the ground, upon an oblong kind of frame padded with leather, on which the falcons perched, and were fastened to the perch by a thong of leather. Each bird had a small bell on one leg, and a leather hood, with an oblong piece of scarlet cloth stitched into it over each eye, surmounted with a plume of

various-coloured feathers on the top of the hood. The man walked in the centre of the frame, with a strap from each side over each shoulder; and when he arrived at the spot fixed upon for the sport, he set down the frame upon its legs, and took off all the falcons, and tethered them to the ground in a convenient shady place. There were four men who had the immediate care of the falcons (seemingly Dutch or Germans), each having a bag, somewhat like a woman's pocket, tied to his waist, containing a live pigeon, called a lure, to which was fastened a long string; there were also some gentlemen attached to the sport, who likewise carried their bags and lures.

After waiting awhile, some herons passed, but at too great a distance; at length one appeared to be coming within reach, and preparations were made to attack him. Each falconer was furnished with a brown leather glove on the right hand (I suppose, to prevent the talons of the bird from scratching it), on which the falcon perched; and there was a small bit of leather attached to the leg of the bird, and which was held by the falconer between the thumb and finger. Each of the men thus equipped, with a falcon on one fist, and the bag with the lure tied to the waist, and mounted on horseback, proceeded slowly in a direction towards where the heron was seen approaching. As soon as the heron was nearly opposite, and at what I conceived a great height in the air, the falconers slipped the hoods from off the heads of the falcons, and held each bird on the fist by the bit of leather till the falcons caught sight of the heron, and then a most gallant scene ensued. The instant they were liberated, they made straight for their prey, though at a considerable distance ahead. As they were dashing away towards the heron, a crow happened to cross; and one of them instantly darted at him, but he struck into a plantation and saved himself: the falcon dashed in after him, but did not take him. The other falcon soon overtook the heron (which immediately disgorged its ballast of two or three fishes); and after flying round in circles for some time, at length soared above him, and then struck him on the back; and they both came tumbling down together, from an exceeding great height, to the ground. The other falcon, having lost some time with the crow, was flying very swiftly to assist his comrade, and had just come up at the time the falcon and heron were falling. At this instant, a rook happened to fly across; the disappointed falcon struck at him, and they both fell together within twenty yards of the other falcon and the heron. When on the ground, each falcon began to pull to pieces its victim; but, as soon as the falconers rode up, the lures were thrown out, and the falcons suffered to make a meal (having previously been kept fasting) upon the pigeon, which was laid on the carcass of the heron; and, after they were satisfied, were again hooded and put up for that day.

The next cast consisted of two younger birds; and when let loose at another heron, they flew up to it very well. But the heron was an old one, and supposed to have been caught before; for the moment he was aware of his enemies below, he began to soar into the air, and set up a loud croak: and these, not so experienced as the first two falcons, would not attack him, but soared about and left him. Upon this, one of the falconers set up a peculiar call, to which, no doubt, the birds were trained; when one of them, from a very great elevation in the air, immediately closed his wings, darted down to the man who called him, and was taken in hand. This was a very extraordinary manœuvre, and an instance of tractable sagacity. The other falcon did not come to the call, but sailed about in the air. At length a heron crossed, and the falcon attacked it, but again left it. A third heron also came in his way: this he also fell to work with, and, after a short struggle, brought him to the ground in the same style as the first. This last heron had his wing broken, and the falconer killed him; but the first was taken alive, and was afterwards turned out before a single falcon, which struck him down in a minute. I understood, that, when a heron had once been taken by a falcon, he never

made any more sport. It was the case with this one; for, the moment he saw his enemy coming towards him, he lost all his powers, and made a ridiculous awkward defence on the ground; where the falcon would soon have dispatched him, if the falconer and his lure had not been near at hand.

This sport was to me an extraordinary treat, from its novelty and the excitement which it caused; but there were circumstances attending it which would have made the farmers stare and swear in some counties, for the horsemen rode through fields of standing corn with as little ceremony as the titheman, but with much more celerity: and the sport was more dangerous than fox-hunting; for the eye, being constantly aloft to view the aerial diversion, the chasms and sinuosities of mother earth were not so observable as when the object of pursuit lay more at right angles with the vision of the pursuer. — *J. C. June* 23. 1831.

The Blackbird crowing like the common Cock. — Sir, As the fact I am about to mention is a novel one to myself, I am inclined to hope it may be so to many of your readers. Within half a mile of my residence there is a blackbird which crows constantly, and as accurately as the common cock, and nearly as loud; as it may, on a still day, be heard at the distance of several hundred yards. When first told of the circumstance, I conjectured that it must have been the work of a cock pheasant concealed in a neighbouring brake; but, on the assurance that it was nothing more or less than a common blackbird, I determined to ascertain the fact with my own eyes and ears; and this day I had the gratification of getting close to it, seated on the top bough of an ash tree, and pursuing with unceasing zeal its unusual note. The resemblance to the crow of the domestic cock is so perfect, that more than one in the distance were answering to it, and the little fellow seemed to take delight in competing with its rivals of the dunghill. It occasionally indulged in its usual song; but only for a second or two; resuming its more favourite note; and once or twice it commenced with crowing, and broke off in the middle into its more natural whistle. I am not aware that the blackbird has ever been included among those birds which could be taught to imitate sounds; such as the starling, jay, or magpie; and in what way this bird has acquired its present propensity I am unable to say, except that, as its usual haunt is near a mill where poultry are kept, it may have learned the note from the common fowl. I am, Sir, yours, &c. — *Barton Bouchier. Wold Rectory, near Northampton, April* 27. 1831.

In-door Nests of the Thrush. — The statement in Vol. III. p. 237. of a curious deviation from its usual habits in the common thrush or throstle (*Turdus musicus*), brought to my recollection a similar circumstance which came under my own observation. At Whitley, a small village about three miles from this place, is a gentleman's house which has been untenanted for several years, and near it is a shed or outhouse through which the person who had the care of the garden was accustomed to pass and repass several times in the course of the day. Two years ago, the gardener pointed out to me a thrush's (or, as he termed it, a grey bird's) nest, built on a cross beam, close to the wall of the shed. At the time I first saw the nest, the eggs were nearly hatched, and in the course of a few more days the young birds were out; but unfortunately the gardener, in this instance, was not so fond of watching the habits of birds as the millwright in your correspondent's account, for, as soon as the young birds were nearly fledged, he carried them away, with the intention of keeping them until fit for sale. This deviation from the natural habits of the bird was the more remarkable, as on the other side of the shed was abundance of shrubs and bushes, such as the thrush delights to build in, and where it would have been much less apt to be disturbed than in the shed. I am, Sir, yours, &c. — *E. Headlam. Greenhow, North Shields, May* 13. 1831.

To obtain the Skeletons of small Fishes. — My method is this: — I suspend the fish by threads attached to the head and tail, in a horizontal

position, in a jar of water such as is found in ponds where tadpoles abound; and change it often, till the tadpoles have finished their work; which, if two or three tadpoles are allowed to work on a fish of a small size, they will complete in twenty-four hours. I always select the smallest sort of tadpoles, as they can insinuate themselves between the smallest bones, without destroying their articulation." (*T. Bluett, in Philosophical Magazine*, vol. vii. p. 151.)

Hermaphrodite Insects. — Sir, Perceiving at p. 150. the figure of a hermaphrodite specimen of *Bómbyx* castrénsis, forwarded to you from Switzerland by M. Duval, I have considered that the accompanying figures, representing several other equally and even more extraordinary individuals may be deemed worthy of a place in your Magazine; especially since they are all representations of British species. The figures are from an extremely rare quarto tract, published by the celebrated Professor Klug of Berlin, and of which not more than a single copy, now in the possession of the Rev. F. W. Hope, has, to the best of my knowledge, found its way to England. From the interest of the figures, I thought it worth while to make a copy of them for my own use; from which copy my ingenious friend, Mr. Ingall, has since engraved the plate (not intended for publication) of which I now forward you an impression.

88

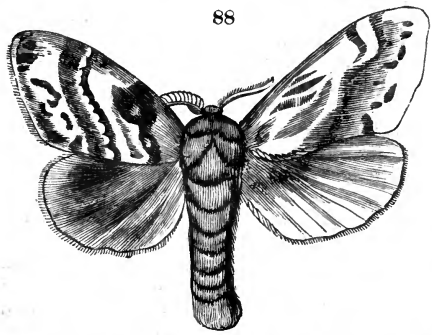


Fig. 88. represents the very rare moth *Bómbyx* (Eutricha *Steph.*) pini; and by drawing a line down the centre of the body, it will be perceived that the left side of the insect possesses the characters of the male, with feathered antennæ, short wings, and abdomen; whilst the opposite side exhibits the contrary characters of the female.

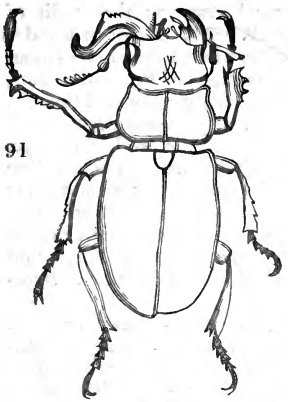
Fig. 89. is a much more singular specimen of *Bómbyx* (Clisiocámpa *Curt.*) castrénsis (which is also rare as British) than M. Duval's; the wings on the *right* side being those of a male, whilst the antennæ and abdomen of the *left* side are of that sex; and the left wing, right antennæ, and the right side of the abdomen are those of a female.

89

Fig. 90. represents the *Bómbyx* (Hypogýmna *Hubn.*), with the antennæ of the male, but the ground of the wings is white, as in the female, with light waves. This I should be inclined to regard merely as a very pale variety of the male.

90

Fig. 91. exhibits a hermaphrodite, and at the same time distorted, specimen of the stag beetle (Lucànus *Cérvus L.*); the left side of the specimen being masculine, with the jaw twisted, and the right side feminine. It is, however, to be observed, that the elytrum on the left side is larger than that on the right; whence it would follow (if the general rule of female insects being larger than their male companions be here preserved) that the specimen is quartered like



91

the *Bómbyx castrénsis* described above. The *Lucánidæ* are, however, generally exceptions to the rule.

There are other instances of similar freaks of nature on record besides the preceding. Thus, in the 15th volume of the *Linnæan Transactions*, and the 1st volume of the *Zoological Journal*, an account is given of a specimen of a large foreign butterfly, in the collection of Mr. MacLeay, the right side of which is masculine, and exhibits the characters of *P*apílio Polycàon, belonging to the Linnæan division of the Greeks; and the left side female, and representing *P.* Laódocus, a Trojan: thus proving these two supposed species to be but the sexes of the same, and also that this portion of the Linnæan classification was erroneous; since the section was established upon sexual characters.

The *Encyclopédie Méthodique*, art. *Papillon*, however, records an instance of two Greeks thus united. The specimen, which is preserved in the museum of the Jardin des Plantes at Paris, being composed of two hitherto supposed distinct species; the right side being *P.* Ulýsses, and the left *P.* Diomèdes, which are hence found to be the sexes of one species: and it is not improbable that other supposed species of *P*apílio are in the same predicament.

In the majority of the preceding instances it will be perceived that the left side of the specimen is masculine.

The Russian naturalist, Dr. G. Fischer, in the plates of the Natural History of Moscow, published with his *Oryctographie du Gouvernement de Moscou*, (fol. 1830, Mosc.), has figured a hermaphrodite *S*phínx (Smerínthus) pópuli, which he reared from the caterpillar (and which, as well as the pupa, is figured) in 1809; but the specimen has since unfortunately been consumed in the fire of Moscow. The right side of the insect is male, and the left female:—"Tout le corps (including the antennæ, palpi, &c.) est divisé en mâle et femelle ainsi que les parties génitales," is the short notice given of the insect. Magnified figures are added of the appearance of the latter organs, as well as of the head, antennæ, and palpi; which last are more developed in the male than in the female.

Figures are also given of a hermaphrodite moth (Geómetra artemisiària) which nearly resembles the Bùpalus piniàrius, likewise bred from the larva, which is figured, as well as the pupa. In this specimen the left side is masculine, and the right feminine: in the genus Bùpalus, however, the females are smaller than the males.

I have likewise seen two specimens of *S*phínx (Smerínthus) pópuli, bred by Mr. Weaver of Birmingham, both of which have the sides of the body of opposite sexes; and the Rev. F. W. Hope has been fortunate enough to procure a specimen of the large water beetle (*D*ytíscus marginàlis) also similarly circumstanced; which is the more interesting, since the sexual characters in that group are greatly developed; the males having patelliform anterior tarsi, and smooth elytra, and the females simple tarsi, and the elytra with deep longitudinal hirsute furrows.

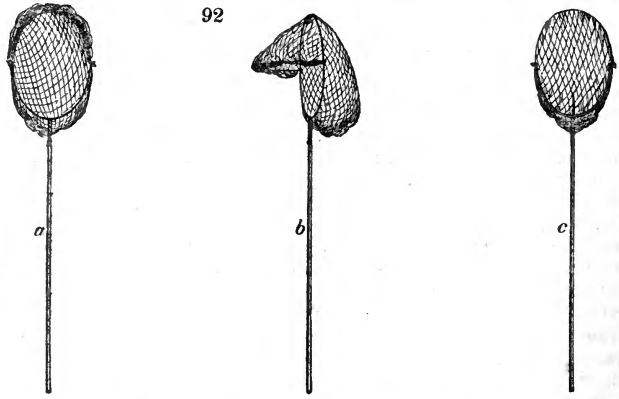
I may add, in conclusion, that these, and other instances of a similar nature, occupy at the present time the attention of one of our most philosophical researchers in natural history; and we may rest assured that from the hands of the acute detector of the *C*ýgnus Bewíckii the student will receive a memoir worthy not only of the subject, but of its author. I am, Sir, yours, &c. — *John O. Westwood. Grove, Hammersmith, June*, 1831.

The Fact of the Flight of Earwigs I had long known, on the credit of others, but not at all from inspection, till May 12. 1831. Between 5 and 6 P. M. the atmosphere was warm and most exciting, when, in an area between two ranges of hot-bed frames, I saw numerous specimens of *Forfícula mìnor*, all in highest ecstasies, and traversing the ground in all directions. I thought I also saw some flying, and alighting round about. Hereupon I caused one on the ground to mount my hand, and elevating it to the level of my eye, saw it fly off: thus also did a second, a third, and a fourth. Each, before taking flight, aided or effected the expansion of its snow-white membranous wings with the forceps in its tail, which it turned over its back, and used with admirable adroitness. They flew ably, and in curves of short diameters. This instance is very similar to the one related in Kirby and Spence's *Introduction to Entomology*, vol. iv. p. 514. — *John Denson. Bayswater, July* 12. 1831.

Sphínx A'tropos met with at Sea.—On our passage up the Mediterranean, in his Majesty's ship Ingate, in the month of May, 1831, then off the Spanish coast, Cape Palos being the nearest point, distant about twenty miles, a fine specimen of the *Sphínx* A'tropos, or death's-head moth, flew on board. That butterflies, and other light and buoyant insects, are of frequent occurrence at sea, I am well aware, having repeatedly seen them in the Atlantic when at least a hundred miles from the land. This instance of the *Sphínx* A'tropos, however, appears worth noticing, on account of the extraordinary size and weight of the insect, compared with the area of its fragile wings; which must have been kept in a violent state of muscular exertion for a length of time, to support so weighty a body in the air, without a moment's pause. As the breeze was not overpowering, it may be fairly conjectured that this aerial traveller had quitted the shore more from choice than compulsion; and, probably, might have safely landed itself in Africa, had it instinctively sought a warmer climate: which, possibly, might have been the case, from its having been met with at so early a period of the year, its usual appearance in England, at least, being in the autumn: seldom before August, but more frequently in October. — *E. S., F.L.S. July* 21. 1831.

A Description of an Instrument for catching all kinds of flying Insects. — *Fig.* 92. *a* represents the front view when open; *b* represents the side

92



view partly closed; *c* the front view when closed. The instrument is to be constructed in the following manner: — To a ring of stiff iron wire is to be attached a bag of spider-net to form the bottom, which is to be covered at pleasure by means of a movable half-ring of wire, filled in with spider-net, and hinged so as to close the top securely when flapped

together: the whole is to be fixed firmly to a light stick about 3 ft. long. It is to be used with a slight jerk; and, with a little dexterity, it will generally enclose the insect between the bags. — *John Perry, jun. July* 15. 1831.

Art. II. *Botany.*

On the relative Scarcity of certain Species of Plants, and on Changes in their Habitats. — Sir, Mr. Bree's communications are always interesting; they present the observations of an enthusiastic naturalist without any scientific rust; and his uniform candour and goodnature in reference to the observations of others, well merits imitation. His remarks "On the claims of *I*ris tuberòsa as a native of Ireland" (p. 28.) have induced me to take up my pen, with the intention of making a few observations on the change in the habitats of plants, and their relative scarcity.

Mr. Purton, in his *Midland Flora*, complains that he could scarcely ever find any of the rarer plants in the stations assigned them by authors; and he therefore observes, "that in the present work no plant is inserted except on positive information." However, I have myself found the same disappointment with regard to Purton's habitats as he himself complains of in others, and it shows the necessity not only of recording any new habitats that may occur*, but of stating the failure of the old ones, where that is the case, since it is frequently the occasion of much disappointment to the botanist. For instance, *R*anúnculus Língua appears in several botanical works, as found on "bogs in Malvern Chase;" but without any other local adjunct: — I have trod the chase in all directions in vain, and I need not hesitate to say that it is no longer found there, nor have I ever found it nearer than Langorse Pool, Breconshire; a fine station for marsh plants, and where it flourishes abundantly. It is true that a considerable part of Malvern Chase is now enclosed, and doubtless several bogs may have been drained, but no record of this appears; and the new edition of Withering still flatters us with "bogs on Malvern Chase," only to betray: ignis fatuus like, we are led into the bog, and left there.

Dr. Stokes (for I have his edition of *Withering* as mentioned by ☞ at p. 55.) says that he found *S*cándix Cerefòlium "near Worcester, growing in considerable plenty in the hedge on the south-east side of the Bristol road, just beyond the turnpike, May, 1775." Now, lest the veracity of the good doctor should be hereafter impeached, I beg to say that it was growing in the very place indicated by the doctor, in great profusion in 1829, and I had previously noticed it there for several successive years; but in 1830 came that great enemy to botanical habitats the "surveyor of the roads," who, armed with his "brief authority," demolished the bank on each side, lowered the hill, altered the direction of the road; and hence, farewell to Dr. Stokes's habitat of the *S*cándix Cerefòlium, "near Worcester," for I can perceive no traces of it this year. Dr. Stokes also records *A*pium gravèolens as growing in Sansom Fields, Worcester; where, indeed, there would seem to have been a mere or lake at some distant period; but the meadows are now enclosed, gardens formed, and built upon, a canal cut, and the plant in question is no longer to be found

---

* Mr. Dale's plan (p. 265.), where he interlaces his "captures of insects," with an occasional rare plant, is excellent; but a few more particulars, as to whether there were few or many of the plants, if in full flower, &c., would be acceptable.

here; while, curious enough, it now grows in profusion on the banks of the saltwater canal formed by Brindley to connect Droitwich with the Severn, which was only finished in 1771, and was thus quite a novel undertaking at the time Dr. Stokes edited his edition of *Withering*. That plants, therefore, change their stations, and cease to grow where they formerly abounded, is very evident; and I have myself noticed plants in habitats where afterwards no diligence could find them: thus, in 1821, I found *O*robus sylváticus on the bank of the Severn just below Worcester, though it has not since appeared there, perhaps washed away by the autumnal floods which are ever making ravages on the bank of the river, and it is not unlikely it might have been brought down the stream originally to the spot I have mentioned, as it has not occurred to me any where else in the neighbourhood. In the autumn of 1822, I found *E*rìca vàgans on some heathy ground on the red sand of the Upper Bromsgrove Lickey (the Lower Lickey, closely adjoining, consists principally of quartz rock); but I have not been again able to meet with it there, and from recent plantations, alterations of roads, and continued enclosures, I fear it may now be totally eradicated. Leland, in his *Itinerary*, mentions Towbury Hill Camp, near Tewkesbury, Gloucestershire, as being overgrown with the juniper (*Juníperus commùnis*) where not a single plant of it now exists.

On the other hand, beautiful plants occasionally rise up in stations where they were before unknown, and sometimes would almost tempt us to disbelieve the evidence of our senses, or that we must have been dozing when we passed the spot so often before unnoticed; I can therefore easily believe Mr. Bree's surprise at being told by Mr. Drummond that *I*ris tuberòsa grew wild in the neighbourhood of Cork (for botanists are often rather incredulous if a rare plant has not been found by themselves); while his pleasure at being shown the spot, and presented with the roots, will be equally appreciated by a genuine botanist. But still we must discriminate, and there does appear to me something like a doubt hanging over the claim of Hibernia to the *I.* tuberòsa, as a specimen of her indigenous flora; the ominous word "ruin" is mentioned by Mr. Bree, and the inference, therefore, is (till further information be elicited) that the *I*ris may have been a tenant of the garden of the "ruin," and thence have insinuated itself around, increasing as it does so much from the roots. In this way, doubtless, some of the plants in our flora have been introduced into the country; many of the monks in olden time cultivating curious herbs in their gardens for medicinal or superstitious purposes, the gift of some holy brother abroad. Indeed, when we find any rare plant on or in the neighbourhood of a "ruin," we ought to be very suspicious whether the plant is not a naturalisation, rather than a real denizen. Thus I noticed the Diánthus barbàtus in the summer of 1827 growing on the ruins of Ragland Castle, Monmouthshire; and Dr. Stokes, in his edition of *Withering*, mentions it as found by him on a limestone wall at King's Weston, near Bristol; but it can have no real claim to a place in our indigenous flora. *S*axífraga umbròsa may now be found on some of the rocks at Malvern, having straggled from the neighbouring gardens, though not really wild there. I have found Melíssa officinàlis in several places near Worcester, but always in the vicinity of gardens or farmhouses, from which it must have escaped, or been accidentally thrown with the outcasts of gardens. *Valeriàna* rùbra must be considered another of these insinuating emigrators: like the land-squatters of America, it first takes possession of some old wall of the garden, thence perhaps it advances to a neighbouring sand-hill, or establishes itself unnoticed in a chalk-pit. After the same manner, *A*ntirrhìnum màjus scales the walls of our gardens, mounting higher and higher; and at the present moment some luxuriant specimens of the plant may be seen waving their red insignia on the roofs of some lofty old houses on the western side of the cathedral here. Mr.

Bree's notice of *I.* tuberòsa also reminds me that, some years ago, Dr. Nash published, in his *History of Worcestershire*, *I*ris *X*iphium as found by the side of the river Avon at Fladbury; and, on Nash's authority, it was inserted in Dr. Stokes's edition of *Withering*, Berkenhout's *Synopsis of the Nat. Hist. of Britain*, and other publications; but the plant (if really found at all) must have been an outcast from a garden, and cannot now be found at all on the banks of the Avon. I by no means would wish to insinuate any doubt whatever as to Mr. Bree's or Mr. Drummond's accuracy, as to the Irish habitat of *I.* tuberòsa, but merely (in the absence of more specific intelligence) to hint that perhaps the "old hedge bank" was the boundary of a former garden, and the station near the "old ruin," probably so likewise.

While, however, as Dr. Withering remarks (see new edit. of his father's *Arrangement of British Plants*, vol. ii. p. 89.), "from the progress of time and intercourse with foreign parts, so many exotics have become naturalised in Britain," plants truly wild occasionally spring up in habitats where they were before unknown; and records of these facts, when noticed in connection with the nature of the soil, become truly valuable. Thus, in your Second Volume, p. 70., Mr. Bree notices the apparently spontaneous appearance of Epipáctis latifòlia in a new plantation he had made, though it was previously unknown in his vicinity; and Purton, in the Appendix to his *Midland Flora*, mentions the Œnothèra biénnis as springing up on the banks of the river Arrow, after the widening of the bed of that stream, and I have myself observed the same plant on the bank of the river Teme, probably after an operation of a like nature. These and other similar facts are confessedly valuable; but I must enter my protest, in accordance with E. (*Mag. Nat. Hist.* vol. iii. p. 460.), against, I must say, the botanical fraud of scattering the seeds of exotic plants among our wild woods and rocks, either for the purpose of astonishing the traveller, or hoaxing the scientific collector. Notwithstanding, then, your query as to increasing the beauty of our wild scenery, and Mr. Thompson's support of the practice (p. 86.), I do think it childish at best, and can only compare those who thus employ themselves to the rustics in the vicinity of Bredon Hill, in this county, who some years ago constructed a pyramid of the oolitic stones which there abound, beneath which they placed an immense horse-shoe, made for the occasion, to astonish the antiquaries of the year 3000. * The garden, the plantation, and the pleasure-ground are the proper places for the exhibition of the effect of man's sportive and improving hand; but let us leave the woods and rocks to their native wildness and magnificence, as long indeed as the advance of population allows us to retain any wilds at all. If, indeed, as Mr. Thompson hints, the winds, birds, and animals may introduce fresh species without our aid, here we have opportunity for observation and remark; but doubt, confusion, and everlasting dispute must result from the reprehensible practice to which I refer, independently of the hoax on the collecting botanist, for that is not "the limit of the evil." Last week I passed through a wood covering one of the transition limestone hills near Ledbury, which was most profusely ornamented by the beautiful *V*ícia sylvática, festooning the trees on all sides; I was delighted in the extreme at this wild production of nature so strikingly lovely, but had it been in the power of any person to have informed me that some ornamenter of wilds had been purposely sowing the plant in the wood, my pleasure would have been much abated, nor could I have in that case concluded that a calcareous

* I must exclude from this censure that genuine son of humour, J. F. Dovaston, Esq., who has frequently enlivened your pages, and who made (Vol. II. p. 400.) the *amende honorable* for planting *A*ntirrhìnum Cymbalària in Wales.

soil was the natural home of the plants. As I last week found *Fumària lùtea* in full flower, growing in some quantity in a retired lane leading from Abberley church, in this county, towards Stourport, near the village pound, I would enquire whether any of your readers may have sown the plant there purposely, or whether I may consider it as really placed there by the hand of nature? I have also found *Hypéricum calycìnum* in some abundance in a hedge bordering a grove, and among underwood about the grove, at Little Malvern, at the eastern base of the Herefordshire Beacon. The plants have now a wild aspect, but may have originated from one planted in the grove. I annually find *Verbáscum virgàtum* by the side of the road leading from this city to Kidderminster, where it was first observed by Dr. Stokes; and, though, being so conspicuous a plant, it is always sure to be plucked before it has perfected its seeds, it still obstinately persists in maintaining its station; from which circumstance, I conclude it to be really wild here, notwithstanding Sir J. E. Smith's idea that it had escaped from Mrs. Nash's garden at Bevere (Smith's *E. Flora*, vol. i. p. 312.), which is, in fact, nearly three quarters of a mile from the spot; and nearer Bevere House I have seen no traces of it. But to recur more particularly to the subject with which I commenced this paper.

While new plants are doubtless yearly naturalised among us, many of our old native ones are becoming scarce, cease to be found in the stations where they formerly abounded, and may, perhaps, be finally lost to us. For instance, the *Bérberis* vulgàris, once so common in many places, is now so totally eradicated (at least in this part of the country) that I am not acquainted with a native station for it within thirty miles; — persecuted (and justly so) from the haunts of man for its blighting influence on our corn, it has now taken to the hoary ruin, and the last time I saw it in a wild state, was (a curious habitat!) on the picturesque remains of Buildwas Abbey, Shropshire. The destruction of old hedges has also caused the scarcity of *Euónymus europæ'us*, which is now only found in old fences that have escaped being rooted up. The *Marrùbium vulgàre*, which formerly abounded on the commons at the foot of the Malvern Hills, has been almost totally eradicated by cottagers, who have transferred the plant to their own gardens, for the sake of the medicinal tea which they extract from it. Thus, too, beautiful varieties can no longer be found, as the sole specimens left are often rooted up; and thus I have often searched in vain a second time for lovely specimens I had, on a former occasion, neglected to secure.

Mr. Bree's observations on the flowering of the *I.* tuberòsa are curious, and similar observations on the irregularities of plants in flowering would be very acceptable; more especially if the causes of such irregularities could be satisfactorily elucidated. I have noticed a small patch of *Iris fœtidíssima* growing wild in a copse at the foot of Cruckbarrow Hill, near this city, and though I have regularly observed it for some years, I could never find it in flower but once. The soil is a heavy red marl, and its situation may not be favourable, as I observed numbers of the same plant most profusely in fruit on the sandstone rocks between Salterton and Sidmouth last autumn, and in greater luxuriance than I ever before noticed. In 1827 I found the *Tùlipa* sylvéstris in some abundance on a red marl cliff amidst underwood, close to the Severn, at Clerkenleap near Worcester, and several specimens were then in flower; but since that time no flowers can be met with, though the leaves are abundant enough. The year before last the *Crocus vérnus* was pointed out to me in a field between this city and Cruckbarrow Hill, and several specimens were gathered in flower by myself and friends, but it has not appeared in flower since that time. The *Sedum álbum* grows plentifully on the rocks at Malvern; and yet never but once, amidst the multiplicity of trailing stems and leaves, could I meet with a flowering branch. The *Ranúnculus fluvi-*

átilis abounds in the Severn; but it scarcely ever flowers, unless the river is so low as to expose its herbage to the influence of the sun, when it flowers profusely. From the continued dry weather this summer, the Severn became very shallow, leaving masses of the *R.* fluviátilis stranded on the shore, and on June 7. all the shallows of the river were beautifully white with the flowers, many of which were double; and one blossom I dissected had 15 petals; but in less than a week, partial heavy rains produced a rise of about 9 in. in the river, every specimen was submerged and not a vestige of the plants are visible to the eye.

Did space allow me, I might enlarge upon the relative scarcity of plants; for how often it happens that those which are rare in one place are abundant in another; and I think your correspondents should not be blamed if they insert in their list plants which may appear common to some, but which are not in reality generally distributed. How very common the Adóxa Moschatéllina is in the neighbourhood of Wellington, Salop, while here the botanist would search the country in vain for it. *C*otylèdon Umbilìcus, a rare rock plant here, is a common denizen of every wall about Abergavenny, Monmouthshire. *O*rchis pyramidàlis covers whole fields on the south side of the Wrekin, Salop, though in this neighbourhood it is rare, and I have only met with it at Malvern. *A*nthyllis Vulnerària grows abundantly on the transition limestone, west of Malvern, but I find it no where else in this neighbourhood. In Shrawley Woods, with a light sandy soil, the abundance of Convallària majàlis is astonishing; but our other woods on the heavy marl might be searched for it in vain. In a fallow field, near Bridgenorth, I noticed, in 1823, the most luxuriant and beautiful specimens of *E*chium vulgàre I ever beheld, full 3 ft. in altitude; while around this city I never met with a specimen, except a starveling 6 in. plant, gathered by a friend from a wall near Evesham. In the same rich meadows by the Severn between Coalport and Bridgenorth, the *I*nula *Helènium* makes a magnificent appearance with its golden sun-flower; but I never met with a specimen lower down the river. The Tanacètum vulgàre, indeed, abounds on the banks of the Severn, giving the richest appearance to the scene when in full flower, but in mountainous situations it becomes uncommon. I was once delighted with the sight of twenty or thirty full grown plants of the *O*robánche elàtior in a single clover field at the northern base of the Wrekin, Salop, each plant nearly a yard high, but I have never since observed such a spectacle. I have observed the *O*rìganum vulgàre most abundantly, both with purple and white flowers, at the base of the Mendip Hills, Somersetshire, but here I find it very scarce, even on calcareous soil. I have perhaps dilated too much on this to me delightful subject, and shall therefore close; leaving my apology with you and your readers in the fine language of James Montgomery:—

> "We but begin to live from that fine point,
> Which memory dwells on, with the morning star,
> The earliest note we heard the cuckoo sing,
> Or the first daisy that we ever pluck'd,
> When thoughts themselves were stars, and birds, and flowers."

I am, Sir, yours, &c. — *Edwin Lees. Worcester, June* 23. 1829.

The Localisation of Plants by Man.—"We fancy that Mr. Dovaston little anticipated the animadversions to which he so innocently subjected himself by his candid acknowledgment (*Mag. Nat. Hist.*, vol. ii. p. 400.) of his patronage of the supposed foreigner Linària Cymbalària. That serious complaints should be advanced" [see *Mag. Nat. Hist.*, vol. iii. p. 460, 461.; vol. iv. p. 439.] "against any individual for increasing the beauties, and adding to the interest of British scenery, will appear singular to the majority of our readers. Those, however, who have experienced an enthusiastic plea-

sure in the pursuit of any peculiar department of science, can readily excuse the feelings of exclusive importance with which the minds of naturalists are sometimes occupied. No established law of nature, in the geographical distribution of plants, is interfered with. Under the same latitudes of the eastern and western hemispheres, the plants are neither all similar nor all dissimilar; therefore, whether seeds be conveyed by man, or by the waters of the Deluge, we see no distinction in the consequence. Who, amongst us, would venture to assert the propriety of excluding cultivated exotics: the edible from our tables, or the ornamental from our gardens; why, then, the flowers from our fields? We would be content to register Britain's legitimate post-diluvian flora as it now stands, class future discoveries as doubtful natives, or acclimated subjects, and encourage all to become disseminators of new beauties over our native land, for the benefit and gratification of future generations. After all, the calm looker-on must smile at the effects of any recent dissemination of the Linària Cymbalària; since Parkinson, about six generations ago, said — 'It groweth naturally in divers places of our land.'" (*B. Maund*, in his *Botanic Garden* for March, 1831, No. 300.)

Linària Cymbalària prevails in the interstices of the masonry of Caius College, Cambridge, especially at the back of the Gate of Virtue; that is, supposing one to enter at the Gate of Humility, and to pass through the Gate of Virtue, in his way to the Gate of Honour. Mr. Dovaston (Vol. II. p. 401.) attests its prevalence in similar situations at the sister university. — *J. D.*

Dissemination of Exotic Plants.— Sir, I have seen that opinion is divided with regard to distributing foreign plants in British soil. I confess I am for doing it, as I have not seen at present any reasons to the contrary that have satisfied me: so, if you do not supply a satisfactory objection, I shall soon commence the (to a select few) abominable practice. Spring flowers, I believe, are generally acknowledged to be most welcome; so I ask you (though, perhaps, you are one of the select few I mentioned), what would more heighten a mechanic's pleasure, after being pent up in a close workshop all the week, and without having tasted any fresh air, and whose eyes have not been blest with the sight of the least "green thing" all the time, than, on taking a Sunday morning's ramble, to observe, on some sunny bank, the golden winter aconite shining in the sunbeams, and here and there a few snowdrops scattered among the sod on which he treads? Oh! he would feel it; it would penetrate to his heart, and make him look "from Nature up to Nature's God." It is what I have been thinking of for some time. I have a stock of seeds of Eránthis hyemàlis (the winter aconite); and I think nothing shall prevent me attempting to make our fields a perfect garden. *Gília* capitàta and Collòmia grandiflòra are the sort of plants for the purpose, as it requires some trouble to extirpate them when once established. I am, Sir, yours, &c. — *Y. R. May* 21. 1831.

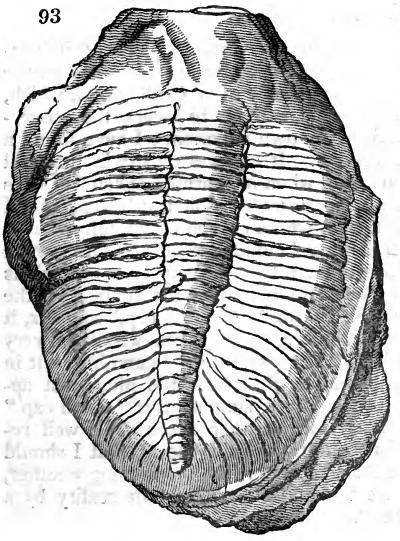
We have been told that the beautiful Coreópsis (now Calliópsis) tinctòria is established in the corn fields about Glasgow. Is this true? If not, it can doubtless be rendered true, as the plants from self-sown seeds are, especially where even slight shelter obtains, proof to the severity of British winters. This elegant and splendid annual, if established in our corn fields, would rival, perhaps even surpass, the brilliant bluebottle (*C*entaurèa *C*yanus, the *C*yanus *s*égetum of Mœnch); the gorgeously golden corn marigold (*C*hrysánthemum *s*égetum); and the beauteous branching larkspur (*D*elphínium Consólida); all which, here and there, beautify the fields of Cambridgeshire. — *J. D.*

Anemòne nemoròsa. — The blossoms of this plant are very fragrant, so much so, that a wood in which it abounds is as fragrant as a bank of violets (*V*iola odoràta). This quality is not noticed by Smith in his *English Flora.* — *Henry Turner. Botanic Garden, Bury St. Edmund's, April*, 1831.

Useful Application of the dead and dry Stems of the Umbelliferous and other Herbaceous Plants. — Sir, I have before now heard the observation fall from the lips of an uneducated person, when speaking of some plant, or animal, or natural substance, " What a pity it is that it is of no use!" and for myself, I always consider it a point gained when any article, hitherto either entirely neglected, or regarded as of little utility, is found to be capable of being turned to account, and applied to some useful purpose: more especially if the article in question be one which can be procured easily and in abundance. I have been led into this general remark by having lately observed the dead dry stalks of *C*hærophýllum sylvéstre (cow parsley) and *H*eracl*è*um *S*phondýlium (cow parsnep) cut into pieces of about a foot long, and hung up in the chimney-corner of a farm-house in this neighbourhood; which, upon enquiry, I was informed had been laid up for the purpose of being used as spills to light candles, &c. It is probable that the dead stalks of many other plants would answer the same purpose equally well. I have tried the experiment successfully with those of Angélica sylvéstris (wild angelica) and *S*cándix odoràta (sweet Cicely). It is almost unnecessary to add, that these ready-made spills, which are to be found in the winter, or even spring, in every hedge, wood, or plantation, should be gathered when quite ripe and dead, and must be kept for use perfectly dry. The hollow stalks of the more gigantic specimens of Angélica sylvéstris, which sometimes exceed an inch in diameter, may be split longitudinally into quarters, or still farther divided, before they are applied to the above purpose. Some specimens of each kind I herewith send you; and should you deem this trifling communication at all worthy of being more generally made known, you are at liberty to make any use of it you may think proper. The discovery, if discovery it is, may be of no great utility or importance; but at least it serves to show historically, and as a matter of curiosity, the purposes to which these neglected vegetable remains are actually applied in some parts of the country. I am, Sir, yours, &c.— *W. T. Bree. Allesley Rectory, April* 29. 1831.

Art. III. *Geology.*

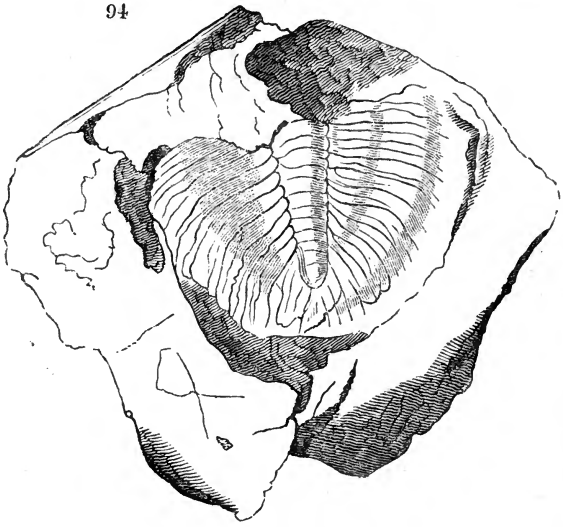
93



Fossil Trilobites resembling Butterflies. (*figs.* 93. 94.) — Sir, As the locality of various fossils is a desirable thing to be ascertained, perhaps that of the following may be worth insertion in your truly valuable Magazine. Last midsummer, whilst I was on a sketching excursion through part of Wales, I was informed when at Llandilo Vawr, that in Lord Dinevor's grounds there were found petrified butterflies. I went in search of them, and discovered what was named petrified butterflies to be parts of a trilobite found in a sort of slaty sandstone of an ochreous brown colour. Their form is very flat compared with those discovered at Dudley, thereby giving something the effect of a butterfly. I have sent two sketches of them; one (*fig.* 94.)

showing the parts as they are generally found, and the other (*fig.* 93.), a more perfect one, which I was fortunate enough to discover. The greatest

94



projection is not more than three eighths of an inch. They are found rather plentifully in a bank on the right side of the road, shortly after entering the park from Llandilo. The drawings are the exact size of the fossil. I am, Sir, yours, &c. — *L. E. Reed. Tiverton, Sept.* 27. 1830.

Art. IV. *Meteorology.*

A forewarner of foul Weather.— It may be a useful piece of information for agriculturists, or those concerned in getting in their crops on the approaching season, to describe the appearance of a small cloud, which, from its rapid formation and disappearance, is likely to escape the observation of most persons, but which from my own experience I have found a very faithful forewarner of foul weather. It appears mostly in the mild weather of spring, summer, and autumn, when its warning token becomes most acceptable. I will endeavour to describe it in the best manner I can: — It is a small, delicately soft, thin, white, curved cloud, formed suddenly upon the summit of those fine heaped clouds (termed cumuli) which often prevail in warm weather, and appear to tower up to a prodigious height. It is necessary to keep a watchful eye upon the summit of the cumulus. When this little film, which I term "the storm cap," appears, it lies closely over the rounded summit, like a white silken web: in a very few seconds it will disappear; sinking, I suppose, into the cumulus; but in a little time, and when heavy foul weather threatens, the film again appears, disappearing as shortly as before. Last summer this "storm cap" was often to be seen, and how much foul weather succeeded I well remember. So confident do I feel in this little warning cloud, that I should entertain no fear of foretelling in this, my letter, the threatening weather, within 24 to 48 hours, and invite the editor to testify the reality by a note. — *B. Laytonstone, April,* 1830.

PART IV.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in the English Counties.*

Devonshire.

Climate of Bovey Tracey, Chudleigh, Devon, as to Birds.—Three swallows were seen here, April 15. 1831, going into some old nests under the eaves of the house. — *J. G. C. Bovey Tracey, Chudleigh, Devon, April* 20. 1831.

Habits and Habitats of Nóctua præ'cox, vitta, vallígera, sagittífera, and Ægèria crabronifórmis, Satúrnia Pavònia mìnor, and Callimórpha domínula.—Sir, As I believe myself to be the first person who ever reared that beautiful moth, *N*óctua præ'cox, from its larva, and ascertained its proper food and locality, I send you some particulars relative to that and some other insects. Donovan mentions that the larva of *N.* præ'cox feeds on the thistle; one having been found at the roots in Portland Island. When residing at Bedifew, North Devon, I examined the thistles at Appledon Burrows for two seasons without success. It was by mere accident I met with the larvæ one dark showery day in the end of May, when they were feeding on short stunted plants of the *G*àlium vèrum, or yellow-flowered ladies' bedstraw, which grows on the bare sand. I found forty in the course of half an hour, and in the circumference of 100 yards; and although on several subsequent days I examined the same spot, not one was to be seen. I put these larvæ into a box, the bottom of which I covered 3 in. deep with sand from the spot, and fed the larvæ with the bedstraw. The moths were produced the following August. The succeeding spring, with a small garden rake, I raked the sand in the same spot and in other places, where I found a number of them, and also of *N*óctua vítta and vallígera. The last two feed on the roots of the grass, and all remain about 1½ in. beneath the sand. The larvæ of the *N.* præ'cox come to the surface to feed only at night; except occasionally on a dark day, after a wet night, as in the above instance; and this through fear of their enemies, the crows and gulls, which feed on them. I also found the larvæ of the *N*óctua sagittífera feeding on the leaves of the henbane (*H*yoscỳamus nìger) near the same spot; and when not feeding they remain under the sand near the plant. I have subsequently found all the above-named larvæ in South Devon also; and this by using the rake.

Habitat of the Larva, Pupa, and Fly of Ægèria crabronifórmis. Examining the bole of a large poplar tree for moths, the bark of which was exceeding rough, I observed a substance resembling sawdust, falling down from several small holes the size of a goose quill in the bark. On a close inspection I found a pair of the insects in a state of copulation. They had that moment escaped from the pupæ, the empty cases of which were half protruding out of two of the small holes. Previously to the developement of the insect, the pupa forces its way to the front of the hole by means of prickles on each segment of the body. I also found one on a sallow tree (*S*àlix) near the above poplar, and on the margin of a fishpond infested with them. I examined the above trees early every morning for some days after, and collected about twenty; and I invariably observed, if the two sexes were on the same tree, they were always in a state of copulation. During that time I was in the practice of beating all the branches of the trees and bushes

about the spot with a pole, and a sheet under to receive the insects and larvæ; yet not one of the above fell into the sheet, nor did I ever see one on the wing.

Satúrnia Pavònia mìnor. The larvæ of Satúrnia Pavònia mìnor feed on the heath, and are not confined to the withy tribe, i. e. the osier species of the genus *S*àlix. On the 14th of June, 1822, at Fishguard, on a rocky mountain near the sea, I found upwards of fifty of them feeding on the heath (*E*rìca) where no other shrub or tree, except the furze (*U*`lex europæ`a), was growing within a mile of the spot. I fed them exclusively on that plant (heath), and they all produced fine moths.

Callimórpha domínula. In a valley two miles from the above mountain, I observed, a few days after taking the above-named larvæ, a number of the males of the Callimórpha domínula flying about at twelve o'clock on a bright sunny day, and captured six males which were surrounding a female at one time. I am, Sir, yours, &c. — *Charles Blomer. Wellington Place, Clifton, Bristol, March* 17. 1831.

Essex.

A Catalogue of Plants collected in Essex, with Remarks on some of the other Natural Productions of the County. — Essex appears to have been as little botanically explored as perhaps any part of England; and of the neighbourhood of Chelmsford, in particular, scarcely any thing is recorded in works on our indigenous plants. A residence of some years in this county, and repeated visits to its coasts, have, however, served to convince me that it is by no means destitute of rarities. My own labours, together with those of a botanical companion by far more efficient than myself, were amply rewarded by the discovery of the following habitats: —

Verónica montàna. In a wood near Broomfield, a village about three miles from Chelmsford, on the Braintree road.

Utriculària vulgàris. In an old clay pit near Broomfield.

Valeriàna dentàta. In corn fields near Broomfield.

Scírpus sylváticus. In a bog near Danbury.

Milium lendígerum. } In woods near Great
Milium effùsum. } Leighs, about half-way between Chelmsford and Braintree.

Alopecùrus fúlvus. In swampy places near Great Leighs.

Mélica unifiòra. In woods at Great Leighs.

Spartìna stricta. In the salt marshes at Walton, on the Naze, a village about ten miles south of Harwich.

Psámma arenària. On the sandy shore near Walton.

Rotbóll*ia* incurvàta. In Walton marshes.

Hórdeum marítimum. At Walton, on the sea walls.

Tríticum júnceum. At Walton, on the sandy shore.

Lolium temuléntum. } Corn fields near Broom-
Lolium arvénse. } field.

Dipsacus pilòsus. Between Coggeshall and Braintree.

Prímula elàtior. At Broomfield.

Menyánthes trifoliàta. In boggy ground on Galleywood and Little Baddow Commons.

Hottòn*ia* palústris. In ponds near Galleywood Common.

Anagállis cærùlea. In corn fields near Broomfield.

Anagállis tenélla. On boggy ground near Danbury.

Calystègia Soldanélla. On the sand near Walton, in one place covering a space of many square yards with its large and delicate flowers.

Campánula *Rapúnculus.* On a dry bank at Danbury.

Campánula hỳbrida. In corn fields near Chelmsford.

Viola hírta. Very frequent near Chelmsford, where the soil is clay.

Bèta marítima. } At Walton.
Salsòla *Kàli.* }

Eryngium marítimum. On the sandy shore near Walton, along with Psámma arenària, Arenària *peplòides*, &c.

Peucédanum officinàle. Near Walton.*

Bupleùrum tenuíssimum. In 1828 it grew on the sea walls at Walton, but had totally disappeared in the summer of 1830.

Bupleùrum rotundifòlium. Near Broomfield.

Sambùcus E'bulus. Near Danbury.

Statice Limònium. } In Walton marshes.
Statice Armèria. }

Drósera rotundifòlia. On Danbury, Little Baddow, and Galleywood Commons.

Myosùrus mínimus. In many of the corn fields near Chelmsford.

Narcíssus Pseùdo-*Narcíssus.* In a wood near Broomfield.

Convallària majàlis. Very abundant on Little Baddow Common; bespangling the barren waste with its snow-white blossoms, and "wasting its sweetness on the desert air."

A'corus Cálamus. This plant is frequent on the banks of the Chelmer.

Frankènia læ`vis. } At Walton.
Triglòchin marítimum. }

Chlòra perfoliàta. Near Broomfield.

Dáphne Laurèola. In woods and hedges near Chelmsford.

Polygonum Bistórta. By the side of the Chelmer, about two miles above Chelmsford.

Pàris quadrifòlia. In a wood near Broomfield, and in the Thrift Wood, near Chelmsford. In this latter station it thickly covers the sloping sides of a pond, which is filled with Hottòn*ia* palústris, and grows to a very unusual size: many of the specimens have five leaves.

---

* The habitat of this plant and that of *T*rifòlium marítimum have, I believe, been previously discovered; but I think the plants had not been seen in them of late years.

Bùtomus umbellàtus. In the Chelmer.
Diánthus Armèria. At Danbury, Sandon, and in the Thrift Wood.
Silène noctiflòra. In corn fields near Broomfield.
Sèdum Telèphium. Near Chelmsford.
Euphórbia platyphýlla. In corn fields near Broomfield, and at Great Leighs.
Rùbus Idæus. In woods near Chelmsford.
Fragària elàtior. In woods near Great Leighs, and at High Easter; undoubtedly wild.
Papàver hýbridum. In a field near Walton.
Aquilègia vulgàris. At Danbury, &c.
Ranúnculus parviflòrus. Very common about Chelmsford.
Scutellària minor. On Danbury and Galleywood Commons.
Linària spùria. } In cornfields near Broom-
Linària Élatine. } field.
Linària minor. }
Orobánche elàtior. On Danbury Common, in great luxuriance.
Senebièra didyma. Near Danbury. This plant has not, I apprehend, been often met with in the eastern counties.
Cakile maritima. On the sandy shore at Walton. It was blooming, in spite of the wintry blasts to which it was exposed, in the twelfth month (December), 1830; and its colours were then much more brilliant than is usually the case in summer.
Cardámine amàra. By the side of the river above Chelmsford.
Fumària claviculàta. In many places near Chelmsford.
Fumària capreolàta. At Great Holland.
Genísta tinctòria. } Near Chelmsford.
Genísta ánglica. }
Láthyrus Aphaca. } At Springfield, near
Láthyrus Nissòlia. } Chelmsford.
Trifòlium subterràneum. On Galleywood Common, and at Danbury.
Trifòlium ochroleùcum. } Near Chelmsford.
Trifòlium mèdium. }
Trifòlium marítimum. Near Walton. (See the note to *Peucédanum officinàle.*)
Trifòlium fragíferum. Near Walton.
Arctium Bardàna. Near Great Leighs.
Cárduus tenuiflòrus. } Near Walton.
Artemisia marítima. }
Gnaphàlium réctum. In the Thrift Wood, and on Little Baddow Common.
Aster Tripòlium. In Walton Marshes. There are two very distinct varieties of this plant: the one of humble growth, much branched, and having the beautiful blue rays very perfect; the other wanting the rays altogether, attaining the height of 4 ft. or more, and being unbranched, except at the top of the massy succulent stem, where the flowers form a corymbus. Both varieties occur nearly on the same spot.
Inula Pulicària. Near Thorp, and near Galleywood Common.
Inula crithmoïdes. About Walton.
Centaurèa Calcitrapa. At Tilbury Fort.
Orchis latifòlia. Near Springfield.
Gymnadènia conópsea. Near Great Leighs.
Gymnadènia bifòlia. Near Broomfield.
Ophrys apífera. Near Great Leighs, and sparingly near Broomfield.
Ophrys muscífera. At High Easter.
Neóttia spiràlis. On Danbury Common.
Epipáctis palústris. On Galleywood Common.
Epipáctis latifòlia. At Great Leighs.
Týpha angustifòlia. At Sandon and Danbury.
Sparganium nàtans. Near Lyonshall, Great Leighs. This is, I believe, the first time the plant has been found in Essex: this, as well as all the other Great Leighs stations, was discovered by my companion, Robert Harrison.
Carex pulicàris. In a bog on Little Baddow Common.
Carex arenària. On the sandy shore at Walton.
Myriophýllum spicàtum. At Danbury.
Myriophýllum verticillàtum. At Broomfield, &c.
Atriplex laciniàta. On the sand at Walton.
Equisètum sylváticum. On Galleywood Common.
Ophioglóssum vulgàtum. At Great Baddow and at Broomfield.
Asplènium Trichómanes. On a very dry bank between Chelmsford and Galleywood Common.
Blechnum boreàle. On Little Baddow Common.
Lycopòdium clavàtum. Once found by my friend, R. Harrison, on Danbury Common, but could not be detected there afterwards.
Aspídium spinulòsum. } At Danbury and on
Aspídium dilatàtum. } Little Baddow Common.
Aspídium Thelýpteris. On Little Baddow Common. I believe this to be the only Essex station.
Osmúnda regàlis. On Little Baddow Common, covering some acres, and growing to the height of 6 ft. Its wiry roots form mounds of considerable magnitude, the spaces between them being channels of water or of black wet peat.

I am no geologist; yet it may not be amiss to state, as far as I am able, the nature of the soil in the various places mentioned above. The immediate neighbourhood of Chelmsford is principally red gravel; at Broomfield there is clay, in many places containing calcareous matter; and at Great Leighs it still more nearly approaches chalk, as may be supposed from the plants found there. Little Baddow Common is a waste of some hundreds of acres, about six miles to the eastward of Chelmsford: it is a hungry loose gravel, and is covered with *Ulex europæa*, *Pteris aquilina*, *Calluna vulgaris*, *Convallaria majalis*, &c. In one or two places is found peat; and it is these spots that produce most of the Little Baddow plants mentioned in the catalogue. The soil in the adjoining parish of Danbury appears to be very similar. Galleywood Common is gravel; and the Thrift, a wood of three miles in length by about half a mile in width, is generally stiff clay. At Walton, the soil is a dark clay; the cliffs, which vary from 30 ft. to 100 ft. in height, are perpetually undermined by the sea, and tumble down in huge masses, frequently exposing to view beautiful specimens of talc, and, in one spot, a great number of shells. There is a stratum of them near the top of the cliff, a large proportion being broken and reduced to a sort of red sand, among which perfect specimens are often to be met with:

they are of the colour of rusty iron, and are, I think, mostly of the genus *Búccinum* or *Mùrex*. There is also a flat bivalve shell, very abundant, probably a Máctra; and some which I suppose to belong to the genus Hèlix. One shell is precisely like the common whelk, except that it is spirally twisted in the opposite direction; a peculiarity which I observed in no other species.

To the north-east of Walton are extensive marshes, overflowed at spring-tides; these are the resort of a considerable variety of water-birds, particularly the Grállæ. An inlet of some width intersects these marshes; and on sailing down it, you hear the loud and mournful piping of the curlew and whimbrel, the shrill scream of the redshank and pewit, and the hoarse cries of the heron and sea-gull. On the shore are to be met with the sanderling, the dunlin, the ring-dottrel, the turnstone, the green and purple sandpipers, the oyster-catcher, and five or six species of gulls. It is altogether a place which affords a rich field for the naturalist, whatever department of natural science may be his particular pursuit.

My researches in Essex have afforded me many hours of delightful recreation; and were the means of awakening that ardent love of rural enjoyments, and that deep interest in the beauties of nature, which will, I hope, never forsake me: and they have proved to me, that no district is so unproductive as not to be worth investigating; for we generally find that where particular spots seem to produce an unusual proportion of rarities, it is only because a greater share of labour has been bestowed upon them. — *J. G. Third Month* (*March*) 3*d.* 1831.

Lancashire.

Some Account of the Banksian Society at Manchester. — Sir, The Banksian Society was established in January, 1829, for the purpose of supplying its members with mutual instruction in botany, entomology, mineralogy, and geology; and this by conversations, by the reading of papers, and by lectures. As the Society is composed in a great degree of tyroes in these branches of natural history, we at present are not able to furnish any information fit to be published. Owing to the want of a convenient room for our meetings, we have not made that progress which we might have made had we had a better situation. I hope, however, we shall soon have a good room for our meetings; and in the mean time we are improving each other by meeting together, by the exhibiting of specimens and conversing upon them, and by occasional lectures. It is the intention of the members, individually, to furnish an account to the Society, as far as it is practicable, of the geological and mineral productions of about thirty miles round Manchester; also of the plants and insects that are to be met with in the same extent. Our library is increasing very fast; it consists of upwards of sixty volumes, in active circulation amongst the members. The magazines are passed from one member to another, according to the situation of the town in which they reside, with the allowance of three days for the reading of them. We have collected a great number of plants, which are arranged according to the Linnean system, and are in a good state of preservation. We have very few insects at present, on account of our cabinet not being complete to receive them. We have several drawers of minerals and fossils, many of which are very beautiful specimens. I am, Sir, yours, &c. — *Wm. Garry.* 223. *Deansgate, Manchester, May,* 1831.

Northumberland.

Birds shot in the Winter of 1829–30, *at Greenhow, North Shields:* —

Anas Bóschas, Wild Duck.
Anas fúsca [*Oidèmia fúsca Fleming*], Velvet Duck.
Anas Cygnus [*Cygnus fèrus Ray*], Swan.
Anas erythropus [*Anser Bérnicla* Willughby] Bernacle Goose.
Pódiceps minor, Little Grebe.
Pódiceps cristàtus, Crested Grebe.

Marèca fistulàris, Widgeon.
Querquédula *C*récca, Teal.
*M*érgus serràtor, Red-breasted Merganser.
Fratércula árctica, Puffin.
*C*ólymbus árcticus, Black-throated Diver.
*L*àrus marìnus, Black-backed Gull.
*L*àrus cànus, Common Gull.
Gallínula chlóropus, Water Hen.
*P*halacrócorax *C*árbo [*C*árbo Cormorànus *Meyer*], Cormorant.
*P*halacrócorax *G*ráculus, Shag.
A'rdea màjor [*A*'rdea cinèrea *Latham*], Heron.
*F*álco *N*ìsus [*Accípiter fringillàrius Ray*], Sparrowhawk.
*F*álco *T*innúnculus, Kestrel.
*F*álco *Æ*'salon, Merlin.
Strix flámmea [Alùco flámmeus *Fleming*], Barn Owl.
Strix O'tus [*O*'tus aurìta *Ray*], Great Horned Owl.
Strix brachyòtus [*O*'tus brachyòtus *Fleming*], Lesser Horned Owl.
*F*ringílla Montifringílla, Brambling.
*St*úrnus vulgàris, Starling.
*T*úrdus pilàris, Fieldfare.

Some of these, I believe, are rare. I am, Sir, yours, &c. — *E. Headlam. Greenhow, North Shields, May* 13. 1831.

We have given in brackets the names adopted by Mr. Rennie in his *Ornithological Dictionary*, where different from those applied by our correspondent. *A*'nser erythropus (*A*'nas erythropus *Lin.*) Mr. Rennie applies to the Laughing Goose, which has orange-coloured (legs and) feet; as erythropus expresses. The Bernacle Goose (*A*'nser *Bérnicla* of Willughby), Mr. Rennie states, has its legs dusky black. The Puffin (called above Fratércula árctica) Mr. Rennie denominates *Puffìnus* Anglòrum *Ray;* and applies the terms Fratércula árctica to the Coulterneb: as, however, Pennant, in his *British Zoology*, 2. No. 232., has published the Coulterneb by the name of Puffin, we have not ventured to vary our correspondent's application. — *J. D.*

Suffolk.

Birds in the Neighbourhood of Great Finborough Hall. — Sir, To promote my acquaintance with the productions of nature, I have preserved some birds and some insects, and am now forming a Hórtus Síccus. I send the names of my birds, which will show what species prevail in, or frequent, this neighbourhood, as all, except those starred, were shot in the village close by. I am, Sir, yours, &c. — *J. Nicholls, Gardener. Great Finborough Hall, Suffolk, May* 26. 1831.

Accéntor modulàris, Hedge Sparrow.
*A*lcèdo I'spida, Kingfisher.
*C*arduèlis commùnis, Goldfinch.
*C*érthia familiàris, Tree-creeper.
Clángula vulgàris, Golden-eye.
*C*olúmba *P*alúmbus, Woodpigeon.
*C*úculus canòrus, Cuckoo.
Emberìza Citrinélla, Yellowhammer.
**F*ringílla canària, Canary-bird.
*F*ringílla *C*hlòris, Greenfinch.
*F*ringílla Montifringílla, Mountain Finch.
*F*ringílla *Sp*ìza *Rennie*, Chaffinch.
Gallínula chlóropus, Moorhen.
Gárrulus glandulàrius, Jay.
*Hi*rúndo rústica, Swallow.
*Hi*rúndo úrbica, Marten.
Lànius excùbitor, Butcherbird.
**L*àri species, a species of Gull.
Lóxia curviróstra, Crossbill.
**M*érgus Mergánser, Dun Diver.
Muscícapa luctuòsa, Flycatcher.
**Nyrèca* ferìna, Dun Bird.
**Œ*dicnèmus crépitans, Stone Curlew.
Pàrus caudàtus, Long-tailed Titmouse, called here Puddingpoke (poke being the Suffolk word for bag).
Pàrus màjor, Large Titmouse.
*P*érdix cinèrea, Common Partridge.
*P*érdix rùfa, Guernsey Partridge.
*P*ícus màjor, Large Woodpecker.
*P*ícus minor, Small Woodpecker.
*P*ícus viridis, Green Woodpecker.
**P*ódiceps minor, Dabchick, or Little Grebe.
*P*yrrhùla vulgàris, Bullfinch, male and female, in abundance.
*R*égulus cristàtus, Golden-crested Wren, with its nest.
Saxícola Rubícola, Stonechat.
*Sc*ólopax rustícola, Woodcock.
*Sí*tta europæ'a, Nuthatch.
Strix Alùco, Grey Owl.
*St*úrnus vulgàris, Starling.
*Sy*lvia Atricapilla, Blackcap.
*Sy*lvia *L*uscínia, Nightingale.
*Sy*lvia *Ph*œnicùrus, Redstart.
*T*ótanus hypoleùcus, Sandpiper.
*T*úrdus pilàris, Fieldfare.
*T*úrdus viscivorus, Missel Thrush.
*Y*únx Torquílla, Wryneck.
Oven-bird.

The systematic names are those adopted by Mr. Rennie in his *Ornithological Dictionary*, where "Oven-bird" is not obvious. — *J. D.*

The first appearance of Yúnx Torquílla here, in 1831, was on April 13. In the various parts of England it is known by the various names of, Cuckoo's maid, mate, leader, and slab; wryneck, snakebird; in Hertfordshire, barley-bird; and around Stow-market, Suffolk, "the turkey-bird." — *Henry Turner. Bury St. Edmund's.*

In Professor Rennie's *Ornithological Dictionary*, all these names do not occur, but the omissions are possibly wilful. This remark, among nume-

rous interesting ones, occurs there:—"The wryneck is seldom observed to climb trees, although the feet seem calculated [constructed] for that purpose." I once saw it climb the perpendicular face of an old tall wall in the botanic garden at Bury St. Edmund's; it was seeking either insects or grit, and proceeded as if in neither haste nor fear, but uttered its hawk-like note at intervals. I observed it through a telescope, and at no great distance, and then first saw the elegant markings of its plumage: this was seven or eight years ago.—*J. D.*

The Kingfisher not rare about Bury St. Edmund's.—At the bottom of the botanic garden, where runs the river Lark, specimens may very often be seen; and also in the low meadows south of the town. On Easter Sunday last, some boys watched an old one into a hole in the bank, and attempted to capture it on its exit; but without success in this case. They then with a crooked stick pulled out a portion of a nest, consisting of a few feathers, old dried roots, and hay. I subsequently examined the hole. It was in a low meadow 300 yards east of Northgate Street, and on the bank of a small stream. The entrance to the hole was about 3 ft. from the water, and 1 ft. beneath the level of the meadow. Hole 9 in. in diameter, and about 5 ft. in length; straight, and somewhat larger at the end than at the entrance. Since this, I have been told of another nest's being found from watching the old bird into her breeding-place, where, in this case, she and her eggs were captured. I have seen many specimens, but only one to alight. I saw one alight about three years since, which it did on a weeping willow that overhangs the Linnet, a branch stream of the Lark above, and where it sat about a minute, attentively watching the fishes in the water, and then plunged in and seized what I believed to be a stickleback, and with this in its beak flew swiftly away.—*Henry Turner. Botanic Garden, Bury St. Edmund's, May* 15. 1831.

I have frequently observed this bird fly up and down the stream of the Lark, and once to be perched on a bar that was placed across the stream. One of its white egg-shells, obtained from a boy who had plundered a nest, was once given me. The size of the hole described by my friend Mr. Turner was seems past the powers of such a bird to excavate: hence Montagu's opinion that it adopts a rat's hole is probably correct; of course a water rat's, and one that has been deserted.—*J. D.*

Anemòne ranunculòides.—I had, this morning, April 3., the pleasure of finding this plant wild in the vicinity of Hawstead, on the banks of a rivulet, about half a mile to the south of Pinfer End Farm. I believe it is of very rare occurrence in this neighbourhood, having never seen it wild before. There were five or six full-blown specimens.—*Henry Turner. Botanic Garden, Bury St. Edmund's,* 1831.

Worcestershire.

Rarer Plants of Worcestershire.'—The following list, which I hope will not be unacceptable to Worcestershire botanists, contains only plants which were observed and gathered by myself in 1812, 1813, 1816, 1827, and 1829. Yours, &c.—*W. G. Perry. Warwick, March* 12. 1830.

Scirpus sylváticus. Near the Lodge-pool, Kidderminster, and in Wire Forest.
Eriòphorum polystàchyon. In a bog in Wire Forest, and in a boggy field by Finny Rough, near Stone.
Eriòphorum angustifòlium. In a swamp on the north side of Falling Sands Common, Kidderminster, and in Burnt Wood, near Bewdley.
Nárdus stricta. On Sutton Common, near Kidderminster.
Mélica unifìbra. Blackstone Rock, near Bewdley.
Móntia fontàna. In a swampy place on Abberley Hill, above the Hundred House.
Dipsacus pilòsus. Blackstone Rock, near Bewdley.
Gálium saxátile. On all the heaths in the vicinity of Kidderminster.
Myosòtis cæspitòsa, with white flowers. In Burnt Wood, near Bewdley.
Sýmphytum officinàle, with purple flowers. On the banks of the canal, &c., Kidderminster.
Menyánthes trifoliàta. In a boggy field by Finny Rough, near Stone.
Lysimàchia némorum. In a wood by Picket Rock, near Kidderminster.
Anagállis tenélla. In a boggy field b Finny Rough, near Stone.

Campánula pátula. In Dolphin Lane and in hedges, Chaddesley Corbet.
Campánula Trachèlium. Blackstone Rock, near Bewdley; banks of the Severn, near Stourport; and on a steep bank, about four miles on the Hereford road from Stourport.
Verbáscum virgàtum. Near Worcester, on the road to Ombersley, 1813.
Verbáscum Blattària. Lanes about Foxholes, near Kidderminster.
Sium rèpens. In a swampy place, on Abberley hill, above the Hundred House.
Sambùcus nìgra, with laciniated leaves. Chester Lane, near Land-oak Turnpike, Kidderminster.
Linum usitatíssimum. In fields near Hartlebury.
Drósera rotundifòlia. In a swamp on the north side of Falling Lands Common; and at Devil's Spitalfields, near Kidderminster.
Júncus squarròsus. Devil's Spitalfields, near Kidderminster.
Rùmex marítimus. On the banks of the Lodge-pools, Kidderminster, 1816.
Triglòchin palústre. Finny Rough, near Stone.
Alísma ranunculòides. Oldfield, near Ombersley.
Epilòbium róseum. In a garden before a house in Church Street, Kidderminster, 1816; and in Mr. John Lea's drying-ground, Mill Street, Kidderminster, 1829.
Epilòbium palústre. On Falling Lands Common, Kidderminster.
Diánthus deltòides. Blackstone Rock, near Bewdley.
Cotylèdon Umbillcus. On Picket Rock, and about Foxholes, near Kidderminster, plentifully.
Sèdum dasyphýllum. On a wall by the side of the Kidderminster road, Bewdley.
Pýrus doméstica. In Wire Forest, June 25. 1827. This solitary tree was observed by Mr. Pitts in the time of Ray, and is supposed to be more than 250 years old. In the neighbourhood of the forest it is well known by the name of "the witty pear." It appears to be rapidly decaying, as it bears leaves on the upper branches only, and shows no signs of fruit.
Rósa grácilis? In Wire Forest, near *Pýrus doméstica.*
Potentílla argéntea. On the top of the rock at Foxholes, and on a rock by the roadside at Wolverley, near Kidderminster; and on rocks by the roadside between Kidderminster and Bewdley.
Cómarum palústre. Oldfield, near Ombersley.
Aquilègia vulgàris. On the banks of Dowlass Brook, in Wire Forest.
Ranunculus hederàceus. In a swampy place, on Abberley Hill, above the Hundred House.
épeta Catària. Roadside between Kidderminster and Bewdley.
Verbèna officinàlis. In a lane near Hartlebury; on the stone cross at Stone; and between Dunley Hall and Abberley.
Marrùbium vulgàre. Opposite to Crane's of Abberley, on the side of the road leading to Picket Rock, from Kidderminster.
Thymus Calamíntha. Hampton Magna, near Evesham.
Scutellària mìnor. In Rock Wood, near Bewdley.
Melampýrum praténse, with orange flowers. In Wire Forest; in Rock Wood and Burnt Wood, near Bewdley; and at Blackstone, near Bewdley.
Pedicularis palústris. Oldfield, near Ombersley; in Wire Forest; and in Burnt Wood, near Bewdley.
Pedicularis sylvática. In a swamp on the north side of Falling Sands Common, Kidderminster; Oldfield, near Ombersley; and in high pastures at Trimpley Green, near Kidderminster.
Linària spùria. In a hilly field at Hampton Magna, near Evesham.
Antirrhìnum màjus. Walls near the cathedral, Worcester.
Teucdàlia nudicaúlis. On Falling Sands Common, pl.
Thláspi arvénse. In gardens near Broad Street, Kidderminster; and in fields near Hartlebury.
Nastúrtium terréstre. On the banks of the Lodge-pools, Kidderminster.
Turrìtis glàbra. Chester Lane, and in a lane near Crane's of Abberley, Kidderminster; and on the roadside between Kidderminster and Chaddesley Corbet.
Eròdium marítimum. On the heath at Picket Rock, near Kidderminster.
Geránium lùcidum. Blackstone Rock, near Bewdley.
Geránium columbìnum. Roadside towards Broadwaters, Kidderminster.
Málva moschàta. In a wood on the summit of Abberley Hill, west of Abberley church; and in hedges about Bewdley.
Fumària lùtea. On a limestone wall near the church at Abberley.
Fumària claviculàta. At Picket Rock, near Kidderminster.
Polýgala vulgàris, with white flowers. At Picket Rock, near Kidderminster.
Vícia sylvática. In Wassel wood, near Bewdley.
Vícia angustifòlia. In a swamp on the north side of Falling Sands Common, Kidderminster; and in a field between Kidderminster and Picket Rock.
Ornithopus perpusíllus. Blackstone Rock, near Bewdley; on Sutton Common, near Kidderminster; and in fields between Kidderminster and Picket Rock.
Hedýsarum Onobrýchis. Near a wood on Abberley hill, west of Abberley church.
Trifòlium striàtum. At Picket Rock, near Kidderminster; and on the side of the Kidderminster road, near Bewdley.
Hypéricum Androsæ'mum. In a wood by Picket Rock, near Kidderminster.
Hypéricum montànum. Blackstone Rock, near Bewdley; near a wood on Abberley Hill, west of Abberley church; and at Picket Rock, near Kidderminster.
Prenánthes muràlis. Blackstone Rock, and Rock Wood, near Bewdley; in a wood by Picket Rock, and Summer Hill, near Kidderminster; and Rock Hill, one mile and a half from Bromsgrove, on the road to Alcester.
Hieràcium murórum. In a wood by Picket Rock, near Kidderminster; and in the rocky wood, Finny Rough, near Stone.
Hieràcium sylváticum. Summer Hill, near Kidderminster; in a lane leading from Foxholes towards Kidderminster; and in Rock Wood, Burnt Wood, and Wassel Wood, near Bewdley.
Cárduus acanthòides. In fields between Kidderminster and Picket Rock.
Cnícus palústris, with white flowers. At Picket Rock, near Kidderminster.
Onopórdum Acánthium. Summer Hill, near Kidderminster.
Conýza squarròsa. In a lane near Hartlebury; and about Chaddesley Corbet.
Solidàgo Virgaúrea. In Burnt Wood, near Bewdley.
Orchis conópsea. In a bog in Wire Forest.
Carex rembta. In the rocky wood, Finny Rough, near Stone.
Carex. Pseudo-Cyperus. In the Lodge-pools, Kidderminster.
Juníperus communis. In Wire Forest.
Aspídium spinulòsum. In a cave on the right hand side of the road from Kidderminster to Bewdley.
Aspídium dilatàtum. Blackstone Rock, near Bewdley.

Aspídium *F*ílix-fœ'mina, with a scaly stalk. In the rocky wood, Finny Rough, near Stone.
Asplènium Trichómanes. At Blackstone Rock, near Bewdley.
Asplènium Rùta-murària. On the church at Stone.
Blèchnum boreàle. At Foxholes, and on the Stourport Road, near the Larches, Kidderminster; Rock Wood, Burnt Wood, and Blackstone Rock, near Bewdley; in the rocky wood, Finny Rough, near Stone; and in a dingle between Dunley Hall and Abberley.

Art. II. *Natural History in Ireland.*

Birds at and near Londonderry. (*Continued from* p. 270.) — The fieldfare arrives in October, departs in the first week of May, and sometimes in the second: the country people call it the felt. The fallowchat, or wheatear (provincially stone-checker), arrives about the 21st of March, departs in September. Whinchat arrives about the 1st of May, departs earlier in September than the fallowchat. Stonechat, resident. The reed-bunting, common, resident. Chaffinch in considerable numbers. I think none of these birds migrate from or to this district, nor do the males separate in flocks from the females. There are no bullfinches in this district. Grey linnet makes its nest in low bushes. Lesser linnet: I had the nest of this little bird in high pear trees in my garden. Golden-crowned wren: this charming British humming-bird is common here from the middle of September till about the same time in April; but I have never seen more than one (and that but once) in summer: it arrives in September, from places more northerly, I should think. The great titmouse, the cole-mouse, and the blue titmouse, all resident; a lively handsome family. The skylark (laverock): this "herald of the morn" is very numerous, building its nest frequently in the mosses, or turf bogs, which abound in this district. [Pied] wagtail, grey wagtail, yellow wagtail: I have never seen the latter at any time except April. House swallow, marten, sand-marten, and swift: all these arrive and depart as usual in the British Isles. Bunting, yellow-hammer (yellow yorlan): I saw a bunting last January, with the whole head and part of its neck yellow, like the yellowhammer. Green grosbeak or linnet, goldfinch, hedge sparrow, redbreast, and wren: all pleasing songsters. Ringdove. Red-grouse is found in floes (mosses [morasses] uncut and undrained, covered with heath, bog myrtle [*Myrìca Gàle*], and different kinds of mosses,) remote from hills or mountains: it is also found in the mountains in abundance. Partridge, quail: not numerous, from May till October. Heron. Bittern: not common. Common curlew: a few breed in the mosses. Woodcock: from the beginning of October till April. Common snipe serenades us with the "heather bleat" all spring and summer, almost as numerous as in winter. Jack-snipe: a winter visitant. Common sandpiper: numerous in summer, along shallow streams. Green or golden plover: in large flocks during winter; breeds, I believe, in large floes and mountains. Redshank: a summer visitant. Common wild duck resident. Teal: resident, on small lakes. Widgeon: a winter visitant. Pochard widgeon, wild-goose widgeon, wild-swan widgeon, water ousel, corncrake, water hen or common gallinule: all resident, except the corncrake, which arrives in the latter end of April, and departs in September. Raven, crow, rook, magpie, jackdaw. Golden eagle, in the mountains. Kestrel, or windhover, very common. Hen harrier, common. Kite, not common. Sparrow hawk, common. Long-horned owl, seen chiefly in harvest.

List of some of the Quadrupeds of this district, in the county Londonderry, viz. twenty miles south of the Giant's Causeway. — Common fox, in the mountains chiefly. Badger (brock), in the mountains. Otter. Marten. Hedgehog. Hare. Rabbit. Weasel. Black rat, not common. Brown rat, very common. Common mouse. Field mouse. Shrew mouse. The sheep of this district have scarcely any disease: we have no trouble in examining them whether they are fly-struck. I never heard of their suffering from it. We shear them the 1st of May, and I have seen wethers

shorn in March. The river Bann abounds in salmon, trout, and eels: the latter come down from Lough Neagh in immense multitudes, choosing the darkest and most tempestuous nights: rolling themselves up in balls, they break through weirs and other obstacles, if not broken by the poles of the fishermen. I will add, in conclusion, that the remarks (Vol. III. p. 538.) upon the winter of 1829–30, &c., by the Rev. Leonard Jenyns, at Swaffham Bulbeck, in Cambridgeshire, would almost describe the weather here. The chief difference was, that it was some days after the severe weather came on there before it arrived here. There was remarkably warm and beautiful weather the last week of March, 1830; and during the first week of April, 1830, there was no snow or sleet here, but keen north and north-east wind. The weather here, however, as there, soon became seasonable again. The late summer and harvest of 1830 were excessively wet and stormy here. October was very fine; nothing remarkable in November, till the morning of the 20th, when there came on a most tremendous hurricane from the south. The snow was eight or nine inches deep from the 22d of December to the end of the same. Sir, yours, &c.—*H. N. June*, 1831.

Art. III. *Monthly Calendar of Nature for Scotland.*

Extracts from the Meteorological Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the Level of the Sea 172 Ft., and 15 Miles from the Coast; being the Mean of daily Observations at 10 o'Clock Morning and 10 o'Clock Evening.

Results for June.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
June 1. to 10.	58·5°	48°	45·4°	29·65	·45	·61
10. to 20.	58·6	54·1	51·4	29·46	·90	·42
20. to 30.	59·1	52·5	47·1	29·56	·35	·85
Monthly mean	58·7°	51·5°	47·9°	29·55	1·70	1·88

The temperature for June, this season, is 1·5° above the ordinary average for that month; the depth of rain is 0·3 in. above the ordinary fall in June, but 1 in. less than fell in the corresponding month last year.

Results for July.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
July 1. to 10.	62·5°	56·5°	46·4°	29·70	·12	1·15
10. to 20.	61·4	54·6	50	29·54	·33	·90
20. to 30.	62·0	55·8	51·2	29·60	·30	1·30
Monthly mean	61·9°	55·6°	49·2°	29·60	·75	3·35

The temperature for July is 1·3° higher than on an ordinary average, but the fall of rain has been 2 in. less than the average fall in July. The air

has been for the most part moderately moist, and nightly dews have been copious. The warmest day in June was on the 13th: mean temperature of that day, 64·5°; wind west: extreme heat throughout the month, 78°. The coldest day of June was on the 10th: mean temperature of that day, 53°; wind east: extreme cold in course of the month, 42°. The highest temperature in June last year was 65°; extreme cold throughout the month, 38°, or 4° lower than this season. The wind blew from easterly points on 11 days; from westerly points on 18 days; 1 day it was variable. The atmosphere was clear on 18 days; on 12 days it was cloudy.

The warmest day in July was on the 29th: mean temperature of that day, 67°; wind west: extreme heat in course of the month, 79°. The coldest day in July was on the 20th; mean temperature of that day, 55°: extreme cold during the month, 42°. On 11 days the wind blew from the east; and on 20 days from westerly points. There were no loud gales of wind on this or the preceding month; and only twice thunder was heard at a distance. There were 19 days of brilliant, and 5 days of partial, sunshine; 7 were cloudy.

About the beginning of June, vegetation was as forward as is usual on an average of seasons. The laburnum showed its flowers on the 4th, 4 days earlier than last season; and the mulberry was in leaf on the 5th, also 4 days earlier. Light showers, with a moderately high temperature, were frequent till the 21st, and promoted a vigorous vegetation. The *A*ster alpìnus came in flower on the 8th. Wheat from Morocco, a promising variety, and very similar to the China wheat received from Mr. Loudon last year, came in the ear on the 10th, a period of 92 days from brairding: mean temperature of that period, 49·2°. Field wheat came in the ear on the 18th, 4 days earlier than on an average of seasons. In my last I expressed a hope "that the unusually high temperature and clear sunshine throughout the day might bring many of the wheat maggot into the fly state before the wheat was in the ear; and that the very dry state of the soil, which we found was inimical to their existence, might diminish their numbers." (p. 380.) This hope has, fortunately for the farmer, been fully realised. As early as the 6th of June, we observed myriads of the flies amongst wheat which lay contiguous to wheat fields of last year; and where the plants stood close, or where chickweed or *Verónicæ* afforded them shelter amongst the roots of thinly planted wheat. The brilliant sunshine then prevailing was to them very oppressive, and they were much exhausted in strength and diminished in numbers before the wheat came in the ear. Some few very early fields of wheat that came in the ear about the 12th suffered partially; but by the 18th, when the general crop came in the ear, the fly was in its last stage of exhaustion, and the loss this year does not exceed the proportion claimed by an English clergyman; in some of the preceding years nearly the half was destroyed. There are, however, still sufficient numbers perpetuated to excite serious alarms as to the safety of future crops. Strawberries were ripe by the 17th, at least a week earlier than on an average of seasons. Spring-sown wheat of the common variety, which appeared above ground on the 5th of April, and had been sown on the 9th of March, came in the ear on the 29th of June, only 11 days later than autumn-sown wheat of the same variety. The dry state of the soil, high temperature, and brilliant sunshine in July, forced the growing crops into early maturity. The privet flowered on the 6th; the white lily (*L*ílium cándidum) on the 11th; *C*entaurèa aúrea on the 14th; *A*lthæ'a officinàlis on the 17th. Peas with black pods (a promising field variety from Van Diemen's Land, seeds from Mr. Lawson, Edinburgh), sown on the 23d of March, were fully ripe on the 23d of July. The *C*ólchicum autumnàle showed its flowers on the 28th; Morocco wheat (seeds from Mr. Neill), which came in the ear on the 10th of June, ripe on the 31st of July, 51 days from the time of earing: mean temperature of that

period 60·6°. The crops are about 16 days earlier than on an average of seasons; but, on light dry lands, barley, oats, and beans are short in straw. Wheat seems to require little moisture to bring it to full maturity. The sample this year, as in the memorable dry year of 1826, is uncommonly fine; and the return is most abundant in proportion to the plants, which, however, were for the most part thin. — *A. G. Aug.* 2. 1831.

Art. IV. *Retrospective Criticism.*

On the recent Controversy in this Magazine. — Sir, I must and will repeat my extremest disgust, and that of about eleven subscribers here, at your sullying these pages with private squabbles. Are not the ephemeral newspapers a fitter arena? Mr. Murray, an able and persevering philosopher, you suffered to be drummed out: and, by printing *part* of my letter, complimentary to him (but never intended for print), you caused a misunderstanding and coolness in that gentlemen towards me. This was like "the Devil quoting Scripture." Your very last Number is disgraced with *two-and-twenty* pages of *blarney* between Mr. Swainson and Mr. Vigors, two gentlemen who might delight and instruct us with their really able and elegant talents, and not waste their moonshine on rubbish. Who is to pay for such trashy trumpery? Or, when given, who is to bind, or even shelve, such chaffy sheaves? But 'tis *you* I blame, Mr. Loudon, for allowing it. Is not this like the foolish Egyptian quail-fights in a hoop? Or is it not, as it were, a brace of brawling orange-wenches, from Covent Garden Square, rushing on the stage, between two scenes of Nature's Great Poet; and disgusting the delighted audience with their snarling tongues and talons? Fie on it: my gorge rises at it. At first it struck me to think no more of the Magazine; till finding some that I had laboured to lug into taking it, had really discontinued, and others talked of doing so; I determined to send you this free but friendly admonition; though I think it impertinent to what ought to be the contents of your book. Let it act as a radical reform. If you have such quantities of matter as you say, why not print it? and not keep papers of correspondents soaking in pickle months after months, till their temporal interest is entirely evaporated; to make room for the scum, froth, and sputtering of effervescent irritability. Encourage such correspondents as the amiable and intellectual parson Bree, who is too kind and courteous wantonly to attack others; and whose always-pleasing productions, like those of his congener, White of Selborne, are too sweet and sound to admit attack from others. I was happy to hear so well of him by my new friend, the Rev. Andrew Bloxam; a thriving, learned, and travelled young naturalist, who visited me this summer on a botanic excursion. Should you print this, 'tis likely you may suffer some other to "lay on," Mac-Loudon; for which I shall care just about three skips of a louse; and treat with the same respect as Deaf-and-Dumby did the donkey. Yours, as you *conduct* yourself, — *John F. M. Dovaston. Westfellon, near Shrewsbury, July* 20. 1831.

Recent Controversy in this Magazine. — Sir, It is not without regret that, as one of your subscribers and constant readers, I feel myself called upon to enter my protest against the war of words which has been carried on for some time past, through the medium of your Magazine, between parties standing high in the scientific world. With the cause and nature of this dispute I have no concern; but surely, Sir, these gentlemen might find some other means of settling their differences, without having recourse to your Magazine, and converting it into an arena upon which to throw down the gauntlet of defiance to each other. On turning over the last Number,

I find no less than twenty pages devoted to this species of warfare; the disputes, Sir, of parties as to which first named a bird or discovered a quadruped. I humbly suggest that such articles as these can afford little instruction or amusement to your readers, and tend rather to subvert than advance the interests of science, and to create a distaste for studies which it has always been your aim to render more popular. I shall not encroach farther on your time and attention, for sure I am that the strict impartiality with which you have hitherto acted cannot fail to suggest the expediency of putting an end to a discussion totally devoid of interest to the majority of your readers, and reflecting but little credit upon the parties engaged in it. I am, Sir, yours, &c. — *An Observer. July* 12. 1831.

Note from Mr. Swainson. — Dear Sir, I have waited until now, expecting daily to receive from my friend, M. Lesson, a reply to the attacks made upon him by the Vigorsian school, and which he had expressed a wish should appear in your Magazine. This reply, however, has not reached me. M. Lesson is absent from Paris, and the delay, I have reason to apprehend, originates in domestic affliction. Be this, however, as it may, I am quite content to remain bespattered with the mud of personal abuse until your next Number. Those to whom I am personally known are well able to discriminate truth from falsehood: but, as this scurrility is intended to prejudice those who *do not know me*, its author may rest assured of such a reply as will work his sore discomfiture. I am, dear Sir, your faithful obedient servant, — *William Swainson. August* 11. 1831.

Management of the Magazine. — Sir, I feel confident that you will agree with me in the broad general principle, that "every promise or engagement ought to be fulfilled." I have been led to make this commonplace remark, the justness of which no one will be disposed to dispute, by observing several subjects commenced in your earlier Numbers with a pledge that they should be continued; which pledge, however, has not been redeemed in your subsequent pages, though we have now arrived at the fourth volume of the Magazine. I allude particularly to two articles (the one a sequel of the other) in your first and third Numbers (Vol. I. p. 37. 242.), on "the principal Forest Trees of Europe, considered as Elements of Landscape, by J. G. Strutt;" and another, in your second Number (Vol. I. p. 147.), an "Introductory Sketch of the Objects and Uses of Meteorological Science, by E. W. Brayley." In both cases it is added at the conclusion of these Essays, that they are "to be continued." Mr. Strutt's articles are highly interesting in themselves, considered in a general point of view, and are, it strikes me, of especial importance to the landscape-painter, more particularly so, when illustrated, as they have been, by the beautiful wood-cuts of Mr. Williams, who possesses the art of depicting foliage, and hitting off the distinctive characters of trees, in a manner far superior to that of any other xylographer with whose performances I happen to be acquainted. Mr. Brayley's Introductory Sketch is an able essay on a useful and difficult subject; a subject but little understood, and well worthy of farther investigation. But my business at present is not to enlarge on the merits of these articles, but to enquire why they have not been continued, according to promise. Have any of your subscribers objected to the introduction into your Magazine of such subjects generally, or found fault with the manner in which these in particular have been treated? I know that it is difficult, if not impossible, to please all tastes: at the same time, I am inclined to think, that at least the majority of your readers have too much good sense not to regret, with me, the discontinuance of the able and interesting articles alluded to. That blame attaches somewhere, on account of the non-fulfilment of the promise, is quite clear. Does it rest, let me ask, with you as editor, or with the respective authors? Have you declined to insert what may have been

sent to you with a view to complete the series? or have these gentlemen failed to supply you with the means of doing so? In either case, your subscribers suffer, and so also, I may add, does the reputation of your Magazine. These few remarks, which are offered in no unkindly spirit, I hope may have their weight in the proper quarter, and induce the parties in fault, whoever they may be, to redeem the pledge, by speedily supplying the deficiencies of which I complain. I am, Sir, yours, &c. — *B. Coventry, July* 4. 1831. [It rests with the respective authors. — *Cond.*]

Periodical Publications. — Sir, I am very much pleased to find that a note relating to Swainson's *Zoological Illustrations*, appended to the review of *Sylva Britannica* (Vol. III. p. 549.), and also an article on "the Advantages and Disadvantages of Periodical Publications" (Vol. III. p. 297.), have attracted the attention of that eminent naturalist. The accusation made was, that Mr. Swainson had levied an exorbitant tax on his subscribers, by charging them half-a-crown for about eight pages of titlepage, preface, indices, &c. Some retrospective criticism on this subject appears in your May Number (p. 272.), with the signature of W. S. affixed to it, which, I may fairly presume, is from the pen of Mr. Swainson himself. He here admits what I have said to be "abstractedly just;" but adds, that, "with reference to the work itself, it is a very partial mode of reasoning, and therefore not fair." He then goes on to draw comparisons between the price of the numbers of *Zoological Illustrations* and that of other similar works; and shows that the advantage to the public, in point of cheapness, is greatly on the side of his own publication. Now, all that he advances about the relative price of his own and other works may be very true, but it is nothing to the purpose. I never insinuated that Mr. Swainson's work was too dear; indeed, I think so highly of it, both of its illustrative and descriptive departments, that had he charged 5*s*., or even 6*s*. a number, in the first instance, I should not have complained, nor have thought the book unworthy of the cost. What I quarrel with, and what offends others as well as myself, is the underhand mode of extorting every now and then a paltry pittance from the pockets of his subscribers, by charging them half-a-crown for eight pages of titlepage, preface, and indices; a demand which no purchaser could possibly expect to be made when he commenced taking in the work, and which, in fact, amounts to a departure from the original bargain between the author and the public. This charge I call an exorbitant tax, and levied too in an unwarrantable manner, let the price of the numbers be what it will; and I should equally object to it, had the numbers been no more than one shilling or sixpence each. For in that case Mr. Swainson would be doing a shabby thing with one hand, while he did a liberal thing with the other. If a man were in the habit of giving a sumptuous entertainment to his friends regularly six days in the week, but on the departure of his guests were to make a practice of charging them a penny per cork for each bottle of wine consumed, or four-pence a head for the use of his stable for their horses, he would, in spite of his hospitality, justly incur the imputation of doing a very mean action. Just so with Mr. Swainson: his admirable work (I am really sorry it does not answer) is, I think, well worth all the money it costs; but this extra unexpected charge of two shillings and sixpence for titlepage and index mars all. And I really do regret that a gentleman should condescend to adopt such an unworthy mode of reimbursing himself, and not rather have charged a fair remunerating price for his numbers in the outset, as is more fully stated in the last half page (Vol. III. p. 308.) of the article on "the Advantages and Disadvantages of Periodical Works" already alluded to.

Mr. Swainson tells you that "I need not fear that this exorbitant tax will continue, or that the science of the country will be much burthened with illustrative works." What am I to understand by this? not, I sin-

cerely hope, that his *Zoological Illustrations* are to be discontinued *, but that it is his intention to discontinue the practice to which I have ventured to object. He asks, also, why it is that some other periodicals, which he has the modesty to designate as of much higher pretensions than his own, "are most unworthily neglected . . . to the disgrace of patrons of periodicals, and of the true legitimate science of the country?" I will endeavour to give Mr. Swainson an answer to this question. Not to mention, then, that such works are for the most part expensive, if not dear, and therefore beyond the pockets of very many who would like to encourage them; not to mention, also, that scientific works on natural history are not calculated for general readers, and therefore are confined to a limited sale; one cause of the neglect complained of, and one that operates even with those who have the taste to appreciate scientific publications, is to be found (I speak from actual knowledge) precisely in the very circumstances I have endeavoured to point out, viz. an apprehension, on the part of those who would otherwise become purchasers, that a work will be discontinued without being completed; a fear of being in some way or other imposed upon, as, e. g., by reduction in the number of the plates, an additional charge for the numbers over and above the original stipulated price, or an afterclap for the titlepage and index.

Mr. Swainson suggests that some writer in your Magazine should "point out which of all these countless periodicals deserve encouragement, and which do not." If I thought that any "wealthy individuals," or the managers of "the different public subscription libraries, provincial institutions, and societies," would attend to the recommendation of an humble and anonymous individual, like myself, I could readily furnish you with a pretty considerable — I do not say a perfect — list of the kind. And I assure Mr. Swainson that his own excellent work, *Zoological Illustrations*, should find a place in the very fore-front of the catalogue, with a salutary warning, however, by way of notice to the public, about the charge of half-a-crown for a few pages of titlepage and index. The particular mention of such works as are not worthy of encouragement would be a rather invidious, if not an unnecessary task; and it might be enough merely to pass such over by a tacit omission. I heartily join Mr. Swainson in his wish, that out of such critical list "all the provincial societies should make a choice of some one, or two, or more, as their funds may permit, and send their orders to the publishers." I greatly fear, however, that the formation of such a list as is suggested would be labour in vain. For the truth is, neither societies nor individuals can afford to gratify their taste to the extent they might wish by the purchase of costly publications.

Having defended (sufficiently defended, as perhaps he flatters himself) his own conduct, Mr. Swainson, I am sorry to see, indulges in certain petulant insinuations against "cheap compilations, crude translations, wonders of the insect world, &c., with such like amusing trifles, fit only for children." And he speaks also in no very complimentary terms of societies which "import wild beasts, and receive money for exhibiting them afterwards." These remarks, it strikes me, are neither just nor liberal. If, in the latter instance, allusion is made (as I shrewdly suspect) to the Zoological Society, it is not my business, as I have no connection with that institution, to stand forth in defence of its proceedings; and the members of the Society are, no doubt, fully competent to defend themselves. I may remark, however, in passing, that I can see no ground for complaint against the Society for "importing wild beasts," and affording the public the high gratification of viewing the collection at the low price of one shilling. If, again, in the other instance, by "cheap compilations,"

* I have received no number of the work for many months, and, upon enquiry, the only answer I can get from the bookseller is, "Not out."

and " wonders of the insect world," are intended such works as Professor Rennie's *Insect Architecture* (the review of which in your Magazine, p. 39., lies at my door), I cannot help expressing my surprise that an accomplished naturalist like Mr. Swainson should be so deficient in good taste, as not to admire that useful and entertaining little work (cheap though it be), and that he should designate such performances by the reproachful title of " infants' food," and " amusing trifles, fit only for children." Mr. Swainson is indeed a giant in natural history, and as such, no doubt, is able himself to relish and digest the strongest meat; but he should remember that the same may not be adapted to the constitutions of the majority even of " the grown-up public."

In conclusion, I beg to assure Mr. Swainson that I have no intention to hurt his feelings, or give him unnecessary offence; my sole object has been to prevail upon him to discontinue a practice which appears to me to reflect discredit upon himself. This end being effected, I should rejoice sincerely if what has passed between us on the subject might prove the means of extending the sale of his admirable work, and obtaining for it that additional encouragement which its merits * so amply deserve. Yours, &c. — *A. R. Y. May* 6. 1831.

Remarks on Mr. Davis's Letter (p. 303.), *which impugns Mr. Stephens's Mode of publishing his " Illustrations of British Entomology."* — Sir, In an article in your last Number, Mr. Davis complains of the irregular manner in which *Stephens's Entomology* is published. Being a subscriber to this work, and a personal friend of the author, I feel myself justified in objecting to Mr. Davis's letter. Without attempting to exculpate Mr. Stephens from the charge of irregularity, which, I doubt not, he can satisfactorily account for if he shall think it worth his while to do so, I conceive that Mr. Davis might have discovered a better mode of removing from his shoulders the " intolerable burden " he complains of, without aspersing the character of an honourable man. Surely, Sir, his letter is every way calculated to injure rather than promote the cause of science. Mr. Stephens's work will always be acceptable to those who are really anxious to see entomology flourishing, upon whatever terms he may be enabled to publish it; and those who are not content with his present mode might easily discontinue their support without attempting to prejudice the minds of other subscribers by an ignorant notion that the author was actuated by dishonourable motives, and would one day leave them in the lurch. A little enquiry might have satisfied Mr. Davis that the motive assigned by Mr. Stephens, viz. " domestic misfortune," was the cause of introducing the irregularities of which he so loudly complains, and which, indeed, every subscriber must greatly regret. Would it not be better for you in future to make a rule that all personally abusive articles, like that of Mr. Davis and some others which so unfortunately stain your pages, should be first submitted to the perusal of the parties they are intended to reflect upon, before you gave your sanction to their publication ? One word of explanation would often be sufficient to stop a controversy begun in misapprehension, and you would thus be the means of saving the abusive from their expression of much angry feeling and its consequent remorse, the abused from the pain of unjust censures, and the public from the disgust of witnessing the want of charity and good-fellowship which actuates the motives of our selfish or unhappy moments. Yours, &c. — *J. S. Henslow. Cambridge, Aug.* 4. 1831.

---

* I have elsewhere spoken (see note appended to the review of Strutt's *Sylva Britannica*, Vol. III. p. 549.) of the excellence of Mr. Swainson's plates, particularly of the shells, the beauty of which, as works of art and faithful representations of nature, I have never seen exceeded in any publication whatever.

Stephens's "Illustrations of British Entomology." — Sir, I am not sorry to see the subject of Stephens's *Illustrations of British Entomology* taken up in your Magazine (p. 303.), and the gross imposition practised on the public, by the recent mode of publishing the numbers of that work, exposed to view, as it ought to be, by the honest and spirited remarks of your correspondent, Mr. Davis. Like him, I have taken in the work from its commencement, and like him, too, am thoroughly sick of it, in consequence of having long been aware how unfairly the subscribers have been treated by the author. There has been an undue increase in the price of the numbers (i. e. an increase out of proportion to the additional quantity of matter), a reduction in the number of the plates, a most unparalleled irregularity in the periods and mode of publication. Then we have had apologies and excuses, explanations and evasions, without end, and promises of future reparation from time to time, which, up to this moment, have not been fulfilled. Mr. Stephens, in short, has contrived so to mystify and perplex the subject, that I, for one, have found it next to impossible to keep a regular debtor and creditor account between him and his subscribers. Mr. Davis, however, has had the patience to unravel the intricacies of this mystery of imposition; and the thanks of the public are due to that gentleman for the laborious task he has undertaken, and for the plain straight-forward manner in which he has accomplished it. I shall be curious to see whether any, and what, reply will be made by Mr. Stephens to the charges brought against him. Of one thing, however, let him be warned, viz. not any longer to "throw dust in the eyes" of the public; nor to attempt (as he has done) to persuade us that the alterations he has adopted in the mode of publication are to the advantage of his subscribers. This would only be adding insult to injury; for it is quite clear, — and Mr. Stephens must know it, however he may attempt to disguise the matter, — that every departure from his original plan has been, in fact, a fraud upon the public, and an artifice to extract money from the pockets of his purchasers. Does Mr. Stephens himself believe that he would have obtained one in ten of his present subscribers, if they could have calculated before-hand on the work being conducted in the manner it has been for some time past? For myself, I regret having taken in the work, though I think highly of its merits; and could I find a convenient stopping place (which, however, the author takes pretty good care shall not be afforded), I should resolve with Mr. Davis to discontinue the numbers. I really am sorry to see a respectable gentleman, a most able and acute entomologist, like Mr. Stephens, disgrace himself by practising such mean artifices; which, I can assure him, injures not only his own reputation, but the cause of science, by tending to deter the public from patronising scientific periodicals in general. I have so often had my "fingers burnt," that, partial as I am to the sort of works in question, I have almost come to the determination (and in this I am not singular) never again to commence taking in a periodical publication on natural history, unless some substantial pledge is given on the part of the author, that he will faithfully fulfil his engagements, without departing from his original terms. Yours, — *A Purchaser of "Stephens's Illustrations."* *July* 4. 1831.

Geological Relations of Plants. — Sir, In a late letter to you, in *Gard. Mag.* vol. vii. p. 372., I adverted to the valuable letter on the geological affinities of plants by Mr. Thomson, which appeared in *Mag. Nat. Hist.* vol. iii. p. 410. I had the temerity there to insinuate that the learned author had fallen into some slight errors, which I did not state. It has since occurred to me, that it is perhaps less kind and less respectful to accuse a writer of error, without pointing out what it is, than to state openly what appears to the reader to be a mistake. I will now, therefore, explain myself on that head. The first point whereon I should differ from him would be the apathetic calmness, and almost scepticism, with which he

treats that most extraordinary hallucination of Dr. Alexander Murray which prefaces Mr. Thomson's remarks. Dr. Murray sets out by saying that he has "endeavoured to discover whether, in the comparatively limited tract to which his observations relate, any decided connection could be traced between the native plants and the soils wherein they are found;" and he concludes that there "is not in science a more hopeless labour than the attempt to discover an unvarying and necessary relation between most plants and the soils wherein they are found." I may, in the first place, observe, that Dr. Murray here entirely changes the terms of his proposition. There is a vast difference between a "decided connection," and "an unvarying and necessary relation." But when the doctor proceeds to add, that, "except in point of moistness, compactness, and depth, soils have, in general, no cognisable relation to their vegetable products," I appeal to every farmer, to every gardener, to every botanist, whether daily and hourly experience does not prove this proposition to be unfounded. If this is "the result of the doctor's observation," his sagacity is but small; and when he asserts that "it appears, when well examined, no less to accord with reason than experience," we may discern that the doctor's "reason" is even less than his sagacity. The reason he assigns is, that "if we examine Britain, we find the soils in all places composed mainly of silica, alumina, magnesia, and lime, with accidental animal and vegetable impregnations." Here he omits to notice the metallic substances; of which one, at least (iron), acts not an unimportant part in vegetable physiology, to say nothing of the mineral acids, the sulphuric, muriatic, and nitrous, which might deserve to be noticed, as well as the phosphoric and oxalic, citric, malic, and gallic: but, confining ourselves to the earths, how does the doctor's complaint that the soils of Britain consist only of all the known earths (viz. the same of which the rest of the globe is composed) prove that the plants have no assignable connection with the soil? Does it follow that no plants have a determined election for some one of these simple earths separately? Does it follow that the numerous combinations which may be made of these four earthy bases with animal and vegetable substances, will not furnish soils extremely distinguishable from each other, differing in many other qualities besides "moistness, compactness, and depth?" And does it follow that plants may not have very different degrees of election for soils consisting of the same ingredients, combined in different proportions? The doctor's *à priori* reasoning on this head does not carry any conviction to my mind: the whole diatribe is really not deserving of the temperate and elaborate refutation with which Mr. Thomson treats such a mass of crudities.

Mr. Thomson illustrates his theory by an allegation that "primitive ranges produce the greatest variety and richest specimens of vegetables; a phenomenon," he says, "derived from the obvious aptitude of such rocks to furnish the best and richest soil for vegetable growth;" and "we should contrast," he says, "with these ranges, the poverty and slow productions of secondary and diluvial districts. We should simply contrast the shores of Orme's Head and Devonshire with those of Lancashire, and leave each enquirer to his own conclusions; satisfied that they would be favourable to the relations we endeavour to establish." Now, be it observed, that this relation may well subsist, though the example fails. Here I object to Mr. Thomson, that he has fallen into a fault still too common, though numerous naturalists and philosophers of the present age have greatly kept clear of it; that, instead of amassing facts, and postponing the making of theories until he had abundance of materials, he has rushed into theory-making with a very scanty provision of facts, and has consequently adopted a theory, to say the least of it, extremely doubtful, and which probably will be impugned by more facts than he can array in support of it; viz. his position, that primitive ranges produce the richest specimens of

vegetables, and that secondary and diluvial districts are distinguished by poverty and slow production. I leave, for the present, the discussion of the question, whether primitive or secondary formations produce the greater variety of plants, because this is by no means identical with the question whether they produce the richest specimens. I do not know whether, when Mr. Thomson speaks of "diluvial," he means to include alluvial strata; but I conclude that he does, otherwise he would be omitting unnoticed extensive tracts of country which cannot be included among primitive ranges, and therefore, unless they are classed with the secondary and diluvial, must go altogether unnoticed. Understanding him thus, I venture to deny his assertion. The soils which invest the primitive rocks in this kingdom are far less fertile than those which clothe the rocks of secondary formation; but the richest of all the soils are on the alluvial and diluvial deposits. It happens, indeed, that the country about Liverpool, and the adjoining parts of Lancashire, consist of an alluvial detritus of the coal measures and adjacent sandstone, which is extremely poor and barren; but the vales of Evesham and Taunton Dean, the rich meadows which follow the course of the Bristol Avon, the fertile marshes of Romney, of Lincolnshire, of Somersetshire, of Pevensey, of Gloucestershire on the Severn, the rich pastures of Crediton, which is the most productive land in Devonshire, and very numerous other spots of superior soil to which I might refer, are all either situate on the secondary strata, or composed of the detritus of it; while very few indeed are the spots where the detritus of the primitive rocks forms so good a soil.

I am not sure whether I misapprehend Mr. Thomson in supposing that he attributes the presence of samphire, cabbage, and *Plantago maritima*, on Orme's Head, simply to their affinity for the mountain limestone; but, if he does, I am induced to think that he has not marked them with sufficient discrimination. Besides the presence of mountain limestone, the presence of sea salt, or one or more of its ingredients, is necessary to make these plants flourish. He would in vain seek for them on the inland ledges of Chedder Cliff; and he justly observes, he could not find the samphire on St. Vincent's Rocks. Although the tide below these rocks is saline, the river is so land-locked, that no spray can dash against the heights; and the maritime plants are mostly confined to the ooze at the water's edge, and the lowest portion of the rocks.

Mr. Thomson says "*Geranium pratense* is, I am persuaded, to be found luxuriant only in basaltic districts." Now, throughout the south of Britain, in almost every sound, deep, rich, loamy soil, in which the various component earths are moderately balanced, not excluding a good proportion of calcareous earth, argil, and silex, this beautiful plant thrives luxuriantly. On the fertile green sand of the Vale of Pewsey in Wiltshire, on the sound calcareous loam over the great oolite, on the new red sandstone beds of Somersetshire, and on the rich alluvial beds that accompany the course of the Bristol Avon through Wiltshire, Somerset, and Gloucester, and on the old red sandstone of Gloucestershire, this *Geranium* is both abundant and magnificent.

Foxglove, which Mr. Thomson says is common every where but on chalk, is not, in truth, common, unless on soils where there is abundance of silex; but on all calcareous strata, and on clays, the foxglove is not spontaneous, and can scarcely be made to grow; and although it is now many years since I visited the Isle of Wight, I should be extremely surprised were I to find in the stratum of grey sand, which crops out below the chalk and forms the central ridge of the island, whereon Appuldurcombe Park extends, the *Digitalis* not plentiful. Mr. Thomson cruelly belies the chalk when he charges it with almost a want of grasses, except those allied to the bents. The fact is, that very few bents grow on chalk, unless there be over the chalk a bed of poor silicious sand; otherwise, the

*A*vèna pubéscens, flavéscens, and praténsis, the *Festùca* ovìna and duriúscula, *Br*ìza mèdia, *Br*òmus eréctus and móllis, *H*ólcus *a*venàceus, *P*hlèum praténse, and *D*áctylis glomeràta are the grasses which chiefly predominate there; and, instead of there being a want of the grasses on any moderately good specimen of the chalk downs, the turf is closer and thicker, and comprehends a greater number of gramineous plants within the compass of a square foot, than almost any other pastures.

The first, and I may say the only, objection which Mr. Thomson raises, in order to combat it, is really not worth notice, viz. that the number and variety of rocks are not in proportion to the number and variety of vegetables. To give any weight to this objection, we must involve in it the term, that those who assert that plants have a geological predilection also assert that only one, or a few, or a very limited number of plants, elect the same stratum; in short, that the whole number of native plants cannot find strata which they affect; a position which I do not understand Mr. Thomson to assert, nor any other observer of nature, and therefore it seems needless to combat it. Suppose, for instance, there were only six strata, and 10,000 plants: it is not asserted that 3000 may not elect one stratum, 2000 another, 1000 a third, 500 a fourth, 500 a fifth, and 800 the sixth; that 1200 may not be common to three, 500 common to other three, 250 common to five, 50 common to six, and 200 common to four of the strata: does the proportion in which the number of species surpasses the number of strata at all forbid such a scheme of election? And yet is it not as much an election, as if six plants chose each one stratum, and all the rest of the 10,000 species refused to grow at all? To know why plants elect some strata and refuse others, we must first collect our facts; and let them be sufficiently numerous before we attempt to generalise and theorise. I am, Sir, yours, &c. — *Causidicus.*

On Hares taking the Water. — I think I am enabled, by decisive facts, to settle all doubts respecting the capability or inclination of hares for taking the water; a curious point of natural history, which has drawn the attention of some of your correspondents at various times. (p. 143. 274. and 382.) Near my residence there is a large sheet of water, in which there is a small island at no great distance from the shore. Conceiving that the spot might be made a convenient receptacle for hares or rabbits, I at various times, as opportunities of catching them occurred, turned out several of each species; but was surprised, on subsequent visits, never to meet with a single individual. For a time I imagined that they had been either drowned in attempting to escape, or been starved from a deficiency of proper food; though, as the island abounded in rich vegetation, untouched, of course, by cattle, I could not so easily admit the latter supposition. One day, however, on landing, I was startled by a large hare bouncing up, which I knew could not be one placed there by myself, as many months had elapsed since I had repeated my experiment of peopling the island. On seeing her rise, I immediately returned to the boat for a dog which had accompanied me; when, to my surprise, I saw her in the act of swimming towards the main land at a steady pace, and, before I could cut her off, she had effected a landing, and, after shaking herself, went away at full speed. On examining the island, I found a regular hare track from the point whence she started, through the rich grass, to her seat; an evident proof that she was in the habit of crossing the ferry, and reposing for the day in a situation which she had wisely selected, as removed from alarm of dogs, guns, and sportsmen. This is not the only instance I have to offer: another occurred in the case of a three-fourths-grown leveret, which accidentally fell into my hands, and whose motions I determined to watch after landing it on the island. For a time it ran about in a state of uneasiness, when, as if aware that it was under restraint, it made for the nearest point to the land, and without a moment's hesitation, as a matter of course, plunged

boldly into the water, and, like its more experienced predecessor, swam on shore with the greatest ease and confidence.—*E. S., F.L.S. July* 21. 1831.

Hares taking the Water. — I once saw a hare that was closely pursued spring into a river about 20 yards wide, and swim boldly across it. Rabbits will take water when less pressed, as I have seen four, and heard of more, to do so, which might have easily escaped without getting wet. In one case, although a man stood on the bank which the rabbit was striving to gain, and the bank was not more than 1½ ft. above the water, the rabbit landed, and made its escape. — *Henry Turner. Botanic Gardens, Bury St. Edmunds, May* 15. 1831.

New Mode of examining Birds. — If A B. (p. 145.) will refer to the preface of the sixth edition of Bewick's *Birds*, for the account of Mr. Dovaston's "ornithoscope," he will perceive that his mode of observing the motions of his feathered friends is not new. — *Thomas Edgeworth. Wrexham, June* 8. 1831.

Men feel and reason very similarly. The same necessities suggest similar expedients to remove or relieve them. I adopted A. B.'s mode, and Mr. Dovaston's also I suppose, for I have not seen Bewick's *Birds*, years ago. (See p. 450.) — *J. D.*

The Resident and Visiting Birds of Renfrew and its Neighbourhood. — Sir, In X. Y. Z.'s list of birds in the neighbourhood of Renfrew (p. 269.), I observe that Pàrus caudàtus (long-tailed titmouse) and *T*úrdus mùsicus (mavis or throstle) have a star prefixed to their names, which mark, we are told, is intended to denote that such species are *visiters* in that part of the country: again, *T*úrdus pilàris (fieldfare) has no star prefixed to it; and we are therefore left to infer that this bird is not a visiter, but that it continues in the neighbourhood of Renfrew throughout the year. Allow me to ask whether these are real facts? or whether the insertion or omission of the star respectively, in the cases alluded to, are mere typographical errors? I do not at the moment recollect ever to have heard of an instance of the fieldfare breeding with us, or continuing in the country through the summer; which I think somewhat extraordinary, considering the immense numbers in which these birds visit us in the autumn and early part of the winter, and also that many of them occasionally get crippled by hedge-sportsmen, and hence might probably be unable to undertake a journey to a distant country. As to the long-tailed titmouse and the mavis, these certainly are not visiters merely, or migratory species, in most parts of the country; they may, however, be so in the north, as may the fieldfare there also be a constant resident. At all events, I should be glad of farther information on these points from your correspondent X. Y. Z.: for the facts, as stated in his list, if facts they be, are certainly curious and highly interesting; and, if the statements be erroneous, they ought to be corrected without loss of time, lest the error should be widely propagated and handed down under the authority of your Magazine. Yours, &c. — *W. T. Bree. Allesley Rectory, May* 12. 1831.

Habits of the Bittern. — Sir, In Vol. I. p. 495., your correspondent, Mr. Rennie, remarks, that "the bittern (*A*rdea stellàris *Lin.*) usually booms while flying high in the air." Now, I do not deny that such may be the case occasionally; but it happened to me to be for many years a frequent visiter of the extensive tract of marshes in the county of Norfolk, through which the river Bure pursues its course, and where the bittern was then a common inhabitant. The amusement in which I was engaged, that of angling, often led me amongst the ditches and retired spots of these marshes: there the bittern's boom was heard, sounding hollow from its sedgy couch amidst the almost impervious clumps of lofty and tufted reeds. On one occasion I had the good fortune to see the bird rise into the air at a short distance only from the place whereon I stood: its boom, however, ceased; and I do not remember ever to have heard it from a bird

when upon the wing. I am inclined to think with Dr. Fleming (*British Animals*, No. xcv.), that this peculiar noise is most frequent in the breeding season, and that it proceeds from the male bird; more especially, perhaps, during the period of incubation by the female. I never succeeded in discovering two of these birds together; but I suspect that they generally lie very close upon the ground, concealed by long grass and rushes, and that on any sudden alarm, or the approach of danger, they crouch into their retreat, rather than, in the first instance, seek escape by flight.

Dr. Fleming also observes that "this bird has disappeared from many districts where it formerly abounded, and is daily becoming scarcer." This is undoubtedly the case in Norfolk, and it may probably be attributed to the draining and improvement of the marshes, which have deprived the birds of their accustomed shelter and food. The name by which it is known amongst the common people is "bottle bump." I am, Sir, yours, &c. — *Michael Bland. Montague Place, Russell Square, July* 5. 1831.

The Robin's forsaking its Eggs after they have been touched, has been several times *touched* upon and controverted in your Magazine. In a hawthorn bush known to me, a robin's nest was built, and young robins annually hatched for at least fifteen successive years. For the last five of these years, the garden in which this hawthorn stood was occupied, with the house adjoining, by my father; and, as I at this time was "in childhood's happier days," it was no rare sight to see me mounted on a short ladder, handing down the eggs for the inspection of my playmates, and replacing them afterwards: I have often even lifted the hen off the nest, to get at the eggs. Notwithstanding all these molestations, the pair continued the use of their old family nursery, until a cat killed both them and their young. The male bird had the rare and permanent peculiarity of three or four white feathers in his breast, which gave him a curious motley appearance. — *Henry Turner. Botanic Garden, Bury St. Edmund's, April* 10. 1831.

The Nuthatch (*Sitta europæa*). — Sir, In reply to the remarks (p. 275.) of your valuable correspondent and that able naturalist the Rev. W. T. Bree, relative to this little interesting bird, I beg leave to say that it is not only a very scarce bird here, but, so far as I have been able to observe it, I believe it to be migratory, as I have never seen it during the winter season. It is also very irregular in its appearance; as last year it appeared on the 24th of March, and this year, it was first seen on the 14th of April, not by myself, but by a gentleman who shoots migratory birds on their arrival, for the purpose of stuffing them for his museum. I have endeavoured, during the last three years, to meet with its nest, but I have hitherto been unsuccessful. This disappointment I very much regret, as I am making a collection of the nests and eggs of every bird that builds within a circumference of five miles of Bedford. I will now avail myself of the present opportunity of enquiring, through the medium of your Magazine, whether the nuthatch can fairly be classed among the *mason birds*. I ask this question, because I once found its nest in Derbyshire, in the deserted hole of a woodpecker, the entrance of which had been diminished by a wall of clay, so as just to admit the parent bird. In my attempt to extract the nest, I injured the mud-walled entrance, and retired unsuccessful. The next day, I visited the nest, for the purpose of securing it, when I saw the male bird actively engaged in repairing the breach I had made on my first visit, the female being in the act of incubation at the time. This interesting sight had such an effect upon me (although I was then in the prime of my birdnesting days), that I desisted from my cruel attempt, and suffered them to bring up their young brood, consisting of four, without further molestation. I have since seen its nest, but I could not perceive any masonry employed in its construction. It is, therefore, from having witnessed the masonry of this bird in *cases of necessity*, and not in *the con-*

struction of its nest, that I consider the matter worthy of investigation. — *W. H. White, H.M.C.S. Bedford, May*, 1831.

Departure of the Cuckoo. — The same intelligent naturalist, too (p. 275.), questions the probability of my having stated the *departure* for the *silence* of the cuckoo, as early as the 3d of July last; and indeed he may, with great apparent propriety do so, since the *song* of this interesting bird was protracted in 1829 till the 28th of July. As a fair and open criticism is the most effectual means of producing well-attested facts, and of promoting scientific research, so also it is the most efficacious method of detecting errors, and of exposing falsehoods (the most insuperable barriers to the acquirement of real knowledge), and of holding them up to that ignominious contempt they justly deserve. As I am very particular in stating only what I see and hear myself, unless I have it upon unquestionable authority, I trust I am taking the only sure means of arriving at facts, of which only it becomes naturalists to speak. Now, with regard to the very early departure of the cuckoo, I can only account for it from the exceedingly cold and wet summer, it being alike ungenial to the feathered and to the vegetable kingdoms. Again, as the situation of Bedford is low, moist, and cold, and many acres of land on the banks of the Ouse were overflowed from the constant rains in June, this may, perhaps, form an additional reason for his retiring so early, from a watery district, to the light sandy spot, Ampthill, where, I am informed, he continued his song till the 10th of July, and took his final departure about the beginning of August, but the precise day I could not learn. Ampthill is a favourite resort of the cuckoo; for, on the last day of April (almost the only summer's day in the whole year), I was in the park, in company with a friend, when we saw seven of them together, sporting and laving on the edge of a fishpond, with all the playfulness of young lambkins. — *Id.*

Cuckoo at the "Witching Hour of Night." — Sir, This circumstance your correspondent J. Murray (p. 147.) considers unusual; but, perhaps, it is not so unusual for the cuckoo to sing at midnight, as for the naturalist to sit up to hear the "unusual sound." But permit me to say that this is not a solitary instance. During the summer of 1830, the days were wet and chilly, and the nights clear and calm; so that the night was, in fact, more pleasant than the day: so much so, that I frequently walked out after supper, and as frequently heard both the cuckoo and the nightingale from ten till eleven o'clock; but on two succeeding evenings, the 4th and 5th of June, the moon being about full, and shining with "unclouded majesty," I heard, about the "witching hour of night," both the cuckoo and the nightingale; and on the 9th, as I was returning from a party of friends, with the fair partner of my pleasures and pursuits, a little after midnight, we were highly gratified in hearing a trio, with all the native melody of the grove, performed by the cuckoo, the nightingale, and the sedge warbler. I am, Sir, yours, &c. — *Id.*

Specific Relations of Anagállis arvénsis and cærùlea. (p. 277.) — I am obliged to two of your correspondents (p. 277, 278.) for their remarks on my communication (Vol. III. p. 537.) respecting the identity of *Anagállis* arvénsis and cærùlea, and would reply to them by a contrary observation, which I have received from a botanical friend, who states his belief that some seeds of *A.* cærùlea sown in his garden, after a few years degenerated to the pink colour. I would farther observe, that, however valuable these notices may be, as serving to direct our attention to particular enquiry, we can expect nothing satisfactory until we shall have had recourse to direct experiment. Mere conjecture, and recollections of what happened, are too vague to furnish any conclusions. — *J. S. Henslow. Cambridge, August* 4. 1831.

In reference to the remarks in p. 278., the validity of Professor Hen-

slow's objection is, for the most part, acknowledged; but this objection operates against himself with equal effect in the case of B.'s opinion, expressed in p. 79. The facts in p. 277. seem to us scarcely amenable to the above objection. — *J. D.*

The Natural Productions indigenous to Britain. — Sir, The remarks of your correspondent ∞ (p. 273.) respecting my article upon the productions of this country (p. 1.), if I understand his meaning aright, altogether misrepresent my argument. I can assure ∞ that I consider the beech and the pine? (Scotch pine) to be as much natives of this island as ∞ himself does; nor did I ever say, or mean to say, that they were not so. My object was to vindicate Cæsar from the charge of falsehood, by proving that the *A*bies and *F*agus did not signify the Scotch pine and the beech so called. Your correspondent seems not to have viewed my argument in this light: but surely the way to persuade the world that a person is in error is not merely to assert that another's opinion differs from his; the facts ought to be adduced which bear him out in his judgment, instead of a bare opinion to the contrary. Your correspondent quotes *Evelyn's Sylva*, to contradict an assertion which was never made. Will your correspondent inform me who "the learned expositors" are with whom he is so readily induced to coincide in believing that the *F*agus of Cæsar is the beech? for I do not see at all how ∞ has proved my assertion to be futile, that the *F*agus of Cæsar is a species of oak. ∞ will see in a future Number some additional proofs of the fact in question, which (but it is needless) I might here repeat. I cannot help being of opinion that your correspondent never referred to the passage of Cæsar in question, or else he is guilty of intentionally misquoting; which, for his credit, I hope is not the case. He unaccountably leaves out the most important part of the sentence, which is as follows: — "Materia cujusque generis, ut in Gallia, est, præter fagum et abietem." Without this, the passage is unintelligible; or ∞ might at once as well endeavour to prove that ebony and the cocoa-nut are natives of Great Britain; "which, I should hope, all your readers know to be false." ∞ proceeds as follows: — "T. E. L.'s reasoning is this; Cæsar was correct in saying that the *F*agus was not found in Britain; but Cæsar's *F*agus is the oak, but not the beech; therefore the oak was not found in Britain!" Perversio optimi fit pessima. I should fancy that ∞ is no botanist, or else is ignorant of facts known to all who profess any acquaintance with the science. Does ∞ suppose that only one species of *Q*uércus exists? and surely he does not think that the *A*bies of Cæsar, which "hewn on Norwegian hills" was fitted "to be the mast of some tall ammiral," is synonymous with our Scotch pine the only native species. Let ∞ understand my argument once for all; in which I am borne out by Mr. Mitford, no mean authority. Cæsar states that the only Gallic trees which he did not meet with in Britain were the *A*bies and *F*agus. To this I assent; contending that the *A*bies is probably the silver fir, and the *F*agus the *Q*uércus *B*allòta, or evergreen oak of the Mediterranean, neither of which is or ever was a native of England; and not, as ∞ strangely interprets it, the *Q*uércus *R*òbur, or British oak. It was with great reluctance that I entered into this controversy; but I could not see Cæsar's veracity impugned, without striking a blow in his defence; which excuse, I trust, will satisfy ∞ that no offence is intended by these remarks. I am, Sir, &c. — *J. E. L. Richmond, Yorkshire, May* 4. 1831.

The Flora of Richmond (Yorkshire), as compared with that of Thirsk. (p. 276.) — Sir, Allow me, through the medium of your Magazine, to express my due acknowledgments for the critical remarks with which your correspondent N. has favoured me, at p. 276., respecting the "Sketch of the Flora of Richmond;" and likewise to assure him that I am fully sensible of his good wishes, so kindly expressed for my success as a naturalist.

Some of the statements contained in that article (p. 24.), which he calls in question, I shall endeavour as briefly as possible to confirm.

Respecting the first passage with which N. has occasion to find fault, I must candidly admit that it is no peculiarity in the Richmond woods, situate upon the high grounds, to be composed of fir, as such is usually the case, on account of the reasons which your correspondent has mentioned.

N. says, " May I ask the author of this paper, did he not mean to write metalliferous, when he wrote carboniferous, limestone ?" If N. will take the trouble to refer to Phillips's and Conybeare's *Introduction to Geology*, at p. 352. he will find the reasons assigned for which the title of carboniferous is preferable to any other, or rather, why those authors thought proper to apply the term to the formation in question.

Since N.'s critical feelings are offended by the term " generally," which I unoffendingly applied to the predominance of mountain lime in the immediate neighbourhood of Richmond, I promise him that his eye shall not have again to complain of such " general" imperfections.

N. seems to doubt that it is the character of the carboniferous limestone (I cannot drop the term consistently) to be full of fissures. If time and space did but permit, I could mention a score of instances sufficient to satisfy any reasonable person; and such I consider N. to be. If N. is a north-countryman, he has probably at some time or other visited the district of Craven in Yorkshire. If so, he must remember Wethercat Cave, Hardraw Scar, and some curious funnel-shaped orifices named Hartle Pot and Sand Pot, and numerous others near Malham Tarn and on the base of Ingleborough; all of which occur in the mountain lime. Nay, even rivers which flow through these strata are not unfrequently swallowed up in the earth, and, after flowing for some time underneath, reappear again in the light of day. Such are the Ribble, and the Manifold in Staffordshire, according to Conybeare; as also Horton Beck, at the foot of Pennigent in Yorkshire; all of which flow for some distance under the surface.

N. forgets that the lead mines, which he says constitute the chief mineral wealth of the country, are from twelve to fifteen miles above Richmond. My observations did not extend so far: I have found lead in small quantities within two miles of Richmond.

To the charge of ambiguity, which N. next brings against me, I plead guilty. By elevation, which I admit is a misappropriation of the term, I meant to signify the thickness of the beds. To the next question which N. offers for solution, I suppose an answer will be expected. My assertion, that the valley of the Swale was narrower in former times (by which I must be understood to mean the valley ascending above Richmond, for below that point I consider the river to enter the plain), though perhaps not an evident conclusion, I still consider highly probable. However, as the supposition gives such offence to your correspondent, I will for the present let it rest. But I would ask N. to what cause does he attribute the formation of valleys ?

N. laughs at my hypothesis respecting the separation of the Round How from its parent rock; yet I could cite several instances, such as Hood Hill and Blakey Topping, which perfectly resemble the Round How in form, though upon a larger scale. I should wish these remarks to be received in the candid spirit with which they are offered; as truth is, or ought to be, the acknowledged aim of both; yet I would rather N. remained silent, if his inertness requires such astonishing convulsions of nature to awaken its sleep. I remain, &c. — *J. E. L. Richmond, Yorkshire, May* 3. 1831.

Ætites, or Eagle Stone. (Vols. III. p. 484. and IV. p. 190.) — Sir, In addition to the description given by your able correspondent Mr. Clarke of East Bergholt, at p. 190., I beg to say that those found in Norfolk, and which I have described in the notes appended to my *Synoptical Table of British Organic Remains* (p. 41.), are, in my opinion, the true *Ætites*. Their

spherical form, the smooth exterior, and the sharpness of their rattle, give them a decided superiority over the argillaceous ironstones described by that gentleman, the nucleus of which is simply indurated clay. Their origin appears to be the investment of an alcyonitic body in flint, some part of the exterior of which resisted this process; consequently, a nucleus was formed, which in some instances is loose. These are what are called eagle stones in Norfolk. I have but one in my cabinet in this state; I have others precisely similar, which do not rattle: one which I broke some time since exhibited the same organic character as represented in Parkinson's *Organic Remains*, vol. ii. pl. 12. fig. 5. There is generally on the surface a number of small holes, which appear to have their origin in the flint, being moulded upon radicles projecting from the body of the alcyonite. I am, Sir, yours, &c. — *Samuel Woodward. Norwich, March* 22. 1831.

Adages on the Weather. — Sir, Mr. Spence, in his remarks on the weather at Pisa (p. 264.), observes that "the Pisans have a saying, 'If the weather be open on the 2d of February (the feast of the Purification of the Virgin), the winter is over; if severe, it is only beginning.'" This brings to my mind the old meteorological couplet, of a nearly opposite tendency: —

> "Si sol splendescat matutino Purificante,
> Major erit glacies post festum, quam fuit ante."

i. e. If the sun shines on the morning of the Purification (February 2.), there will be more frost after the festival than there had been before it. It would be difficult to account for the origin of these contrary sayings. The Latin proverb is perhaps to be understood with considerable latitude of interpretation, as meaning only that, if we have premature mild weather in the early spring, we are likely to suffer for it by severe weather at a later season of the year; a sense which seems also to be expressed in the following saying: —

> "If the grass grow in Janiveer,
> It grows the worse for 't all the year;"

as well as in another, of more coarse and homely manufacture, relating to the worth or value of "February's grass," which I refrain from quoting. How far the Pisan adage may be founded on fact, I am less able to judge than Mr. Spence; it carries with it, however, more of the air of probability than the Latin couplet, at least if literally interpreted, appears to do. Yours, &c. — *W. T. Bree. Allesley Rectory, May* 12. 1831.

Erratum in J. G. Tatem's Journal of the Weather for 1830, *at High Wycombe.* (p. 168.) — Sir, I beg to thank your correspondent the Rev. J. S. Henslow, for recalling (p. 383.) to my notice an error in the heading of the columns containing the number of rainy and snowy days in my table of the weather for 1830, inserted in p. 168., which should have been "rainy, snowy, fair," instead of "fair, rainy, snowy." The long and dangerous illness of a much-loved daughter has prevented my requesting your attention to the subject before. I am, Sir, yours, &c. — *James G. Tatem, Wycombe, July* 18. 1831.

Kilkenny Meteorological Journal. — Sir, I beg to correct an error which I made in my communication, Vol. II. p. 97. I there stated Kilkenny to be 500 ft. above the level of the sea; I should have said, about 400 ft.; and its distance from the sea about forty English miles, as our Irish miles are much longer. Yours, &c. — *John Robertson. Kilkenny, March* 15. 1831.

Erratum. — For "Coulemb's balance of Tarsim," Vol. III. p. 189., read "Coulomb's balance of torsion." — *J. Murray. Caermarthen, April* 2. 1830.

Art. V. *Queries and Answers.*

Depot for the Exchange and Sale of Specimens in Natural History. — Sir, Fully concurring in the suggestions of your correspondents (Vol. III. p. 185. 470. Vol. IV. p. 178.), as to the practicability and usefulness of a depôt for the exchange and sale of duplicate specimens in Natural History, and having fully considered the probable success of any individual who should commence such an establishment, I take the liberty of stating that I should have much pleasure in commencing such an undertaking, under such regulations and superintendence as might hereafter be agreed upon. Of my fitness for this office it is necessary I should say something. I have been a shell collector for the last fifteen years; four of which have been entirely devoted to that object in Africa and the Mauritius; and I am now residing in a central situation, where I would gladly undertake the commissions alluded to, as far as regards shells, birds, or insects. Fossils and plants I have no knowledge of; but, if supplied with the necessary information respecting them, the exchange would be a mere matter of attention. I would rather, however, confine myself to the three first-named branches. With regard to my respectability and character, I should be able to supply you, Sir, with references from many persons well known to you. By way of commencement, I beg to state that I am ready to exchange any of the Cape and many Mauritius shells, with the true localities attached, for those of equal value of any other country (except Britain); likewise many of the birds from the same countries. Of the shells I enclose you a list, and remain, Sir, &c. — *J. Warwick.* 1. *Newman Street, Oxford Street, March* 16. 1831.

Patélla granatîna.
longicósta.
plúmbea.
ràdians.
compréssa.
cóchlear.
granulàris.
pectinàta.
Parmóphora austràlis.
Fissurélla nimbòsa.
nodòsa.
radiàta.
Calyptræ'a equéstris.
lævigàta.
Crepídula fornicàta.
aculeàta.
Búlla apérta.
Nerìta exùvia.
versícolor.
albicílla.
Nática glaúcina.
mamillàris.
Canrèna.
Haliòtis tubífera.
tuberculàta.
asinìna.
Túrbo sarmáticus.
Phasianélla bulimöides.
Cássis rùfa.
vìbex.
Volùta mùsica.
péllis-serpéntis.
Cypræ'a cervìna.
exanthèma.
A'rgus.
Mús.
máppa.
tigrìna.
vitéllus.
câput-serpéntis.
Lynx.
adústa.
eròsa.
Isabélla.
ocellàta.
undàta.
zigzag.
Oníscus.
ràdians.
austràlis.
porària.
nùcleus.
Túrdus.
glóbulus.
caúrica.
Aséllus.
Cònus marmòreus.
fuscàtus.
hebræ'us.
literàtus.
Cònus monìle.
betùlinus.
quércinus.
Nussatélla.
figullnus.
Dentàlium dentàlis.
Sabélla alveolàta.
Tubicinélla balænàrum.
Corónula balænàris.
Máctra Spénglerí.
Dònax rínguens.
Tridácna gìgas.
Hippopus maculàtus.
Múrex haustéllum.
ternispìna.
inflàtus.
adústus.
Pterócera chíragra.
Lámbis.
Dòlium Pérdix.
fasciàtum.
Málleus vulgàris.
Avícula cròcea.
Chìton gìgas.
spinòsus.
squamòsus.
Also many fine specimens of Echìni and Madrepores from the Mauritius.

Exchanging of Eggs. — Sir, I beg to enquire whether any of the Norfolk gentlemen mentioned (p. 177.) as collectors of eggs; viz. Mr. John Scales, Beachamwell; Mr. Richard Griffin, Norwich; and Mr. John Smith, Yarmouth; are desirous of exchanging or selling any of their specimens. If so, I am prepared to send to the London depôt mentioned on the cover of your May Number, viz. No. 1. Newman Street, any duplicates I may have to dispose of. I subjoin a list of those of which I am in want: — Kite, Honey Buzzard, Moor ditto, Brown Owl, Long-eared ditto, Short-eared ditto, Red-legged Crow or Cornish Chough, either of the Woodpeckers,

Great Ash-coloured Shrike, Wryneck, Nuthatch, Grosbeak, Bullfinch, Lesser Redpole, Pipit Lark, Grasshopper ditto, Wheatear, Marsh Titmouse, Cole Titmouse, Sand Marten, Quail, Bustards, Curlew, and almost any kind of water birds. Any of these I shall be glad to buy, or receive in exchange for others. — *H. Burney. Near Wallingford, Berks, June* 26. 1831. — A letter addressed "H. B., Post Office, Wallingford, Berks," will be immediately answered.

A Dictionary of British Entomology. — Sir, I see by your last Number, (p. 278.) that your correspondent "Frank Plain," in the name of the unlearned, among whom he is pleased to class himself, "frankly calls upon the veterans in the science for a *Dictionary of British Entomology*, with derivations, accentuations, and reasons of application, &c." I beg most heartily to join him in this request. Such a work as he suggests is much wanted, and, if well executed, would be of the highest utility, not merely to the unlearned, but even to fair classical scholars. The enormous multiplication of genera in modern days has induced the necessity of constructing a corresponding number of new names. These names are often derived from the Greek language, and from words by no means of everyday occurrence; so that even the learned are often obliged to turn to their lexicons, and after all, perhaps, to remain in doubt, if not in ignorance, as to the signification in particular instances. The task of committing to memory a long list of hard names is much diminished, and becomes, indeed, a pleasurable occupation, when their meaning is known, and the propriety of their application apparent. And here I cannot help expressing my regret that the master-builders in the science of natural history should not have attended a little more to euphony in their nomenclature. Some names of modern manufacture, in botany as well as entomology, are so cacophonous, and almost unutterable, that they do require some considerable counterbalancing advantage to justify their admission to general use. It would be superfluous to produce examples, as they must occur in abundance to every one at all acquainted with recent scientific works. Except in particular cases, where it is intended to do honour to the memories of eminent men, I do not see any reason why the naturalists of this country, at least, in describing a new insect or plant, should choose to encumber it with a name as difficult to be pronounced by English lips as the sesquipedalian name of some Russian chieftain, consisting of perhaps eight or ten consonants to a vowel. At the same time I am fully aware of the difficulty of inventing a large number of new names, which shall be at once appropriate and free from every objection. But I am straying from my subject, and occupying too large a space in your pages; I will therefore conclude by again expressing my earnest hope that Frank Plain's suggestion will be attended to, and that some "veteran" will ere long present us with a "Dictionary of British Entomology." Yours, &c. — *B. Coventry, May* 10. 1831.

Trade in Snakes in the Fens of Cambridgeshire. — Sir, Professor Henslow mentions the circumstance (p. 279.) of a trade in snakes having been carried on by the fenmen in Cambridgeshire, who sold them, when skinned and dried in the sun, to a London agent, at the rate of one shilling per dozen; but he states that this profitable trade has ceased, and that it was not known to what purpose the snakes were applied. Is it not probable that they were procured on account of their supposed medicinal virtues? The fat or grease of vipers, it is well known, was believed to possess peculiar properties; and we have often heard of viper broth as a specific for one disease or another. The fat of the common snake might be equally efficacious, or perhaps might be substituted for that of the less abundant species, the viper. It is not, I think, more than fourteen or fifteen years since I happened to be in the late Mr. Dickson's shop in Covent Garden (an excellent gossip-shop, by the way, for naturalists), shortly after a viper had been brought in from the country, which Mr. Dickson had purchased in the

way of trade as an article for retail sale. Some portions of the reptile lay on the counter when I was there; and I recollect that the entrails, &c., still exhibited a very high degree of palpitation or muscular motion, though separated from the rest of the body. Whether viper broth or the fat of vipers or of snakes be still retained in the materia medica, it is not for me to determine: but if, as I think probable, such recipes have been exploded by the more enlightened practice of modern physicians, this circumstance will account for the loss of trade to the Cambridgeshire fenmen. Yours, &c. — *W. T. Bree. Allesley Rectory, May* 12. 1831.

Since writing the above, in referring to the materia medica of Linnæus, I find that the common snake (*Cóluber Natrix*), as well as *Cóluber Vipera* (an Egyptian species), is mentioned by him as possessing medicinal properties. Speaking of the latter species, in his *Systèma Naturæ*, he says, "Officinalis hæc vipera est Egyptiorum, nec Berus:" with the Egyptians this, and not *Cóluber Bèrus* (the common viper), is the viper of the shops. — *Id.*

The Rot in Sheep. (p. 284.) — Sir, So great has been the mortality amongst sheep this season, that I think, with Rusticus, it becomes a matter of no small consideration to be more acquainted with so fatal a malady. The opinions amongst farmers, as to the cause of the rot, are very numerous; which fact renders the knowledge of its real cause the more desirable; for, from not knowing the real cause, we know not a proper remedy. The disease is well known to be that of the liver in particular. I shall not pursue it through its whole course, nor indeed do I think it needful; the cause being the chief object. Most of your readers are aware that by the frequent and repeated moistening of land the grass grows in greater abundance, much more quickly, and has a more luxuriant appearance, particularly when the weather is close and warm. It is this quickness of its growth which, I think, is the great cause of the mischief. When grown slowly, time is allowed for that bitter principle to be more fully elaborated, on which depends the good quality of our grasses; which is the case in a moderately dry season, and when also the disease does not make its appearance. But when, contrary to this, the grass grows too quickly to allow of that change taking place, and does not contain that bitterness, but has a more delicate appearance, or is what is termed squashy, the sheep become diseased, from the loss of that usual stimulus to the bowels, the bitter principle of well grown grass. In consequence of this they become torpid, the food not well digested, the secretion of bile sluggish; and here is the foundation of that mass of disease in the liver. How far this opinion may be correct, I leave to the judgment of others; but, should it prove so, the remedy will be simple when taken in the first place, that is, before matter is formed in the liver. I presume that for want of that stimulus to the bowels the liver does not perform its functions, and becomes overloaded with bile, part of which is again circulated with the blood; but in time, from its stagnation, it becomes putrid, and matter is formed upon the liver in small tubercles, which, bursting into each other, become abscesses, in which are found the hydatids or flukes (fig. 51. p. 284.). By what means they get there is at present a matter of conjecture. It is certain they are animalcules, as they have been seen to move several hours after their removal from the sheep. It may be asked by some, How are we to know the rot in its first stage? The weather, the situation of his land, together with his own judgment as to the probability of his flock becoming diseased, are the sheep-owner's best guides. The sheep themselves, in an early stage of the disease, will appear slothful, and their eyes dim, with a tinge of yellow; i. e. having a jaundiced appearance. In this state, I should give a few doses of mild mercurials, saline aperients, and then a mild bitter infusion, such as infusion of chamomile or of gentian, two or three times a day. I am, Sir, yours, &c. — *D. N. Worksop, May* 12. 1831.

Cheap Preparation of Anatomical Specimens. — Sir, In Vol. III. p. 92. I find a query as to a cheap and efficacious mode of putting up anatomical preparations. Perhaps the following, for which my father obtained, in 1819, the silver medal of the Society of Arts, and which has stood the test of fifteen years, may answer the wishes of your correspondent.

Make a saturated solution of muriate of soda (common salt) in clear water, and filter through blotting-paper. Let the specimens to be preserved macerate, as usual, a few days in water, frequently changed, to cleanse them from blood. Then let them remain four or five days in some of the solution, and it will be advisable to put in with them some salt, tied up in a linen bag. Your readers will at once perceive the importance of this second maceration, as the large quantity of water which would otherwise be left in the specimens would destroy the saturation so essential to success. In putting up, the only thing necessary to be observed is that it is better to avoid the use of lead. The best mode of closing is with glass, cemented over the mouths of the bottles with rosin, or a mixture of rosin and oil. Some specimens will be found to float, even after the second maceration, and should be sunk by pieces of glass, which may often be made useful, by extending or exposing any parts required to be seen. A few drops of water may be added to the solution; say a drachm to a pint; otherwise the least evaporation will provoke crystallisation. Glass floats, for ascertaining the point of saturation, may be obtained of any instrument-maker. It only remains to add, that specimens thus treated in general retain their natural colours better than in spirits, and that some agarics have thus been preserved with such success as to warrant a repetition of the experiment. A more detailed account may be found in the *Transactions of the Society of Arts* for the year 1819. I am, Sir, yours, &c. — *W. C. jun. Trinity Square, Tower Hill, London, July* 1. 1831.

Whirls of the Tumbler Pigeon. — Sir, If Mr. Swainson, or any of the learned contributors to your Magazine, will condescend to give a satisfactory reason for the instinct peculiar to the tumbler pigeon, it would be a great relief to my mind; as it is a subject with regard to which I can come to no satisfactory conclusion. Buffon attributes the movement to vertigoes, arising from domestication; but Temminck, though he does not risk an opinion about it, gives an account of a wild species of tumbler (*Colúmba arquàtrix*), that amuses itself in the air with a sort of movement somewhat resembling the one alluded to. I therefore cannot imagine that Buffon, who was unacquainted with the wild species, has solved the riddle; especially as I am convinced that in both species it is a movement indicative of pleasure. I shall anxiously wait for a reply to my enquiry in your next Number. I am, Sir, yours, &c. — *A Subscriber. Southampton, May* 12. 1831.

Goldfinch losing its Note. — Sir, Having placed a canary within sight of a goldfinch, I found some time after that the canary began gradually to lose its note, and at last ceased altogether. It now endeavours to imitate the note of the goldfinch. Information on the reason, and the means I should adopt for the restoration (if possible) of its note, would oblige — *A. Z. London, June* 30. 1831.

In Bird-stuffing, what book of instructions is best, and cheapest? — *H. T.*

Rennie's *Ornithological Dictionary* seems silent on this subject. — *J. D.*

The Tree Creeper (*Cértlia familiàris*). — Sir, I saw this little bird on the 6th of January last, but always looking upon it as migratory, I thought I might have been mistaken, especially as Pennant says it migrates into Italy during our winter. In order to satisfy myself of its identity, or to convince myself of my mistake, I kept a daily look out, and had the satisfaction of seeing it again on the 14th, not far from the spot where I saw it on the 6th. It was running rapidly round the bole of an oak tree, apparently in search of insects. I approached sufficiently near to feel certain that I was not

mistaken. I shall, therefore, feel obliged if any of your correspondents can inform me whether the tree creeper is regularly a migratory bird, or whether, from its retired habits, it does not spend the winter in our woods. It is a very rare bird here, and the specimen I saw might have been of a late brood, and too weak to join in the general flight, if migratory. Yours, &c. — *W. H. White, H.M.C.S. Bedford, Feb.* 1. 1831.

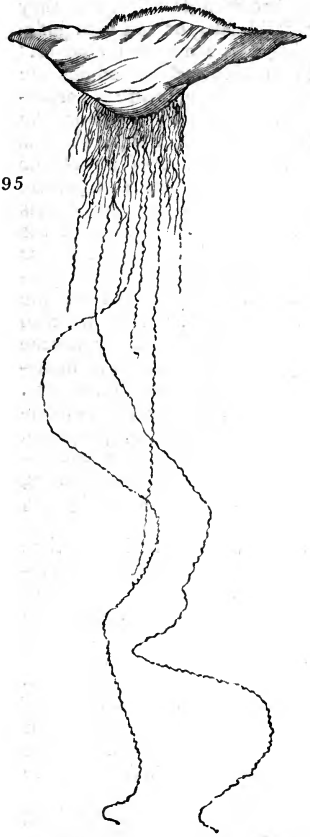
The Habits of the long-legged whistling Ducks of the West India Islands, and the Habits of the Sheldrake. — Sir, I shall feel particularly obliged to any of your readers who can furnish me with some information on the manners and habits of those long-legged whistling ducks found in the West India Islands, which are said to perch upon trees, and live more upon land than in the water. What I want is, information from those who have seen these birds in their native country, or who have watched them in a state of domestication. A similar original history of the common sheldrake (*Anas Tadorna*) would be valuable and interesting, touching its respective powers of walking, swimming, and diving, in comparison to those possessed by the common duck. Yours, &c. — *W. Swainson.*

The Pipe for blowing Eggs. (fig. 25. p. 145.) — "An Observer of Nature" would oblige me, and doubtless many other lovers of oology, by inducing the manufacturer of his invention to place some pipes on sale at some shop in London, and in making known to us what shop, and the price, through your Magazine. — *Henry Turner. Botanic Garden, Bury St. Edmund's.*

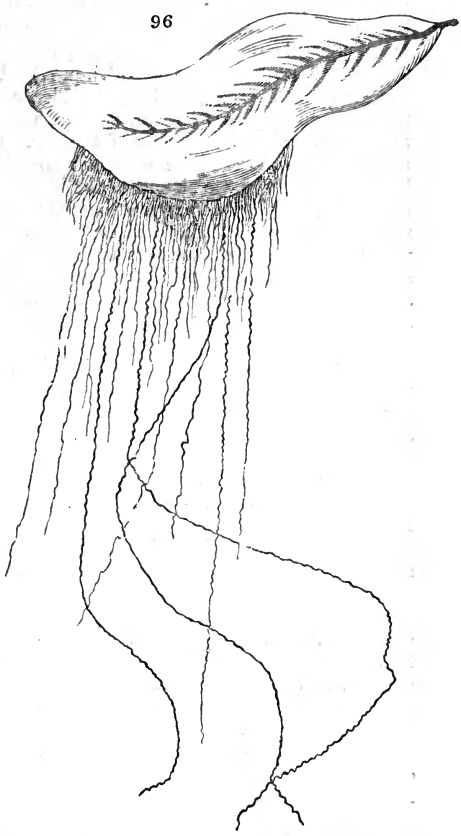
Snakes taking the Water. — Sir, At p. 279, 280. there are references to the question, whether the common land snake will take the water. I was not aware until I read the articles on this subject that any doubts had been entertained respecting it. Snakes will not only enter freshwater ponds and rivers, but will cross considerable channels of the sea. About thirty years since, during my first excursion into North Wales, I met by accident at Caernarvon with the Rev. W. Bingley, author of *Animal Biography;* we engaged a fishing-smack, to sail for a day on the southern coast of Anglesea, and to land us on those parts we wished to examine. It was a brilliant cloudless day, in the month of August. On our return in the evening, I was surprised by a sudden cry of the boatmen, when, about fifty yards south of the vessel, we saw a snake, with its head raised about one foot above the water, progressing rapidly towards the Isle of Anglesea: the snake was then in the broadest part of the Menai, nearly a mile from land on either side of the strait. The head and neck had an oscillatory motion. One of the men in our vessel threw out a small cork boat, and with oars and the most dreadful imprecations hastened to arrest the progress of the poor animal, which appeared to have no power of escape by diving. After a few strokes with his oar, the man succeeded in wounding the snake, and bringing it into our vessel. It was nearly a yard in length, and differed in no respect from the common snake. Mr. Bingley, who was well acquainted with that part of Wales, said that snakes abounded in the southern part of the Isle of Anglesea; and were frequently seen crossing thence to the Caernarvonshire coast. The common people entertain many superstitious notions respecting them, and their association with demons and wizards: this, he told me, was the cause of the rage with which our Welsh boatman pursued the snake we had just seen him kill. It is difficult to imagine how an animal like the snake could first ascertain the existence of land across a strait so broad as the Menai on its southern end; and by what instinct it was first impelled to undertake so long a voyage of discovery. I am, Sir, yours, &c. — *Robert Bakewell. Hampstead, June* 7. 1831.

P. S. — The frequent passage of snakes across the Menai, to and from the Isle of Anglesea was further attested by fishermen whom I questioned respecting it. They said that the snakes generally deposited their eggs on the low grounds on the Anglesea coast. — *R. B.*

The Portuguese Man of War. (p. 96 282.) — Sir, If the accompanying sketches (*figs.* 95. and 96.) and description will convey a good idea of the



95



96

animal, they are at your service. In Stark's *Elements of Natural History* it will be found under the division Radiàta, class *Acalèpha*: it is the Physàlia, or Phýsalis pelágica, of *Lamarck*. When seen floating on the surface of the water, the most conspicuous part of the animal appears to be an oval subtrigonal membrane, inflated with air, having an elevated ridge running along its back like a cock's comb, strongly marked with indentations, and tinged along the summit of a beautiful rosy hue, the extremities of the inflated bladder being of a fine purple and violet colour. Underneath the membrane, and nearest to the larger extremity, are attached numerous appendages; some are very short and thick, while others are very long, many upwards of 30 in. in length. Some are straight, others twisted, and a few are spirally twisted, like the spring-wire of a bell. These appendages, according to Cuvier, form the suckers, tentacula, and ovaries, and are of a beautiful violet and blue colour, intermixed with purple. The smaller extremity is free, and the animal possesses the power of lifting it out of the water altogether; raising it aloft into the air, while the larger one is kept floating on the water by the weight of the fleshy appendages already mentioned. They have the power of contracting and dilating their membranous bag at plea-

sure, and no doubt, by trimming it to the wind, make it act the part of a sail to propel themselves through the water. " They are very often to be met with at sea," says Sir Hans Sloane; " and seamen do affirm that they have very great skill in sailing, managing their bladder or sail with judgment for this purpose, according to the different winds and courses." (*Sloane's Voyage to Jamaica*, vol. i. p. 7.) Upon attentively examining the narrow or free extremity of the bladder, a small round aperture is perceptible, surrounded by a circular zone of fibres, of a beautiful red colour, like the muscular fibres of the iris of the eye. Out of this small hole, which is not larger than would be sufficient to admit the passage of a very fine bristle, I squeezed the air out of the bladder. It is by this aperture (which, by the by, I have never seen described) that the animal, I presume, expels the air from the bladder, when he wishes to sink under the surface of the water; but whether he refills it, by inhaling the air by this aperture, or secretes it from his blood, I shall not undertake to determine. They possess in a high degree the stinging quality which has procured for the animals belonging to the Radiàta the term sea nettles. They are also endowed with the luminous property which belongs to so many marine animals; and I have never failed to observe, when they have been numerous during the day, that the sea at night has been brilliantly illuminated. Sir Hans Sloane, in his *Voyage to Jamaica*, has given a figure of this interesting little animal, plate 4. fig. 5. " Urtìca marìna solùta, purpùrea, oblónga, cirrhis longíssimis — a caravell." The plate, however, is exceedingly bad; the crust is much too large, and altogether, as Lamarck observes, it is " très-mauvaise." — *W. Baird.* 8. *Everett Street, Russell Square, April* 10. 1831.

E'later murìnus, with a branched Antenna. — Sir, I captured some time since, on a nettle in the Battersea Fields, a specimen of E'later murìnus, remarkable for an extraordinary appendage attached to the second joint of the left antenna. This appendage consists of two antennæ, if I may so call them, each composed of nine joints, very stout. The natural limb however, though containing its usual number of eleven joints, is weak and slender, and not above half the length of the right antenna, which is perfect, and has no appendage attached to it. I should feel obliged if any of your readers could inform me if such instances as the present are of frequent occurrence, and to what cause, sexual or otherwise, this singular formation of the antennæ may be attributed. I am, Sir, yours, &c. — *A Lover of the Science. July* 14. 1831.

The supernumerary appendage found on the tarsus of Chlànius vestìtus, as figured and described in Vol. II. p. 302. fig. 86., may be cited as a case remotely parallel to the above. — *J. D.*

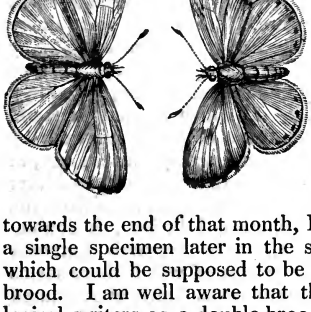
The Water Beetle. (Vol. III. p. 148.) — I should be obliged if you, or any of your correspondents, would inform me what species of insect is meant by " the water beetle," and to what previous communication the notice there refers. The destructive propensity of the insect in question renders it a matter of importance that its species should be accurately ascertained. — *B. Coventry, April*, 1830.

Queries by Agronome. — Sir, I shall endeavour, in this letter, not to offend any of your readers, by rambling out of my element, and getting among the stars or comets, but content myself with asking a few questions respecting the lower order of creation. And first, you have not satisfied me what are the origin and end of the hairworms (Górdius and Filària, Vol. I. p. 301., II. p. 103. 211., III. p. 149. fig. 32. p. 459. fig. 114.). I dare say that you, like me, when a boy, have been told that it was a horse-hair dropt in the water, and that the moisture swelled it into life; we have also heard of a lady who oiled her hair to such a degree, that each hair swelled into a serpent, and stung her to death. When a cowboy, I often tried to bring hairs into life by steeping them in water, but without effect. I then concluded that the hairworms were young eels, and kept some in bottles, but still they

would never grow bigger, and died in the course of time. I was thus far in the dark for many years, when in 1808 I was sweeping out a damp shed, in which were great quantities of the common black beetle, and in killing them I discovered in many of them a full grown hairworm : I therefore concluded that the hairworm was the origin of the beetle; and that, after it had lived a certain time in the water, it retired into some hole, and shrivelled up into a chrysalis, and formed the beetle. This I however afterwards found to be another grand mistake of mine, as on examining the natural habits of the beetle (not from books, but from actual observation), I found its natural history quite different. I therefore still wished and wish to know, how an animal such as the hairworm could get into the intestines of the beetle, and there grow to its full size, almost as heavy as the insect it lives in. I can believe that the bots in horses proceed from the eggs or nits deposited on their hair by a certain fly; but what is the origin of the tapeworm, and other worms, in man or beast, or what is their ultimate or last stage of perfection ? How does the tapeworm propagate its species ? We know that it is propagated by cuttings ; but naturalists know that nothing can be produced without original seed. Even the louse, Sir, (you can give it its scientific name) [*Pedículus humànus*] has puzzled me very much to find how it first originates on the cleanest of children's heads. If some of your many excellent correspondents will answer all or any of the above queries, I shall be particularly thankful; if not, I shall endeavour to answer them all in my own clumsy way, as I have a deal more to say on these subjects, but forbear, on account of my not being perfect in the language of science. Yours, &c. — *Agronome. March* 28. 1831.

Are Polyómmatus Argìolus, Melitæ'a Euphrósyne and M. Selène double-brooded or single-brooded Insects? — Sir, I should be obliged to any of your entomological correspondents, if they would inform me, through the medium of your Magazine, whether they consider the beautiful little Polyómmatus Argìolus (*Papílio Argìolus Linn.*), azure blue butterfly (*fig.* 97.), to be a double-brooded or a single-brooded insect. This may be deemed a question not worth taking up the room it occupies in your pages, as the answer to it might be readily obtained by reference to almost any work on British Lepidóptera. But my reason for asking the question is, that, though the butterfly is common enough in this district in the spring, more common, indeed, than I happen elsewhere to have observed it *, and usually makes its appearance with us by the middle of April, if the weather be fine, or towards the end of that month, I never yet could see, in any one season, a single specimen later in the summer than the month of June, or one which could be supposed to be any other than the product of the spring brood. I am well aware that the insect is mentioned by most entomological writers as a double-brooded species: and for this I may refer you, among other works, to Haworth's *Lepidóptera Británnica*†, Samouelle's

97



* I generally see it daily during its season, when the weather is fine, hovering about, and occasionally settling upon, the evergreens in my garden, with which it seems to be much delighted. The holly and ivy, on which, I believe, the caterpillar feeds, abound in this neighbourhood; and it is no uncommon thing to see four or five of the butterflies at a time vapouring about the same bush.

† In Haworth's *Pródromus Lepidopterórum Britannicórum*, which was published in 1802, one year before his larger work, P. Argìolus is merely stated

Entomologist's Useful Compendium, The Butterfly Collector's Vade Mecum, Stephens's *Illustrations,* &c.; all of which speak of the insect as double-brooded, and appearing in May, and again in August. Lewin (*British Papilios*) says, "there are two broods in the summer: the first is out on the wing the first week in May; the latter, the first week in July;" and Donovan, in his *British Insects,* observes, "there is one brood in the month of June or July, and another the latter end of August;" a statement which is evidently erroneous. I see by the last Number of your Magazine (p. 266.) that Mr. Dale took P. Argìolus at Cheddar, on the 31st of July; and lastly, I have myself taken fresh bright specimens in the Isle of Wight on the 29th of that month. It should seem, then, either that the insect in one part of the country produces two broods in the season, and in others only one; which would be an anomalous and extraordinary occurrence; or else, that in one place it appears only in the spring, and in another only in the summer, which would be little less extraordinary: and it may be worth while to submit to a minute examination the vernal and æstival specimens, in order to see whether two distinct, though closely allied, species may not have been confounded together, and hitherto supposed to form but one. Can any practical entomologist inform me, on his own authority, that he finds P. Argìolus in one and the same district both in the spring and more advanced summer? And has any one carefully examined and compared together specimens captured at different seasons of the year and in distant parts of the country? It is somewhat extraordinary, again, that a butterfly, which makes its appearance so early as the middle or end of April, or sometimes earlier (I have seen it on the wing on the 28th of March), should produce but one brood during the summer, as seems unquestionably to be the case with P. Argìolus in this neighbourhood; while several allied species, which make their first appearance later in the season, are known to produce two, as, e. g. P. Adònis, Icarus, Idas, Alsus, &c.; though, I am aware, we have an instance of the like anomaly in the case of Póntia cardámines, which appears on the wing in April and May, and is only single-brooded.—While on this subject, I would wish to ask also, whether Melitæ'a Euphrósyne and Selène (large and small pearl-bordered fritillaries) are really to be considered as producing two broods in the year? They are, I see, stated so to do by Mr. Stephens, in his *Illustrations;* and the latter of the two insects also by the author of *The Butterfly Collector's Vade-Mecum.* In answer to some enquiries on this point, Mr. Haworth, if my memory serves me, stated in a letter, that all the examples of the second brood which he had seen, and which were but few in number, varied from those of the first brood, by being of a much paler colour. I suspect that these two species are not, in reality, double-brooded, and that the few examples that have occurred later in the summer than usual, are merely accidental, and exceptions from the general rule. No other of our British fritillaries, I believe, is double-brooded, with the exception, perhaps, of the rare Argýnnis Lathònia (queen of Spain fritillary); concerning the broods of which there seems to be nearly the same kind of doubt and uncertainty as I have above stated in the case of P. Argìolus.* A. Lathònia, however, is so rare an insect in this country, that there is but little opportunity for instituting such

---

as appearing on the wing the middle of May. No notice is here taken of any second brood; and this omission leads me to conclude that the insect was only known to the author at that time as a single-brooded one: and if so, knowing, as I do, how accurate an observer Mr Haworth is, I may conclude also that P. Argìolus, in other parts of the country as well as this, appears on the wing only once in the year, and that in the spring.

* See preface to Haworth's *Lepidóptera Británnica,* p. 27, 28.; and Stephens's *Illustrations, Haustellàta,* vol. i. p. 37, 38.

experiments on the subject as may enable us to draw from them any very satisfactory conclusions. — I have to apologise for the length to which my remarks have extended; and I fear they will occupy more space in your Magazine than the importance of the matter in question may be thought to justify. The subject, however, relates to what appears to be a singular fact in natural history, and as such is interesting to me, and may prove so to some of your readers. Yours, &c. — *W. T. Bree. Allesley Rectory, May* 12. 1831.

Lobster-like Insect attacking the Leg of a House-fly. (p. 94.) — Sir, From your correspondent's description of this insect, I should take it to be the *Pedículus pùbis Lin.*, as I remember some years ago finding one in a similar situation. These animals are frequently found on uncleanly persons; and the way in which I accounted for this insect being found on the fly was, by supposing that the fly had alighted on some one so infested, and that one of the insects had seized on the fly. I preserved this specimen for some time, and gave it to a friend for microscopical observation, but, as well as I remember, it was a flattened insect with six legs, the two former having the claws like a crab. The description given in Turton's English edition of Linnæus's *Systèma Natùræ* is " abdomen emarginate, and hairy behind: legs cheliform: antennæ of five articulations." — *C. Jan.* 1831.

The House-fly's Duration, Rate of Increase, and Deposition of its Eggs.—Is it annual? as of the myriads which prevail in summer very few individuals are perceptible in winter. If annual, the rate of increase must be prodigious. What is the rate? Are there several generations in one summer? If yes, how many? Does each or every female produce more than one brood? If yes, how many? When does she produce it or them? Where are the eggs or larvæ usually deposited? — for though those of the flesh-fly (*Músca* carnària) are familiar to me, those of the house-fly (*Músca* doméstica) I have never knowingly seen. — *John Denson. July* 30. 1831.

Corollas perforated by Bees; in reply to R. A. Tudor (p. 93.). — I have seen the conical hoods (galeæ) of *Aconìtum* lycóctonum and the species nearest to this, when perforated, and under perforation, by bees; almost half the flowers on a plant: this five or six years ago; and a few flowers this week also in the Comte de Vandes's garden, close by. The specific name of the bee or bees I know not. In *Aconìtum* lycóctonum and its near allies, the structure of the hood so effectually covers and guards the nectaries, that to touch the latter without perforating or removing the hood is perfectly impossible. In *A.* Napéllus and its near allies, a more lax structure of the hood renders perforation less necessary, and in these I have never observed it. Is not the Aconite genus a suspicious one for the bee family to collect from? Nevertheless, two, three, or more species of bee do collect from it, and amongst them, I believe, the hive-bee; and hereby, I suppose, illustrate the couplet of Pope: —

> " In the nice bee, what sense, so subtly true,
> From poisonous herbs extracts the healing dew!" *J. D.*

Campánula hederàcea at High Beech. — A. J. (at p. 182.) asks some one to verify this habitat. In the summer of last year I observed the plant growing there, sparingly, together with *Anagállis* tenélla, Drósera rotundifòlia, &c. — *J. G. May* 19. 1831.

Mr. Dale observed Campánula *hederàcea*, July 14. 1830, " on the Dart, near Ashburton." (See p. 266.) — *J. D.*

Lace Bark. — Sir, I possess a small portion of a substance composed of fine white fibres of wood, having in their arrangement the appearance of lace. It was given me for part of a tree growing in Falmouth, north of Jamaica, called the lace tree. A description of such tree would be a favour to — *A. Z. London, June* 30. 1831.

" *Lagétta* linteària, producing the lace-bark, is a tree, the wood of which is white; its leaves are about 4 in. long, and 2½ in. broad near the base where broadest, having one middle and several transverse ribs of a yellowish green colour, shining, thick, and smooth. The outer bark is smooth, light brown or grey, and striated; the inner is solid and white, of a very fine texture, tough, and divisible into several coats or layers, which may be drawn out into thin webs resembling lace, and have been actually worn as such. King Charles II. had a cravat made of it, which was presented to him by Sir Thomas Lynch, then governor of Jamaica. It is there principally used for ropes; but would undoubtedly make fine paper if properly prepared. Native of Jamaica, where it is called Lagetto, or lace bark tree; and of Hispaniola, where it is termed Bois Dentelle." — Martyn's *Miller's Dictionary*, under *Dáphne Lagétto*, the name of the tree in old nomenclature. — *J. D.*

Retrospective Meteorology.—The following passages occur in Tacitus's life of Agricola (cap. 12.), and are related of England: — " The sky in this country is deformed by clouds and frequent rains; but the cold is never extremely rigorous. . . . . The soil, though improper for the olive and vine, and other productions of warmer climates, is fertile, and suitable for corn. Growth is quick, but maturation slow; both from the same cause, the great humidity of the ground and the atmosphere." Are not these passages, written almost 1800 years ago, a proof that no great alteration has taken place in the soil or climate of England? — *W. P. S. March* 6. 1831.

Frost. — Sir, I have elsewhere observed (p. 35.), when speaking of the severe weather which occurred early in April, 1830, that " the effects of the frosty nights on trees seemed to differ according to circumstances, and to be most destructive in the lower situations." Several instances of the same kind presented themselves to my notice this season, during the frosts which prevailed in the month of May. The gooseberries and currants were in some cases much injured in gardens which lay low, while those in more elevated situations escaped unhurt. Many of our native plants were cut off, as, e. g. *Equisètum arvénse*, Aspídium *Fílix mas** and aculeàtum, *Scílla nùtans*, &c.; all of them lovers of low ground. But not only were the late frosts most destructive in low situations; they seem also to have had a much more injurious effect on vegetation within a few feet of the surface of the ground than they had as many yards above it. And of this I was struck with a remarkable instance in a wood in this neighbourhood, which consists chiefly of oak. For the space of several acres, I observed the opening foliage of the underwood oak, to about 7 or 8 ft. from the ground, entirely cut off by the frost, though the bushes were, of course, much sheltered by the overshadowing boughs of the poles and trees above them; while, contrary to what might be expected, the foliage of the poles and trees themselves, which were exposed to the atmosphere, but elevated some yards above the underwood, remained unaffected. In the case also of single oak trees, in other situations, I observed the foliage of the lower boughs to be cut off by the frost, and that of the head and higher branches to be unimpaired. Is this usually the case? and how is it to be accounted for? It has been suggested to me, that these spring frosts prove most prejudicial to vegetation at that distance from the surface of the ground to which the fogs extend which often accompany them. Yours, &c. — *W. T. Bree. Allesley Rectory, June* 1. 1831.

* I remarked, in several instances, that one patch of fern was cut off, while another of the same species, on the same bank, and only a few feet distant, was not affected; and even one frond was killed, and the remainder on the same root escaped without the least injury.

THE MAGAZINE

OF

NATURAL HISTORY.

NOVEMBER, 1831.

ART. I. *The final Statement of Mr. Swainson, in Reply to Mr. Vigors.* By WILLAM SWAINSON, Esq. F.R.S. L.S. &c.

Dear Sir,

WHEN a man, for defending his friend, receives abuse, he justifies, not to the insulting party, but to the bystanders. I address myself, therefore, to you and to your readers.

Violent and reiterated attacks have been made upon M. Lesson and other French naturalists. These attacks have been vindicated by one party, and deprecated by me. The name of Mr. Vigors, either as author, abettor, or editor, is attached to all. Of the last and worst, "published under the superintendence of the secretary, and with the sanction of the council, of the Zoological Society," Mr. Bennett steps forward as the avowed author. This may be true: but I have yet to learn the difference between the man who originates, and the man who knowingly propagates, a calumny; who "superintends" its concoction; gives it the public support of his name; and implicates a set of gentlemen, as sanctioners of the libel, who never saw it. When this difference is established, then will I publicly retract my accusations. To do so before, with a conviction of their justness, would be base and dishonourable.

The editor of a journal, it must be confessed, is in a delicate situation: he cannot, nor should he, reject controversial papers. Science would be stationary without discussion, and without the insufficiencies of its teachers ever being questioned. But an editor, in my estimation, is bound to strike out all passages of personal abuse; all charges of base motives; all violent and unwarrantable expressions. Since his name is

unavoidably coupled with controversy, he will be doubly cautious in becoming himself an antagonist. Mr. Vigors has neither evinced this discretion, nor manifested this spirit. Had he loved peace, he would not have printed (at whose expense?) the well-known letter on the dichotomous system*, after it had been published, in a softened tone, elsewhere. In all this, however, there is nothing dishonourable. What I say is, that it implies a want of judgment and a love of controversy. We judge by acts, not by professions. You are told, indeed, that I was the first to begin this system. This the asserter knows to be false. The very first article of this description in his journal is an attack upon me (*Zoological Journal*, vol. i. p. 253.); the first I ever received. My answer was the first and the last, until now, that I ever penned: it occupies four pages. The controversial papers of Mr. Vigors, avowedly by himself, fill exactly forty. (*Zoological Journal*, vol. iii. p. 92—123. vol. v. p. 134—141.)

So far for the main question. My connection with the Zoological Society may be stated in a few words:—Mr. Vigors, by personal importunity, got permission to write my name on the paper sent round for its establishment. Sir Stamford Raffles was then alive; and Dr. Horsfield, I was told, was to be secretary. Upon these names I relied for a liberal set of measures. I soon, however, quitted London, and never heard more of the Society until I received the subjoined letter†, from what is mystically called "the financial department," in plain English, from Mr. Vigors. Sir Stamford Raffles, in the interim, had died; Dr. Horsfield had retired; and the whole concern had assumed the characteristics of any thing but of a liberal scientific institution. I consequently would not confirm my first intention, and declined joining a society where science was not wanted.

* It is somewhat singular that the library of the Linnean Society should have been fixed upon as the deposit of this private reprint, whence the copies were disseminated.

† "Sir, Your name appearing on the list of members of the Zoological Society for an early period, but no communication having been received from you from the time at which it was entered, I am requested by the president and council to enquire whether it is your intention to continue a member. I am likewise instructed to inform you that, as you have not availed yourself of the privileges of this society, you are liable to no further demands, should you wish to remain a member, than the entrance subscription, and the contribution for the present year.

"I have the honour to be, &c.

"*Zoological Society, Bruton Street, April* 14. 1828." "N. A. VIGORS, *Secretary.*"

"*William Swainson, Esq.*"

Subsequently, for the advantage of Dr. Richardson's work, I asked permission to use their museum: having previously, by the way, presented to it my collection of fish. Permission was granted, but with this extraordinary condition, that whatever I wished to know was to be learned "at the discretion of the secretary:" in other words, I was prohibited the free use of my own eyes and my own judgment; and was to solicit those of another, incompetent to understand, much less to throw light upon, my enquiries. Such was the "liberal assistance placed within my reach," such the "unprecedented generosity and forbearance" experienced. I went, however, to Bruton Street, accompanied by my friend, Mr. Audubon. Mr. Blanchard, the brother-in-law of Mr. Vigors*, very civilly opened the cases, and I was pencilling some notes upon a well-known bird (*Túrdus orientàlis Gm.*), when Mr. Bennett, with evident reluctance, interfered. He stated that, as Mr. Vigors was absent, I could not, agreeably to his express orders, proceed with my notes; the species I was examining *not being an arctic bird.* † Mr. Audubon and myself were both astonished looked at each other, and soon walked out of the place. In this way has been manifested "that spirit of disinterestedness and liberality," which, as Mr. Vigors says, "renders him a marked man." ‡

Having now divested this subject of all personal considerations (for a large body of liberal-minded gentlemen shall not be brought into disrepute and contempt by the petty jealousies of a few "monopolisers of petty power"), I shall have the "temerity" to return to it ere long. I shall mix up no scientific question in this letter. Those who choose to know more of Colàptes mexicànus than they have yet been told, may consult *North. Zoology*, vol. ii. p. 315. I have there, long ago, spoken of this blunder as Mr. Vigors wishes, and in that spirit which he should have shown towards M. Lesson.

Here I would fain pause; and if the personal reflections upon me had been less gross, or had come from one less known, I should have done so. But I must throw aside false delicacy, and proceed.

* There is a vast deal of patronage, I hear, in a small way, in the gift of the secretary.

† I accordingly applied, a second time, for "unrestrained" permission, and was then officially refused.

‡ So long as the secretary is thus able to debar scientific men from the free use of the Society's museum, he has, of course, exclusive control over his former collection. This collection, so much vaunted, I have often seen. I may safely say, it is decidedly inferior to the *duplicate* series of birds, insects, and shells in my own museum. It is certainly the dearest shilling exhibition in London. Who are the "money-changers?"

First, then, on my "grade" and "profession." My interrogator was, or is, in the army; consequently he knows, or should know, that he of whom he writes is his superior officer, and that in "camps and courts" he must give him place.

2. On the decline of science.

"This is the cant of the present day: every man who has a petty grievance to bring forward, or some trivial point of minor information on which he hopes to be borne into notice, adopts the decline of science as the post from which he starts." (p. 335.)

The only men who have written upon this subject are Sir Humphry Davy, Mr. Herschel, Mr. Babbage, and a powerful writer in the *Quarterly Review*. I feel honoured in being thus associated.

3. Opprobrious expressions are heaped upon me for receiving pecuniary recompense for my writings. Here again I find myself in a goodly company, headed by Sir Walter Scott, and terminated, we will say, by Mr. Bennett. We are all, it seems, "jobbers," "money-changers," "dealers in literary or scientific peltry." With such epithets does this writer insult that mighty and intellectual power of the country engaged to instruct or delight the world.

4. I am, moreover, "employed" by Dr. Richardson. The nature of this employment will be best understood by the following extract of his letter:—

"*Chatham, July* 4. 1831.

"Dear Sir, I have had the honour of your acquaintance now for upwards of three years, during which we have been mutually engaged on the ornithological part of the *Faúna Boreàli-Americàna;* and, so far from your being guided solely by mercenary motives, you have voluntarily, and at a great personal sacrifice of time, and a considerable one of expense, contributed a large and most material part of the letterpress to that work; although you have not received any pecuniary reward for these exertions, and were perfectly aware, from the first, that you never could derive any. Your conduct to me has been gentlemanly and strictly honourable throughout, and I have derived both pleasure and profit from your society.

"I remain, ever your sincere friend,

"*William Swainson, Esq.*" "JOHN RICHARDSON."

Dr. Horsfield, Sir W. Jardine, Bart., Messrs. Selby, Wilson, Sowerby, Stevens, Audubon, Trail, Scoresby, the late Mr. Roscoe, all the most eminent naturalists of the present day, have warmly returned me public thanks for liberality and disinterestedness. This, too, at a time when solicited on all sides, by publishers and booksellers, to devote more of my time to their undertakings. Even the author of the *Hòræ Entomológicæ* is a public, a willing, and a grateful witness in my cause.* I am perpetually assisting others, to the neglect

* Horæ Entom., part 2. p. 524.

and detriment of my own publication.* But there is one witness yet to be intimated: a person, who, having largely profited by this liberality, has measured out his acknowledgements in an equivocal tone† and in a thankless spirit; who, as a mere tyro in that science over which he now assumes the dictatorship, assiduously sought and courted my acquaintance, importuned me with interrogatory letters‡, borrowed specimens from my museum, expensive books from my library, until his character was discovered and his acquaintance renounced. There was wanting but a darker and a bolder stroke to complete the picture; that by which our real positions were to appear to the world as if reversed: this stroke has now been given.

But those I have named are personal friends. Now for the testimony of a stranger, and of one, moreover, who requested my advice and assistance in controverting my own opinions! Mr. Rennie, a gentleman I never saw, thus expresses himself: —

"Permit me to return you my best thanks for your prompt attention and your candid remarks on my proposed introduction to *Montagu*. They are the more valuable, as coming from a naturalist who has had so many opportunities of studying the various classes of animals, and who is, besides, well acquainted with the quinary system, to which I have ventured to object. Your remarks, however, make me think I shall never be able to comprehend that system. In my first proof I had treated it as claiming to be the natural system; but Mr. ——, on reviewing that proof, disclaims this absolutely, and says it is altogether artificial. I amended my proof accordingly, in conformity to all these minute corrections, yet you intimate that it is§ the natural system, as Mr. MacLeay, I think, unequivocally does."

In consequence of another explanatory letter from me, Mr. Rennie thus replies: —

"I feel extremely flattered and obliged by your kind letter; so very different from the treatment I have received from several other quarters, where my fairness, in sending my proofs before publication, has been met with abuse, instead of the manly candour of your communication."

Here we have one party meanly betraying, or ignorantly misrepresenting, his master; and another, while he does not assent to his entire theory, nevertheless defending him. Such is the present state of zoological science among us. Mr. Mac Leay is peculiarly unfortunate: misunderstood by his opponents, and misrepresented by his friends, I can only wonder he has a grain of patience left. When will he return, like Ulysses, and clear the hall of these pretenders?

* Zoological Illustrations.
† Linn. Trans. vol. xiv. p. 465., and particularly the note at p. 513.
‡ These have been preserved; they are unanswerable witnesses.
§ "A part of" should have been here inserted.

As I am contemptuously urged for farther explanations on this topic, I must now declare that he "who adopts theories he does not understand" is Mr. Vigors. He has proved this by his own words, in his published writings. I have convicted this person, moreover, of being profoundly ignorant of the very essence of that quinary and circular system upon which he publicly lectures.* These are no random assertions. They rest upon scientific details now coming before the public, divested, as all such matters should be, of personal feeling.

To me this exposure is any thing but distressing. Living on terms of intimacy or of friendship with almost every naturalist in London, whispered defamations, from time to time, have reached my ears: they have now appeared in a definite shape, and I rejoice in the power of fairly meeting them.†

If it is enquired, what good results from this controversy? I would reply, much. Truth is the result of discussion. A better tone will be assumed by those who write and those who edit. Students will know the respective merits of their teachers; and a beneficial change will be effected, sooner or later, in the management of the Zoological Society.‡ For myself, I have little or no personal interest in these matters: praise and blame, from such a quarter, are alike indifferent to me. I have stepped forward as the champion of others, not of myself. Had I desired controversy upon my own account, I have shown it might have been begun three years ago. I have done, in fact, what every one of your readers, placed in M. Lesson's situation, bit and worried on all sides, would have most cordially thanked me for. Let them remember this, and I am sure of their approbation. Nothing shall now tempt me to another reply.

I am, dear Sir, yours, &c.

WILLIAM SWAINSON.

Tittenhanger Green, St. Albans,
October 1. 1831.

* "What influence these misunderstanding parties could have had upon the real interests of science, I am," says Mr. Vigors, "at a loss to discover." In other words, it is of no consequence whether a public lecturer understands, or not, the theory which he professes to explain and illustrate.

† It is almost beneath me to say that the "famous story" about the hyacinthine maccaw is a complete fabrication. The specimen in question was exchanged, not sold, for sixteen small African birds, with this person's friend, the bird-stuffer.

‡ Who does not know that you, Sir, more than any other reformer, by your just and manly attacks on the Horticultural Society, worked as great a change in the disreputable management of that institution, as is now so loudly called for in the Zoological?

ART. II. *Letter to the Editor, in Defence of certain French Naturalists.* By M. LESSON.

Sir,

WILL you have the goodness to insert, in your valuable Journal, the short answer of a stranger, to the voluminous articles of Mr. Vigors in the *Zoological Journal?* Your readers may possibly blame your indulgence, since they may think these recriminations very tedious. I shall even confess that if an individual of the most honourable feeling, and for whose high talents I have the greatest respect, had not taken up the gauntlet which Mr. Vigors so disdainfully threw down, I should not have done it myself, literally speaking at least, since I should have left the public to form its own judgment upon these attacks, destitute, as they are, of justice and of good feeling. But I cannot refrain from publicly expressing to Mr. Swainson the most lively sense of gratitude for his generous conduct. He has known that the feelings and the reputation of his friend have been wounded by unjust and personal attacks; and that this friend, a stranger and a foreigner, might be condemned in England, without appeal. But to the question. Indirect attacks by Mr. Vigors upon other foreign authors had made me understand the nature of his criticism*, when M. le Baron de Ferussac requested me to give an account of the memoir of Messrs. Horsfield and Vigors upon certain quadrupeds described by these gentlemen as new. This I did, simply by referring to certain descriptions and figures, already published, of these supposed new species. A long and angry reply from Mr. Vigors, full of bitterness and personality, immediately appeared in the *Zoological Journal.* (No. xvii. p. 134.) If "the style," as Buffon asserts, "shows the man," I conclude that Mr. Vigors is more prolix in his refutations than in his memoirs. How could I have been justified in deceiving the public that these discoveries were new? I should then, indeed, not have offended; but *vitam impendere vero.*

I am accused by Mr. Vigors of jealousy of the naturalists of England; of ignorance of their labours, &c. Now, it is to this that I must answer. I have for many years travelled in the foreign colonies and possessions of Britain, and there learned to appreciate the character of the nation. So far back as 1825, I translated into French the *Zoological and Botanical Memoirs* of Dr. Horsfield, which had been published in Java. I receive all the monthly scientific publications of

* In the original, *m'avaient donné la mesure de sa critique.*

Britain, and make known their contents in those of France; and although without private fortune, and a military medical officer upon slender pay, there are few English works upon zoology I have not procured, except the very expensive ones. No writer on the Continent has so frequently cited the works of Sir S. Raffles, Swainson, Horsfield, Yarrell, Selby, Bell, Richardson, Sabine, Hardwicke, &c. &c. This accusation is therefore false and unjust. A nation, also, which has produced so many eminent zoologists, and which ranks so high at this moment, can only be regarded with jealousy by blind or stupid men; and I do not believe I am in either of these two classes.

I ought, perhaps, to have followed the same course as my friend M. Desmarest, who, after seeing Mr. Vigors's article on the word "Perroquet" in the *Zoological Journal* (vol. iii. p. 91—123.), said to me, "I shall take good care not to answer this: if I write but one or two pages, they will come down upon me with a quarto volume at least." * To conclude, I can only subscribe to the "defence" of my friend, Mr. Swainson: in every respect. Both as regards M. Desmarest and myself, it is perfectly true, and will be sufficient, I hope, to clear us in the estimation of the naturalists of England, whose esteem we value in proportion as we highly appreciate their numerous and important works. Accept the assurances of my great consideration, &c.

Paris, Aug. 24. 1831. P. Lesson.

Art. III. *Reply to Mr. Davis's Animadversions upon the recent Method of publishing his "Illustrations of British Entomology."* By J. F. Stephens, Esq. F.L. and Z.S. &c.

Sir,

An article having appeared in your Magazine of the 1st instant, respecting the recent mode of publication of my *Illustrations of British Entomology*, from the factious pen of Mr. Davis, I rely upon your impartiality to insert the following refutation of the calumnies contained therein, though, as I would much rather that the space were devoted to objects more legitimately connected with the real advancement of knowledge, I shall be as explicit as the nature of the charges will permit. I shall, therefore, first proceed to analyse the first two paragraphs and their attached notes, and to correct

* Me dit, "Je me donnerai bien de garde d'y repondre; car si j'écrivais un ou deux pages, on me terrasserait avec un volume in 4to au moins."

the obviously false inferences Mr. Davis necessarily draws from his erroneous premises.

Mr. Davis commences by saying (p. 303.) —

1. " On the first appearance of this periodical (on the 1st of May, 1827), it was announced at 3*s.* 6*d.* per number, and was to be completed in sixteen years."

Now, Sir, the original prospectus, which was issued extensively, and inserted in all the leading journals of the day, and of which I enclose you a copy, regretting at the same time that I have not a sufficient number remaining to meet the demands of your useful publication, assuredly states that the *Illustrations* were to appear in monthly numbers, containing one sheet of letterpress, at 3*s.* 6*d.* each, but not one word occurs regarding the extent of the work, or the time it was likely to occupy in its publication; and it was not until the appearance of my tenth number, on February 1. 1828, that any definitive time was even hinted at; when it was stated, in reply to a disingenuous allusion to my work by Mr. Curtis,—

" That no one could expect to see the completion of a work upon species, in the present advanced state of science," &c. : — that " my labours would cease in about sixteen years, or the period employed in the publication of Mr. Donovan's *British Entomology*."

But no time was even then named for the termination of the respective volumes; and it was not until the 1st of May following that I proposed " to complete two volumes, with an index, &c., annually on the 1st of June," to be effected by publishing a supplementary number of about 100 pages, on June 30. 1828 : thereby clearly showing that it was never contemplated that the first two volumes (of six sheets each, less than some of my numbers) were to be completed by the 1st of May, as Mr. Davis, who states that he " wishes to deal only with facts," chooses to assert, by affirming (in p. 305.) that the third volumes " ought to have been completed on the very day this address (of May 1. 1830) was dated;" and also again (in p. 308.), " the third volumes of the work will be completed just thirteen months later than the time originally promised," if finished by the 1st of June last; mere assertions, evidently introduced, as above and elsewhere alluded to, for the dishonourable purpose of giving a colour to his other misstatements and charges.*

* Figures, the most unerring guides when correctly stated, will render this point more evident, and show the false stress that is laid upon the mere word volume. The three double volumes, actually brought to a close, contain ninety-two sheets of letterpress. Now, as the original stipulation was to publish one sheet monthly, ninety-two months, or nearly eight years,

2. " At this period [before the appearance of No. xv.] commenced those irregularities in the publication which have produced so much mystification," &c.

Now, the only irregularity that took place previously to the appearance of No. xxviii., exclusively of the extra number (xv.), was by No. xxii. containing one sheet in lieu of two; arising from my being unexpectedly called upon and compelled to serve on the grand jury for Middlesex for nearly a fortnight; but the deficient sheet was published in the following number. Here again Mr. Davis's dates and assertions are false.

3. " A slight delay which occurred with Nos. xv. and xvi. was attempted to be atoned for by another pledge (being the third alteration) to complete the work in 120 numbers."

Here also Mr. Davis, with his usual disregard to veracity, makes no less than three false statements. No. i. was published, as admitted by Mr. Davis, on May 1. 1827, and the succeeding numbers appeared on the 1st of each successive month, as stipulated. No. xiii., consequently, was published on May 1. 1828; No. xiv. on June 1.; No. xv. on July 1. " Oh, no!" " I wish to deal only with facts," says Mr. Davis. " A slight delay occurred with Nos. xv. and xvi.;" whereas No. xv. was published on June 30., and No. xvi. on July 15.; which, according to my simple notions, was rather an acceleration, and required no atonement; the former number being published one day, and the latter one fortnight, earlier than

---

would have been required before three volumes of the same extent could have been completed, agreeably thereto; whereas fifty months only have elapsed since the commencement of the work (eight of which, as hereafter noticed, were not devoted towards its prosecution,) and, in addition, seven sheets towards the next volumes have been published; thereby manifestly showing that double the original quantity of matter has been given in half the time. And, with regard to the third volumes, it may be remarked, that the volume of Mandibulàta was actually finished twenty-nine months, and that of Haustellàta twenty-three months, before their original time, although the former volume contains six sheets more than the covenanted quantity, and the latter four sheets; being forty-six sheets in lieu of thirty-six, or ten extra-sheets (about three times the value of the six figures deficient in the volumes, but which will, nevertheless, ultimately appear), which would have occupied above three monthly numbers, and for which no actual charge is made; these volumes being sold at the same price as the others, although it has clearly occasioned me one fourth more labour than the subscribers have any right to expect. But, should it be objected that the latter are placed in a worse condition than those persons who take the work in volumes, by having apparently to pay for the extra-matter, be it remembered that they have already received thirty figures, and seven sheets of letterpress (and would have received more of the latter, had it not been for the gratuitous quantity in the third volumes), towards the next volumes, in addition to the advantage of procuring the early parts of the volumes, and becoming acquainted with their contents long since.

promised. No. xvii. appeared on the 15th of August, and No. xviii. on the 1st of September, all complete; whereby a clear month was gained, exclusively of the additional quantity of matter produced within that period (in No. xv.), which, according to the original proposals, would have been eighteen sheets only, whereas no less than twenty-seven sheets and a half had been then published, and which, had the original plan of the work been adhered to, would have occupied as many numbers; the twenty-seventh of which would not have been published until the 1st of July, 1829. The other pledge, "to complete the work in 120 numbers," was given, according to Mr. Davis, in consequence of the delay above referred to. This assertion Mr. Davis contradicts, himself, in the following paragraph, from my words; which clearly show that the 120 numbers alluded to on June 30. 1828, were in addition to the fifteen then published (making 135, as there stated): there was consequently no alteration, instead of a third, as falsely assumed.

4. "Owing to these irregularities, the second volumes were not completed until the 1st of July, 1829, instead of the 1st of May."

See the first observation in regard to this succeeding misstatement, to which, as showing the wonted injustice of the writer, it may be added that the volumes were completed and published on the 15th of June, and a copy presented to the Linnean Society on the 16th. It is, therefore, evident that Mr. Davis finds it inconvenient for his arguments to adhere correctly to dates, &c.

5. "On the wrapper of No. xxviii. [it should have been xxvii.], which appeared on that day (July 1. 1829, see above), a farther proposal was announced: it was this — to reduce the coloured figures, and increase the letterpress; a promise was given that each successive number should contain alternately a plate with six figures, and thirty-two pages of letterpress, and a plate with three figures and sixty-four pages: the advantage to be derived being the completion of the work in 87 numbers instead of 135, and the cessation of the author's labours in five years; and the cost, at least, two thirds less than originally proposed."

To this is attached the following note: —

"The fallacy of all this would admit of exposure. [Why so considerate as not to proceed with the exposures?] Four years have now been consumed, and the author has described less than 2500 species: at the same rate of proceeding, sixteen years will be required to describe 10,000."

These sentences are replete with misstatements and false assumptions. On the 15th of June I proposed

"to reduce the number of coloured figures, and to increase the quantity of letterpress: each number (price 5*s*., as at present) [see hereafter] to contain alternately six figures with 32 pages of letterpress, and three

figures with 64 pages, forming two annual volumes, as heretofore. By this alteration in his plan, the author's labours will not only cease in five, in lieu of nine, years [from the commencement, Mr. Davis infers by his note, though any schoolboy could tell better by the context], but the entire work (in 87 instead of 135 numbers) will cost nearly two thirds less than originally proposed."

In this quotation, where does the word *plate* appear? a term made use of by Mr. Davis, with his usual candour, to found a further charge upon. He concludes the two wily paragraphs, which I have here analysed, by the following statement: —

"His renewed engagement, then, binds him to furnish annually six plates of six figures each, with twelve sheets of letterpress; and six plates of three figures each, with twenty-four sheets of letterpress."

There is apparently but little difference between our two statements in this particular; but the variation Mr. Davis makes is entirely to strengthen a subsequent assertion, by the undue advantage of employing the word *plate*, of which anon; as I must first controvert the more important misstatements or reservations, "the fallacy of all which," Mr. Davis says, "would admit of exposure." My proposals of the 15th of June, 1829, simply amount to this: to complete the work in 87 numbers, each two containing nine figures and six sheets of letterpress, or 54 figures and 36 sheets per annum; and by this plan to save nearly two thirds of the original expense *, as well as to conclude my labours in seven years from

* The original expense would have been above 40*l*., thus calculated: —

One year of 21½ sheets, one year of 24 (or 25½ sheets, as actually published), and five years of 36 sheets; with ten additional sheets given in vol. iii., and at least 10 more in the forthcoming volumes: equal to 247 sheets or original numbers at 3*s*. 6*d*. each =						£43	4	6
Altered publication, as proposed on wrapper of No. xiii. (May 1. 1828): one year, or 15 Nos. at	£3	0	0					
120 do., 5*s*. each =	30	0	0	= £33	0	0		
First saving				£10	4	6		
Second (and last) alteration: one year, or 15 Nos. at	£3	0	0					
72 do., at 5*s*. each =	18	0	0	=			21	0	0
Actual saving to subscribers, with the original quantity of letterpress (247 sheets), without taking into consideration other additional sheets which may be given in the forthcoming volumes, or the six numbers saved by an alteration, not of plan, but of type alone, 1*l*. 10*s*. more; or 23*l*. 14*s*. 6*d*. altogether; and the work to be completed in seven, instead of upwards of twenty, years						£22	4	6

the commencement; 27 numbers having then appeared, and 60 monthly ones being at that time required to make up the number promised. Mr. Davis continues: — "Four years have now been consumed," &c.; intimating, by his astute mode of reasoning, that they had elapsed since the alterations, or rather that the alterations implied the completion of the work in five years from the commencement; "and the author has described less than 2500 species [2551 was then the number]: at the same rate of proceeding, sixteen years will be required to describe 10,000." This last clause is undoubtedly incontrovertible. But do I proceed at the same rate? No; I boldly aver. During the first twelvemonth, I described only 280 species; whereas, 694 were described between November and May last, and 175 in the last two numbers. The third volume of Mandibulàta (which contains full descriptions, &c., of 735 species) was completed between May 30. and January last; and the total number of insects already described is 2726.

Having thus shown that there is scarcely a correct sentence in the two leading paragraphs of the article in question, I must proceed to notice other charges therein, which I shall do as briefly as possible.

With regard to the irregularities, no one has more cause to regret them than myself; and I candidly admit that my zeal has overstepped the bounds of prudence, by inducing me to suppose that I should be enabled to redeem my promises at the periods specified: promises broken, not from the sordid motives imputed by Mr. Davis (which I utterly and contemptuously deny), nor from any other motives, but purely from physical causes, and from them alone; as I shall, though accompanied by painful reflections, proceed briefly to detail; — causes well known to most of my entomological friends, and not altogether unknown to Mr. Davis himself, although unnoticed by him. In changing my residence rather unexpectedly, at the end of July, 1829, my library and cabinets were necessarily packed up; and from the alterations required here, it was not until the end of September following that I could regain access to them, which alone compelled me to postpone the publication of the number then due to the 30th of that month; during which interval severe domestic illness arose, which continued almost unceasingly, until it suddenly terminated fatally in the beginning of November last. And I was not only afflicted myself with illness during the greater portion of the preceding months of February, March, and April, part of July, and again in September, so as to prevent me

from attending my public avocations, as officially notified; and, for about fifteen successive weeks, I scarcely obtained two hours' consecutive repose, in addition to the anxiety consequent upon the state of my family; but unexpected demands upon me, connected with my publications, in October, 1829, determined me, in justice to my then increasing family, which is chiefly dependent upon my exertions for support, to discontinue my *Illustrations*, as I found the expenses of carrying them on amounted to at least two thirds of my income, with an uncertain return of less than three fourths of my actual expenditure. In pursuance of that resolution, I abstained from proceeding with my MSS., with the exception of the small portion that was then nearly ready, and published in January at the urgent solicitations of many friends, whose persuasions subsequently induced me to recommence my labours, which were, as above stated, necessarily suspended from January to nearly the end of April. The causes, therefore, to which I referred on the 1st of May, were indubitably "uncontrollable," and remained so, and were of no "immediate interest" to my subscribers: and I have yet to learn that any human being is accountable to another for suspending an undertaking in which he may be engaged, when prevented from proceeding by the afflictions of our "Universal Parent;" because such compulsory suspension may "indisputably affect the pockets" of the subscribers, as Mr. Davis so feelingly remarks: a remark, by the way, totally devoid of truth.

Having thus shown that the causes which led to the derangement of the work were totally repugnant to my own designs, I shall leave the other "envenomed shafts" of Mr. Davis to receive their proper direction from the justice of the reader, previously directing attention to one or two sentences therein which seem to require particular notice. It may be remarked that every extenuating point is omitted, while defects, real or assumed, are unjustly magnified throughout the article; e. g. Mr. Davis observes that certain numbers are charged the usual price (*5s.* *), although they contain less than the stipulated quantity of matter: but he takes especial care to remain silent in regard to the price of such numbers as, for instance,

* In reference to the price of the numbers, that was settled by my publishers, whose known probity and uprightness sufficiently guarantee its propriety, and which, compared with similar works, is not exorbitant; and the third volumes will bear comparison with any systematic work in regard to price; and, in these volumes, twenty-two sheets of letterpress have been given in lieu of twenty-four figures, decidedly to the advantage of the purchaser.

No. xl., which contains six sheets and nine figures (two ordinary numbers, for 5*s.*), or No. xxxv. part 2., which contains more than an ordinary number, for which 2*s.* 6*d.* only was charged. Again, how carefully he conceals the fact that the third volume of Mandibulàta contains 24 sheets instead of 18, while he claims "at least three more sheets" to complete that of Haustellàta, at the time when 37 instead of 36 sheets had been published towards the third volumes; and, although forty-eight figures out of fifty-four had appeared, he claims two plates of six figures each to make up the assumed deficiency, as boldly as if his mere assertions were matters of fact!

Before I conclude, I must add a word respecting the completion of the third volume of Haustellàta, which I proposed that my subscribers should receive *gratis*, as, it is evident, will be the case, however dissonantly to the practices of *trade* I may have carried my designs into execution. The third volumes are now terminated: consequently, as they contain ten extra sheets, and are sold for the original price, the additional quantity, recently published, has been given *gratis*, notwithstanding, in their publication, they have been blended with the fourth volumes, which will also contain at least thirty-six sheets, as stipulated, and the six deficient figures. And it may be remarked, that the blending of the volumes (a point by no means unusual in periodicals), although liberally attributed by Mr. Davis to design, stimulated by cupidity *, which I utterly disclaim, was solely the effect of accident, occasioned by my determination to carry each volume to the point fixed upon for their respective limits, so as ultimately to comprise the work in (the eighty-one numbers, or) thirteen volumes, at 1*l.* 11*s.* 6*d.* each half-bound, without rigidly adhering to the eighteen sheets proposed for each volume respectively. Whereas, had I been actuated by the feelings alluded to, the third volume of Mandibulàta would have stopped at the eighteenth sheet, which appeared in December; and the matter of the January number would then have sufficed to complete the corresponding volume of Haustellàta; the points I had determined

* When I state that, from some of my friends preferring the work in volumes, several copies of the third volumes cannot be distributed by me until they are completed and bound, it appears paradoxical how the extension of the volume can arise from cupidity; and whether my actions in the prosecution of the work are stimulated by that feeling, especially when I add that *two thirds of my actual expenses have not yet been repaid*, may be appreciated by remarking, that, in order to enable me to proceed with my *Illustrations*, I have refused very lucrative offers from my own publishers, and also from Messrs. Murray, Griffith, and others, to edit works on entomological subjects, unaccompanied by personal expense, by which I have sacrificed several hundreds of pounds.

to reach being to the end of the Bostrícidæ in the Mandibulàta, and to that of the Geométridæ in the Haustellàta, as I had, in like manner, determined to carry the fourth volumes respectively to Híspa on the one hand, and to the end of the Lepidóptera on the other. Acting, therefore, upon my decision, the third volumes were thus terminated, notwithstanding, when I collated the MSS., I found they would so considerably exceed their due bounds. And when I state as facts that the ten sheets published in December and January were written, printed, corrected, and published during those two months; to accomplish which, I was actually compelled to labour during two entire nights, my time being limited to five evenings in the week only, and to a short period each morning; the cause of the conclusion of the volume of Haustellàta not appearing so soon as promised may be rendered manifest. And I may add that, in consequence of my proceeding with the MSS. of the last-mentioned volume, which I could not send to press, from the tabular views of the *N*octùidæ and Geométridæ not being drawn up (a task, I freely confess, I had not sufficient confidence to attempt, nor time to devote thereto, and was at last compelled to postpone to the end of the volume), a single sheet of Coleóptera was published in February; the only month this year in which there has been a real deficiency of letter-press: the January number (xl.) containing six sheets; March, three; April, four; May, four; June, three; July, five: equal to twenty-six, as distributed by me *; and the number of figures being thirty-three, or six sheets and three figures above the quantity required for seven months, and consequently so much towards getting up the arrears, which last I have never attempted to deny. What "paltry advantages," therefore, I have taken, in the prosecution of my work, I must leave to the astuteness of Mr. Davis to discover. I may, however, here take the opportunity of noticing a point with which, although a bookseller, he appears to be unacquainted. Amongst his other assertions, he finds it convenient to confound a matter of courtesy with a right, by stating that I "debar my supporters from their undoubted privilege" of withdrawing their support. Now, the general fact is (not that I wish to apply it to my case) that an "original subscriber" has no right to withdraw his name, and can be compelled to "finish what

* The custom of the book-trade requiring that periodicals shall be ready by an early hour on the morning of publication, has occasionally caused a dissimilarity in the contents of the numbers, as distributed by my publishers and myself, as in some instances an additional sheet has been ready by the 1st of the month, which I have sent out to my subscribers.

he has begun;" but, in courtesy, his withdrawal is generally admitted.

Finally, Mr. Davis asserts that "I make no less than five deviations from my original plan." This I deny in the most positive terms. My original plan was, to publish one sheet monthly, and six figures; my second, two sheets and six figures; and my third *and last*, to furnish alternately two and four sheets, and six and three figures, equal to three sheets and four and a half figures monthly: the saving of six numbers, as before alluded to, originating in no deviation from the plan of the work, but by a slight alteration in the employment of type alone.

A person who takes upon himself the unenviable office of a "public accuser" should, at least, be certain of his premises, and come before the public with clean hands. Whether Mr. Davis's conduct is as pure and honourable as it ought to be, may be inferred from the fact of his becoming the publisher (of course, disinterestedly) of a work which he was informed by me, in March, 1828, was obtained originally from my MSS.; and which, had he been well versed in entomology, he might have seen was subsequently pirated from my *Nomenclature* and *Systematic Catalogue*, the combinations of species existing in no other works, and the typographical errors being, in most instances, scrupulously and ignorantly retained and republished: a fact which sufficiently exemplifies the object of his attack, and at the same time shows how little he regards the just rights of others, while he so pertinaciously adheres to his assumed privileges, under the false plea of promoting the "advantage of science." But from the context, and his conduct, it is evident that his object is the suppression of the work which I have undertaken: a suspicion confirmed by the circumstance that, although he received an invitation to visit this place, whenever he was disposed, on Wednesday evenings (of which he has several times availed himself, the last time in July 1830, twenty-seven months after the irregularities in my work commenced, according to *his* account, and three months after I had, as he wishes to make out, endeavoured to impose upon him by publishing numbers without plates for the full price), he has chosen your pages in which to make his first complaint. But he may rest assured that, feeling conscious of the rectitude of my intentions, his malevolent assertions excite only the contempt they merit; and that I shall continue to labour at my avocations, without deviating from the course I have already chalked out, so as to complete the work within its assigned limits, although irregularities may occasionally

take place, being fully aware that every honourable man, upon becoming acquainted with the truth, will give "credit where credit is due."

I am, Sir, yours, &c.

Hermitage, South Lambeth, J. F. STEPHENS.*
July 29. 1831.

ART. IV. *On the Intellectual Faculties of Brute Animals.* By J. J.

Sir,

IT is an opinion very generally entertained, that man is the only living being endowed with the faculty of reason; and that the intellectual operations of all brute animals are the results of mere instinct. This doctrine has been current from time immemorial, although the most learned and the most knowing amongst the ancients and moderns, who have examined it impartially, have been obliged to admit that it is unsupported by a single fact; and that it is altogether inconsistent with philosophy, and even, indeed, with common sense. Mr. Locke, who by universal acquiescence is allowed to be one of the most profound thinkers, and one of the most generally correct in his positions and inferences, of any that ever lived, conceded a degree of reason to brutes. "It seems," says he, "as evident to me that some of them do in certain instances reason, as that they have sense." The most eminent philosophers and naturalists of the present day are also unanimous in the same opinion. The testimony of that prince of naturalists, Cuvier, will serve as an example. "Although," he observes, "the most perfect of other animals are infinitely below mankind in their intellectual faculties, it is, nevertheless, certain that they perform intellectual operations similar to ours in *kind*, although not in *degree*." After having amply illustrated, and proved incontrovertibly, the truth of this proposition, he adds: — "In short, we perceive in the superior animals a certain degree of reason, with the consequences, both good and bad, resulting from the exercise

* In your last Number (p. 460.) there is an addendum to Mr. Davis's attack, from the pen of a cowardly assailant, whose anonymous remarks I shall not condescend to reply to, until he has the manliness to avow himself; which remarks, by the way, being unaccompanied by the writer's name, according to your avowed sentiments, ought not to have been inserted.

[When we feel, as in this case, perfect confidence both in the science and honesty of a correspondent, we do not hesitate to publish his opinions, though under an assumed name. What we have stated on the cover of No. XXI. is perfectly consistent with this view of our duties. — *Cond.*]

of that faculty in man. It resembles the dawning of intellect in the infant mind previously to the acquirement of speech." It would be useless to multiply authorities in opposition to a hypothesis, the absurdity of which must be obvious to every enquiring unbiassed mind; and if the subject were formally investigated in its various bearings, the arguments *pro* and *con* brought forward, I should usurp the space that may be occupied by much more interesting matter, and should become involved in details, many of which are rather alien from the objects of this Magazine.

I was led into these remarks by having lately observed a circumstance that exemplifies, in a remarkable degree, the truth of the assertions I have just made. It was about the middle of last April, when I observed a young lamb entangled amongst briars. It had, seemingly, struggled for liberty until it was quite exhausted. Its mother was present, endeavouring with her head and feet to disentangle it. After having attempted in vain, for a long time, to effect this purpose, she left it, and ran away *baaing* with all her might. We fancied there was something peculiarly doleful in her voice. Thus she proceeded across three large fields; and through four strong hedges, until she came to a flock of sheep. From not having been able to follow her, I could not watch her motions when with them. However, she left them in about five minutes, accompanied by a large ram that had two powerful horns. They returned speedily towards the poor lamb; and as soon as they reached it, the ram immediately set about liberating it, which he did in a few minutes by dragging away the briars with his horns.

In order to elucidate the matter still farther, it may not be improper to introduce in this place a definition of the word *instinct*, that we may clearly understand the difference between its operations and those of reason. Instinct may be said to be "an involuntary desire or aversion, acting on the mind without the intervention of reason, motive, or deliberation, but tending uniformly and exclusively to the preservation of the individual, or propagation of the race." Or it may be defined as "an involuntary stimulus of an innate unknown power, acting on the principle of life, both animal and vegetable, for the preservation and propagation of organised existence." In either of these respects, instinct is the very antithesis of reason, "whose acts result from volition, are perfectly free, may be beneficial, injurious, or indifferent to the creature, may perpetuate its race, or work its destruction."

Now it may be asked, what analogy, even in the remotest

degree, had the actions mentioned in the above anecdote, to the operations of instinct? Was it an "*involuntary* desire," that induced the sheep to endeavour to liberate her young one, when she observed it imprisoned amongst briars? Was she urged by an "involuntary desire," or did she act "without motive or deliberation," when she ran across three large fields, and surmounted four strong thorn hedges, in search of its relief, which, by these means, she must have known, or at least hoped, that she could obtain? Did the ram act "without motive or deliberation," when he returned with her, of course according to her request, and effected what she desired? Or is it not infinitely more probable, is it not, indeed, indisputable, that these, and a thousand actions of a similar nature, which are daily observable in our domesticated animals, are "perfectly free," are the "result of volition," are, in short, neither more nor less than the operations of reason? If we can entertain the contrary conclusion, *our* reason must have gone most wofully astray.

J. J.

G——y, Montgomeryshire, June, 1831.

ART. V. *Further Remarks on the Luminosity of the Sea.* By WILLIAM BAIRD, Esq. M.D., Member of the Plinian Society, Edinburgh.

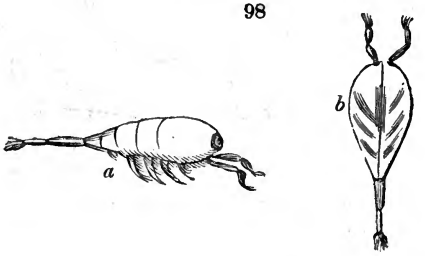
Sir,

As there seems at present a spirit amongst naturalists for exploring the wonders of the deep, and extending our knowledge of those exceedingly interesting but minute animals which, by their power of emitting light, illuminate the profound abyss of ocean, and throw a fairy radiance over the solitary and otherwise dark face of the sea, especially when deserted by the lights of heaven, may I presume to come forward again, and add my second mite to this hitherto neglected part of natural history? In a former paper on this subject (Vol. III. p. 308.), I described a number of animalcules, which, during a long voyage at sea, I had found possessed of the property of luminosity, and had observed in various parts of the world. Since that paper was written, I have had another opportunity of continuing those researches; and, besides corroborating my previous observations, have found several other luminous animals, some of which may perhaps be new.

In prosecuting my researches upon this subject, I have

generally found that, out in the open ocean, the little animals belonging to Müller's Entomóstraca, and most probably to his genus Cyclops, were by far the most numerous, but that their power of emitting light was fainter and less easy of satisfactory proof (they are so exceedingly minute) than that of the others to be described, which were generally most abundant in straits, or near sand-banks, such as the Aguillas Bank off the Cape of Good Hope, &c. One of these minute creatures I have sketched, highly magnified (*fig.* 98. *a*, *b*), evidently belonging to the genus Cyclops. It resembles, in general appearance, *e* and *f* fig. 83. Vol. III. p. 315., but differs materially from both the animals there represented in the length and form of the antennæ, which are much shorter, and somewhat articulated. In general outline, too, it differs somewhat, and appears a more graceful animal than either of the two former: *b* represents a view of it lying supine, or on its back. These minute creatures were not larger than a grain of sand.

98



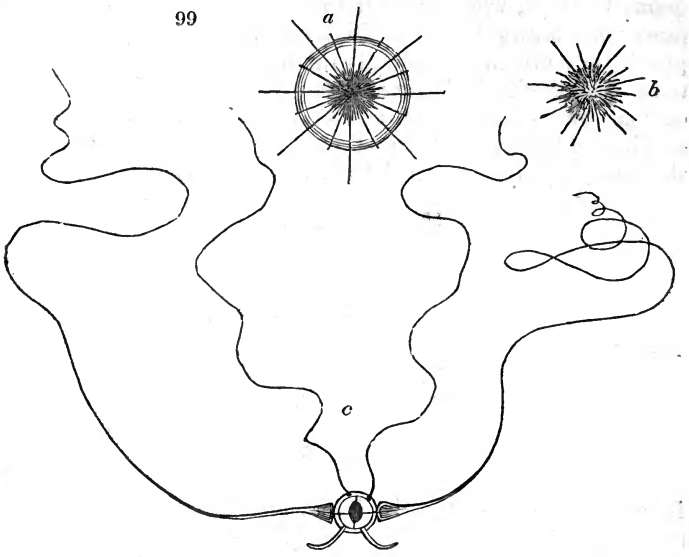
a, *b*, and *c* (*fig.* 99.) appear to belong to the division Radiàta, or radiated animals.

a (*fig.* 99.) appeared, when submitted to the microscope, to be composed of a small circular body of short tentacula, very numerous, with larger and longer ones, but fewer in number, running through it, like the spokes of a wheel. The whole animal, with the exception of the largest tentaculum, was enveloped in a loose membranous expansion or bag.

b (*fig.* 99.) much resembled, when seen by the microscope, an *E*chinus. It was covered with numerous very short spines, like most of the sea eggs, a number of larger and longer ones projecting considerably beyond them. The animal was a perfect sphere. These two last-mentioned animals were each about the size of a grain of sand; *a* rather the larger of the two.

c (*fig.* 99.), perhaps, instead of being referred to the Radiàta, ought to be placed amongst the Entomóstraca of Müller, as it seemed to be contained within a fine, transparent, delicate shell. It may be described generally as a round, glutinous, perfectly transparent body, with four very long tentacula, and two short ones. A cylindrical body occupied the centre, containing the viscera apparently; while four fine rib-like

lines ran across the body, two of them terminating in the two upper long tentacula. It was possessed of considerable



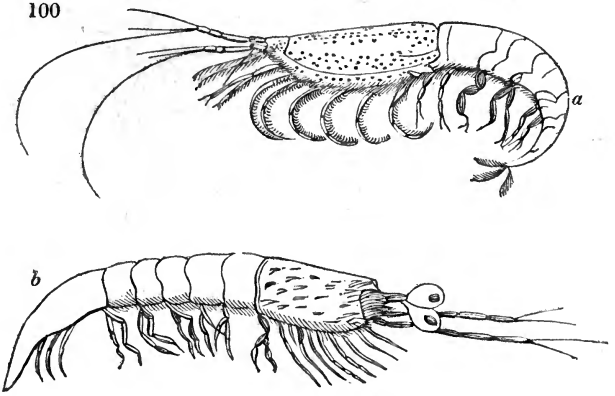
celerity of motion through the water, the body being very rapidly contracted and dilated; while the long tentacula were thrown out from it, as if to sweep for prey.

a and *b* (*fig.* 100.) were two crustaceous animals, possessed of the luminous property in a much higher degree of intensity than any yet described. The light given out by one solitary animal was brilliant in the extreme. What must the sight be when the ocean is lighted up with myriads of such beautiful animals?

a (*fig.*100.) very much resembles the *C*áncer fúlgens of Sir Joseph Banks, the Noctilùca Bánks*ii* of Thompson. It is described by Sir Joseph Banks as having its legs furnished with numerous setæ: but this beautiful appearance does not seem to me to be well represented in the figures of this animal, as given by Macartney in the *Philosophical Transactions* for 1810, or as copied from his plate into the frontispiece of Mr. Murray's work, *Experimental Researches on Natural History*, or in the figure given by Thompson; and, as there seems to be some little difference in other respects, perhaps mine may be a separate species. The six legs on the upper part of the body were furnished with numerous setæ, most beautifully arranged in curved lines, and, when seen through the microscope, presenting an exceedingly interesting appear-

ance. Its other legs were seven in number. The body was of a light colour, elegantly spotted with red, and tinged slightly of that colour in various parts.

100



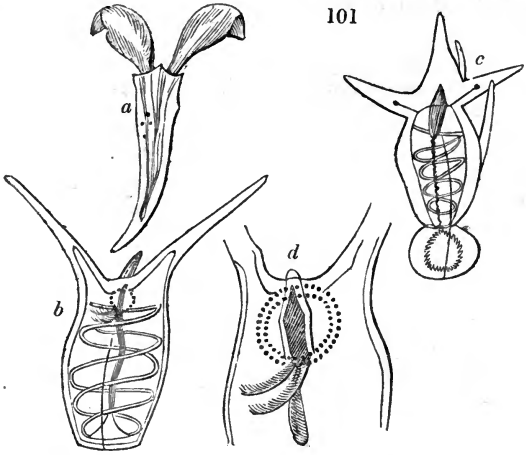
b (*fig.* 100.) is evidently pretty nearly allied to the last, and, like it, is highly magnified. Its eyes projected considerably from the body, and its antennæ were differently situated from the last, jointed, and bifurcated at their extremities. Its body was divided by six bands, running across; two legs (or spiracles?) springing from the body at each segment. The upper and largest segment was spotted with numerous dark spots. This is by no means such a graceful animal as the last, though the light it gives forth is exceedingly brilliant.

a, *b*, and *c* (*fig.* 101.) are most probably animals which would have been placed by Müller amongst his Entomóstraca, as they were contained within delicate shells.

a (*fig.* 101.) is a very beautiful transparent animal, contained within a delicate, perfectly transparent, conical shell. Out of the upper part of this shell were exserted, when in motion, two large flattish bodies, or antennæ, which he quickly withdrew into his shell when he was touched, or the water near him even agitated; remaining motionless for a time, but very soon thrusting them forth again, and moving away. This little animal, or at least an animal very nearly resembling it, is figured by Dr. Friedr. Eschscholtz, in a work lately published in Germany, and perhaps not much known in this country. It differs from his figure only in the colours, this animal being perfectly transparent, and almost colourless. It is called by the above mentioned naturalist the Chrysèis cónica.

b (*fig.* 101.) consisted of an oval, transparent, gelatinous body, about the fourth of an inch in length; the projecting an-

tennæ-like bodies being about the same length. Its structure appeared at first sight to be very simple. At one extremity



projected two bodies, like antennæ; and betwixt these there was a short conical body protruded a little distance. Just beneath this was a beautiful circular collar, set round with two rows of small round substances, which, from their clearness and brilliancy, appeared like a rich necklace of the finest pearls; and in the centre of this was situated an elongated cylindrical body, which appeared to terminate in a spiral tube, running through the whole length of the animal, but dividing before it reached the opposite extremity, into two smaller ones, through which the fluids were to be seen in a constant vermicular motion. Two minute feathery filaments were attached to the cylindrical body, and were also in constant motion (branchiæ?). Through the body ran several fine hair-like tubes, one of which became of much larger diameter as it descended. A number of flat zones or belts, quite transparent, encircled the animal. It darted through the water pretty rapidly, and, though it moved freely in either direction of its extremities, its general motion was what at first sight appeared to be retrograde, dragging the antennæ-like bodies after it. Near to the extremity to which these were attached were situated the chief apparatus, resembling viscera, and a retrograde motion is not a very rare thing to be met with; but it was at the opposite or blunt extremity that an aperture existed, which was evidently the mouth. This aperture was of considerable dimensions, and the lips were curved, and almost constantly in motion, opening and shutting; at which times it caused a strong circular motion, or whirlpool, in the

water round it. This animal possessed a great power of contracting its body laterally; and it seemed to me that it was by this power it was enabled to dart so quickly forward in the water. It retained its luminous property for upwards of twelve hours after it was put into a tumbler of clear salt water. *d* is a more magnified sketch of the front of the body, showing the necklaces and feathery filaments.

c (*fig.* 101.) is evidently one of the same group as the last-described. It consisted also of a pure, transparent, gelatinous body, with four short angular horns projecting from its upper extremities, and in the centre a cylindrical substance, as in the last, but without the beautiful pearl necklace. It was contracted near its lower extremity, bulging out again at the lower end. The body of the animal was surrounded like the other by circular zones; and two short antennæ, with a round spot at their summits, appeared on each side, running a short way into the angular horns. This also retained its luminous power a considerable time. Yours, &c.

Edinburgh, July 20. 1831. W. Baird.

Art. VI. *Additional Remarks on the Luminosity of the Sea.* By J. O. Westwood, Esq. F.L.S. &c.

Sir,

My friend, W. Baird, Esq., has placed in my hands the very interesting paper inserted above, upon the luminosity of the ocean (intended for the Magazine of Natural History), for the purpose of my adding any additional observations which may occur to me upon the subject. These additional observations will relate, 1st, to the *nature and cause* of luminosity of the sea; and, 2d, to the *animals* observed by my friend belonging to the class Crustàcea.

1. It will be seen, in his former memoir (Vol. III. p. 308.), that Mr. Baird, after stating some of the supposed causes of the interesting appearance in question, adopts the now generally received opinion, which, indeed, he considers as fully established, that animalcules of various kinds, having the power of emitting light, are the true cause and origin of the appearance. Let us, however, consider the views taken of the subject by some of the most distinguished naturalists. It is true that Viviani, Sir Joseph Banks, Dr. Macartney, Mr. J. V. Thompson (p. 260.), Dr. Macculloch, Mr. Woodward (p. 285.), as well as my friend Baird, and others, suppose that it originates in luminous marine animals: Dr. Macartney expressly stating, that "the light of the sea is *always* produced by living animals" (*Phil. Trans.*, 1810, vol. ii. p. 290.); Dr. Macculloch,

that *every* marine animal which he has examined is luminous; and Mr. Baird, that in *every* instance where the water has been properly examined when luminous, great quantities of animalcules have been seen; and that, on the contrary, where the water has not been luminous, the animalcules have not been present.

Other causes have, however, been attributed for the appearance by equally celebrated naturalists, although some of their suppositions certainly do not appear very tenable. Martini supposed the light to be occasioned by putrefaction; Silberschlag believed it to be phosphoric; Professor Mayer conjectured that the surface of the sea imbibed light, which it afterwards discharged; Bajon and Gentil thought the light electric, from a circumstance which the animalculists have too greatly overlooked, viz. that it was excited by friction; Forster conceived that it was sometimes electric, sometimes caused by putrefaction, and at others by the presence of living animals; Fougeroux de Bondaroy believed that it came sometimes from electric fires, but more frequently from the putrefaction of marine animals and plants. (Macartney in loc. cit.) The latter opinion was also held by Commerson. M. Bory de St. Vincent has more recently declared that marine animals take no share in it; and my friend, Daniel Sharpe, Esq., has particularly examined and described the luminous appearance of the ocean during his recent passage to Lisbon. (*Proc. Zool. Soc.*, January, 1831.) The appearance here resembled a number of small sparks, not brighter than the smallest stars. When a bucketful was taken up, nothing was visible until it was shaken, when it was instantly filled with spangles, which disappeared as the water settled. On carefully examining this water with a microscope, nothing could be detected but an abundance of small fibres and shreds of apparently animal matter; and Mr. Sharpe did not detect even one entire animal. Hence he is disposed to infer that, in some cases at least, the phosphorescence of the sea arises from the particles of dead fishes, &c., always floating upon its surface, although he confesses himself unable to explain the reason why these shine only when the water is disturbed.

From these and the preceding observations (for I am only able to judge of the question from the statements of those who have observed it), I certainly feel inclined to adopt the opinion, that animalcules are not the *primary* cause of the phenomenon; in other words, that some species of luminosity may and do exist without the presence of living animals. How this effect is produced is a very distinct question. The putrefaction of the waters of the ocean is not a likely cause;

but the decomposition of animal or vegetable matter, in various stages, is a much more plausible reason. Mr. Baird merely states, to the contrary, that, when fishes and other marine animals have fairly commenced the putrefactive process, their luminosity ceases altogether: thus, in fact, admitting that in certain stages of their decomposition they are luminous. But is not this supposition greatly strengthened by the circumstance above alluded to, that the light is excited by friction or motion? Mr. Sharpe expressly states that it was not until the water in the bucket was shaken that the luminosity appeared; Mr. Woodward states (p. 285.) that the edges or divisions of the waves became luminous, and the spray from the oars particularly so, and that every disturbance of the water gave out a brilliant flash of phosphoric light (Viviani describes his animalcules in a work with the title *Phosphorescentia Maris*); Mr. Baird, more elegantly, tells us that the light appears when the bow of the vessel throws the water to each side, as it gracefully parts the yielding waves; and Mr. Thompson's first variety of luminosity sparkles in the spray of the ship, and in the foam created by her way, when the water is agitated by winds or currents; sometimes even, in stormy weather, enveloping the sails in a sparkling shower as the foam is dashed over the ship. Now, in all these instances, it appears evident that it is only upon the contact of the matter with which the surface of the ocean is at such times impregnated with the atmospheric air that the light is given out, since, if the animals were *per se* luminous, the light would constantly appear, and not merely when the water is disturbed; or at least it is not to be supposed (even if it be admitted that the animals have the power of emitting light at will) that they never do so except when the water is disturbed, and comes in contact with the atmospheric air. As to the nature of the matter or fluid with which the ocean is at these times impregnated, and which I consider to be the primary cause of the phenomenon, it is only by the assistance of chemical analysis that we can arrive at certain conclusions.

But we are told that every marine animal is luminous, and it is acknowledged by most authors, that animalcules have been caught in the very act of giving out the luminous appearance in vast numbers. This, however, I conceive to be rather a corroboration of my idea, that these animals are a secondary but not primary cause; since, if the water be at certain times charged with some matter or liquid, which when agitated has the power of emitting light, it would necessarily follow that if any living animalcules were to find their way into such impregnated water, they must necessarily by

contact and respiration, both internally and externally, acquire the means of emitting this light: and, indeed, this idea, which reconciles the two diverse opinions, perfectly accords with the observations of Mr. Thompson, namely, that, contrary to what is observed in terrestrial animals, the aquatic luminous species seem to be entirely pervaded with the light. I may likewise mention another circumstance, observed by the Rev. F. W. Hope, which seems to confirm this view of the question, viz. that he once met with a specimen of Sílpha obscùra upon the coast which was luminous, although the species has never been observed to possess the power of giving out light. In this case, the conjecture of Mr. Hope, that the insect (which had evidently been feeding upon the dead fish, &c., lying upon the shore in a state of decomposition, and about which it was crawling) had received its luminosity from the putrefactive animal matter, appears to be well founded.

Moreover, in the accounts of the animalculists, we even find that the presence of the animalcules is not the true and only cause of the phenomenon. Mr. Baird himself tells us that he put a single Medùs*a* into a glass full of clear water, and, "when taken to a dark place, the water, upon its surface being struck and agitated by the finger, immediately gave out several bright sparks." Now, in this case it is evident that the water, and not the Medùs*a*, gave out the light. So the insect described by Riville, generally supposed to belong to the genus Lyncèu*s*, and which Müller considers may be his Lyncèu*s* brachyùrus (but, as the species of that genus are only found in fresh water, it should rather belong to the genus Cytherèa), is not of itself luminous, but certain conglomerated globules pendent from the body are represented to be so; which Riville, indeed, supposed to be the receptacles of phosphorescent liquid, but which Latreille, Gœtze, and Müller consider as eggs.

In concluding these observations upon the nature of the luminosity of the sea, I am tempted to remark that the suppositions which have been raised as to the object of its existence, appear very inapplicable thereto; Mr. Thompson considering that it may be given in order to render the darkness and gloom less dull and irksome to the voyager, and in order to diminish the number of his dangers by pointing out his approach to some fatal spot; and Mr. Baird stating that the faculty of emitting light is evidently given to the animals as a defence and protection, and to enable them to take their prey in their deep and dark abodes. In preference to adopting either of these ideas, which appear to me to be "of fairy

fancy formed," I should be rather inclined to imagine that this is one of the inconceivable number of the "ways" of the Great Creator in "the great deep," which, at least as yet, are "past finding out."

2. With respect to the crustaceous animals which have been recorded by Mr. Baird in his former and the preceding memoir, I can but regret the difficulty under which he (in common with Macartney, Thompson, and others, who have observed these animals at sea) laboured, in not being enabled to examine and describe the very minute objects of his investigation with that degree of delicate accuracy which the recent researches of Strauss, Jurine, &c., have shown to be so indispensable to the true knowledge of their structure.

With respect to the Límulus noctilùcus of Macartney, which Dr. Leach regarded as belonging to a very different undescribed genus, I may observe that Mr. Thompson has described its characters and luminous properties under the name of Sapphirìna indicàtor, and that he considers it as referable to the group of Monóculi near Cỳclops.

The crustaceous animalcule figured by Mr. Baird (Vol. III. p. 315. fig. 83. *d*) certainly belongs (as Mr. Baird considers) to a new genus, if it really possesses a pair of lateral eyes; in other respects it resembles the one-eyed genus Cỳclops, to which *e* and *f* (Vol. III. fig. 83.) are certainly referable: the latter appears to approach the Cỳclops minùtus of Müller (Monóculus staphylinus of Jurine and Desmarest), with which it agrees in the length of the antennæ and two long caudal setæ. In the engraving these two setæ are accidentally united at the end, giving the appearance of a long cylindric tail. Müller obtained this species not only from stagnant water, but also from the waters of the coast of the Baltic.

The singular animal fig. 83. *g* (Vol. III.) appeared to me, at the first, to be the young state of some species of Cỳclops, which Müller, supposing to be perfect animals, formed into two genera. The possession, however, of two lateral eyes, sufficiently separates them; but, as it was found by Mr. Baird in the Straits of Malacca, where it would appear that fig. 83. *d*, was also captured, it does not seem improbable that it may be the young state of that insect: especially since, from a general comparison of Müller's figures of the young and perfect Cỳclops, I feel but little hesitation in regarding it as not arrived at its adult state. The same observation seems, also, to apply to figs. *h* and *i*. The form and structure of these two extraordinary animals are perfectly distinct from any thing hitherto recorded, and it is only to be regretted that more highly magnifying powers were not employed in their examination. From the very interesting account of the

motions of fig. *i*, we are, however, able to supply from analogy some of the deficiencies. Now, it seems certain that the very quick rotatory motion, produced by the fascicles of hairs at the upper and lower extremities, had for its object not only the supply of food, in the manner so well described by Mr. Baird, and which is, in fact, perfectly analogous to what I have observed in the common Bránchipus (*Cáncer Linn.*) stagnàlis, but also, as in that animal, for the equally important function of respiration; it being evident that the fascicles at the tail cannot be set in motion for the purpose of producing a whirlpool, the centre of which is the mouth, and which is the case with the fascicles at the sides of the head; those at the tail I should, therefore, rather consider as the analogues of the false respiratory legs of some of the typical Crustàcea. If we further compare fig. 83. *h* with Dr. Shaw's figure of the young state of the Bránchipus stagnàlis, in the first volume of the *Linnean Transactions*, we find the same short obtuse body, and likewise the three pairs of long lateral fringed legs; whilst, if fig. 83. *i* be compared with the figure of the second state of the same animal in the same plate, we perceive in both the tail more elongated, and the long ciliated legs reduced to two pairs. Hence, both from structure and economy, I should be inclined to think that Mr. Baird's two animals belong to that group of entomostracous Crustàcea, whose legs serve both for swimming and respiration (Branchiópoda), rather than to the Lophýropa or Ostrápoda. The small size of the animal (scarcely that of a small pin's head), and its fascicles of hairs, are different from any of the known forms of the former group.

In fig. 98. *a* and *b*, in the preceding memoir, two lateral eyes are represented; hence I should regard them as congenerous with fig. 83. *d* (Vol. III.), rather than *e* and *f*, which belong to the one-eyed genus Cỳclops. The only two remaining animals belong to the more perfectly organised Crustàcea, and appear referable either to the group containing the long-tailed crabs with eyes on foot-stalks (Malacóstraca Podopthálma, division Macrùra), or to the split-legged shrimps (Schizópoda); indeed I should be inclined to agree with Mr. J. T. Thompson, that the first of them, at least, belongs to the latter group.

Fig. 100. *a* seems to represent Sir Joseph Banks's *C*áncer fúlgens, especially in the antennæ. In this respect Mr. Thompson's figure of the Noctilùca Bánks*ii* seems to be distinct. As the legs of these animals are always placed in pairs, Mr. Baird has certainly fallen into an error respecting their number: the true legs being stated to be only six, and the abdominal false legs seven. If, however, this animal belong

to the Schizópoda, there are not less than eight pairs of double or split legs attached to the thorax, and five pairs of subabdominal ones.

Fig. 100. *b* appears, from the pedunculated structure of the eyes and bifurcate antennæ, to represent an animal belonging to Mr. Thompson's genus Cýnthi*a*. The legs, from Mr. Baird's description, appear to be only six pairs; but he has not noticed the more delicate legs attached to the first or thoracic segment. These and the first pair of legs mentioned by Mr. Baird are the true legs, and are doubtless of the same number, and similarly formed, with those of Cýnthi*a* figured by Thompson. (pl. 6. fig. 7.) The remaining five pairs of legs are the subabdominal prolegs, used, as Mr. Baird conjectures, for the purposes of respiration.

Fig. 101. *b* and *c* are very extraordinary, and require further investigation. Yours, &c.

JOHN O. WESTWOOD.

The Grove, Hammersmith, July, 1831.

P.S. I perceive that Mr. Rennie (*Insect Miscellanies*, p. 232.) is inclined to think that the light does not arise from living animals. Also see *Literary Gazette*, Oct. 8. 1831.

ART. VII. *On the Domestic Education of Cats.* By CATTUS.

Sir,

IT has not been ascertained at what period cats were first classed among domestic animals; but, as this of little consequence, I will endeavour to give some account of them from the time that their useful and amusing qualities brought them into general notice, as forming a part of our household comforts. The finest species of domestic cats are those called Angora, which are remarkable for size and strength of body, elegance of the head, softness of hair, and docile qualities, which rank them precedent as domestic cats. Every country has its peculiar species: that of Tobolski is red; that of the Cape of Good Hope blue; and those of China and Japan have pendent ears. Pallas informs us, that in Russia the muzzle is small and pointed, and the tail six times as long as the body.

At all times, cats have acquired some influence, indeed may be considered favourites, with women. There were very severe laws enacted in Egypt against those who killed or even illtreated this animal. They carried their notions so far as to be quite ridiculous; for they actually worshipped them as their gods, made great lamentations at their death, and

buried them (according to Herodotus) with much pomp. In China, this animal is indulged with a bed of down and silk, where it remains in a state of indolence, or lies at the feet of its mistress on a sofa, covered over like a child, decorated with a silver collar on its throat, and its ears adorned with earrings of jasper or sapphire. The Turks have places made or rented for them, that they may be fed and attended to by servants engaged for the purpose. They enjoy a still happier life in France: as faithful companions to their mistresses, they not only amuse them, but, by their gentleness and playful tricks, dispel *ennui*. They seldom look you in the face, but obliquely.

I have remarked that naturalists have not spoken much in favour of this animal, particularly Buffon, who says "that the cat may be considered as a faithless friend, brought under human protection to oppose a still more insidious enemy. It is, in fact, the only animal of this tribe whose service can more than recompense the trouble of education, and whose strength is not sufficient to make its anger formidable. Of all animals, when young, there is none more prettily playful than the kitten; but it appears to change this disposition as it grows old, and the innate treachery of its kind begins to show itself. From being naturally ravenous, education teaches it to disguise its appetite, and to seize the favourable moment for plunder. Supple, insinuating, and artful, it has learned the art of concealing its intentions till it can put them in force: whenever the opportunity occurs, it directly seizes upon whatever it finds, flies off with it, and remains at a distance till it thinks its offence is forgotten."

The aversion cats have to any thing like slavery or imprisonment is so great, that by means of it they may be forced to prompt obedience: but, under restraint, they are very different; though surrounded by food, when deprived of liberty, they abandon the desire of theft or prey, and literally die of languor and hunger. Lemery, after having put a cat into a cage, suffered two or three mice to run through it. Puss, instead of destroying them, only looked at them with apparent indifference. The mice became more bold, and even attempted to provoke her; however, it had no effect, as she still remained quiet. Liberty being given her, her strength and voracity returned; so that, had the cage been open, the mice would have soon become her prey. They also fear severe chastisement, and therefore this may be considered the best means of enforcing obedience. It is related that the monks of the Isle of Cyprus instructed cats to drive away serpents which infested the island; and they succeeded so well, that in a short time they were relieved of the venomous reptiles.

The effect that both sound and music have upon this animal is well known. They, like dogs, may be made to answer the call of a whistle. An invalid, who was confined to his room for some time, was much amused by this means, and with other proofs of the docility and sagacity of a favourite cat. Valmont de Bomare saw, at the fair of St. Germain, cats turned musicians, the performance being announced by the title of the "Mewing Concert." In the centre was an ape, beating time; and on either side were the cats placed, with music before them on the stalls: at the signal of the ape, they regulated their mewing to sad or lively strains. One of our celebrated naturalists assures us that they *are* capable of gratitude, and may be considered faithful.

After so many instances well known, why should so severe a sentence be passed upon these animals? It is said (without proof) that education has no effect upon their natural savageness; but I cannot imagine why this should be asserted, when we notice how quietly a cat will obey its mistress, and remain by her side most of the day, if required; will run when it is called, and appear unsettled and unhappy during the absence of its protector; and how delighted when she returns, as it proves by its caresses, not acting from dissimulation or cunning. When cats have attained these social habits, they will retain them till their death; and thus brought up, they lose their inclination for mice and rats, and are devoted to those who are attached to them. From all that can be said, this conclusion may be drawn, that the more pains are bestowed upon educating them, the less they show of their natural wild state. Yours, &c.

CATTUS.

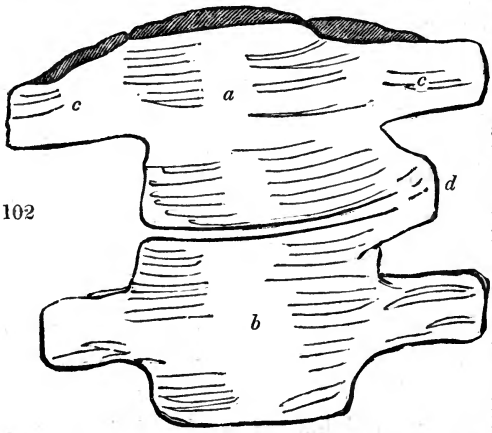
ART. VIII. *Unusual Structure of the first two Cervical Vertebræ of a large Quadruped found in a Bone-yard.* By C. B.

Sir,

THERE is, perhaps, no opinion more prejudicial to the promotion of scientific knowledge, than the idea that trifles are not worth recording or being examined. Some of the most splendid inventions and useful discoveries have had their origin from what might at first appear, to the careless observer, trivial occurrences, and, as such, unworthy of any analysis. It is by noting down any the smallest deviation from the more common contrivances and operations of nature (such as, for instance, any slight variation in the form-

ation or habits of animated beings), that the naturalist, at the same time that he gains to himself an endless source of amusement and instruction, can ever hope to contribute to the support of science, and add a powerful stimulus to investigation, the final results of which become not unfrequently of most extensive and permanent advantage to mankind. But, independently of this, supposing that such or such a fact leads to nothing beyond the knowledge of the bare circumstance observed, still it is an operation of nature, and, therefore, ought not to be passed over by the general observer, whose professed object is to record new phenomena for the purpose of still better comprehending the magnificence and beautiful order of creation, and of more worthily adoring its beneficent Creator. The case to which I beg to invite the attention of yourself and your readers is one of unusual structure in the first two vertebræ (*verto*, to turn) of the neck of some large quadruped, as exhibited in a specimen picked up at a bone-mill at Grimsby, not long ago, by myself. (*fig.* 102.)

It will be proper to explain the ordinary structure of these two bones in vertebrated animals, so as more clearly to demonstrate the extraordinary formation in the specimen referred to. When it is remembered that the object of the backbone or spine is to give support to the whole frame; that at the same time it must be firm and flexible, so as to allow of free motion; its structure exhibits a most interesting example of adaptation of means to the end required.



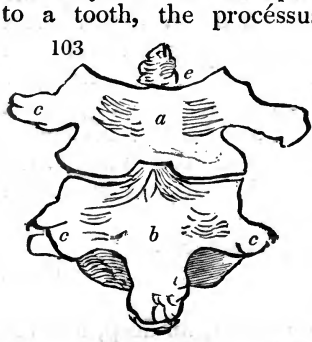
102

The whole backbone consists of a certain number of separate bones, locking one within the other in succession, and moving on each other by means of smooth surfaces, which admit of a sufficient degree of play, at the same time that strong connecting ligaments prevent dislocation. Each bone or vertebra is in the shape of an irregular ring, thicker in front, which thicker portion is termed the body: processes, or bony projections, stick out laterally, obliquely, and poste-

riorly. It is from the shape of those which stick out behind that the whole column derives its name of the spine. The long series of these vertebræ which extends all along the back forms a tube or canal, nearly round, but rather flattened in front, for the reception of the spinal marrow, which is a prolongation of the brain; and which, from the important offices it is destined to fulfil, and its extreme delicacy (the least pressure causing paralysis or death), requires to be as strongly defended as it is. On the top of this column is placed the head. Now, when we consider how necessary it is, for the preservation and comfort of the animal, that the head should have free play up and down, to the right and to the left, we shall be led to examine with wonder and delight the beautiful yet simple mechanism by which this is effected. The up-and-down (supination and pronation) is produced by a peculiar formation of the first cervical vertebra (*fig.* 103. *a*). This is termed the atlas, because it gives support to the globe of the head. It has, on its upper surface, cavities to receive the condyles (or knobs) of the occipital bone of the head: thus a hinge is formed, and the head acts freely in that direction.

But now we want horizontal movement; and for this end the second vertebra (*b*) presents a peculiar mechanism. From the body of this bone a process, called, from its resemblance to a tooth, the procéssus dentàtus (*e*), arises, and sticks up perpendicularly; and, fitting into a hollow in the interior surface of the body of the atlas, allows of the horizontal action of the skull. Thus we have the compound action required, amply and beautifully provided for. Now, though in the structure of the spine of all vertebrated animals there exist some slight modifications suited to the habits of the different animals, the general type is uniform; but, in the instance of the two vertebræ now the subject of this paper, there appears a very essential departure from the general mechanism. Upon examining the first vertebra (*fig.* 102. *a*), I found that the transverse processes (*c c*), as well as the upper surface of the body of that vertebra, were hollowed out, in order to receive the condyles of the occipital bone: hence it is evident that this is the atlas, and that the animal had the power of moving the head up and down. I next examined the second vertebra (*b*). The tooth-like process is totally wanting; there are no traces of its ever having existed; there is no cavity in the atlas for

103



its reception, but there is a very curious bony excrescence which unites the two vertebræ firmly together on the right side (*d*). The two vertebræ are perfectly distinct and separate as usual, except at that one point. There are no appearances whatever of the second vertebra having been joined in a similar manner to the third, the under surface of the former being perfectly smooth. What I would particularly remark in this specimen is, that whilst, in all the spinal columns that I have ever seen, Nature has (as it has been explained) provided in an especial manner for the horizontal motion of the head, she has in this instance made an especial provision against the possibility of such an occurrence. The lower cervical, the dorsal, and the lumbar vertebræ, are not wanted to move horizontally, and there is, therefore, no tooth-like process in any of them; but, on the other hand, they have nothing analogous to the bony excrescence which is observable in *fig.* 102., to keep them firm; the surrounding ligaments, &c., are sufficient for the purpose. From the specimen I have described, it would almost appear that Nature had feared that the atlas would instinctively try to move in a rotatory direction, as in the generality of cases; and that thus an extra-fastening was provided, for keeping the animal from attempting to imitate its neighbours, for which it had not the requisite apparatus with which they are furnished. Whether these vertebræ belonged to an individual of a species of vertebrated animals who enjoy but a circumscribed action of the head, or whether it is an instance of malformation, I do not pretend to decide. The fact is a curious one; and I do not remember ever to have seen a similar circumstance noticed in any of the works which treat of that deservedly admired piece of animal mechanism, the spinal column.

I am, Sir, yours, &c.

London, Oct. 9. 1830. C. B.

The dimensions of each vertebra are $3\frac{1}{8}$ in. deep, and the diameter of the spinal canal $1\frac{2}{8}$ in. The transverse processes are broken off at their extremities.

ART. IX. *Remarks on Professor Rennie's Edition of Montagu's Ornithological Dictionary.* By CHARLES WATERTON, Esq.

"IT is admitted by all the naturalists already quoted, that the nest in question (grebe's) is built on moist ground, if not actually touching the water, and that part at least of the materials consist of moist water plants. Now, it is indispensable to hatching, that the eggs be kept at a high tem-

perature, and not be suffered to cool for a moment. The natural heat of the bird itself is sufficient for this purpose, without the heat of fermentation, erroneously supposed by Pennant; but if she quits them for a moment, to go in pursuit of food, or to withdraw the attention of an intruding water-spaniel, or a prying naturalist, their near vicinity to moist plants, or to water, would certainly prove fatal to the embryo chicks. In order, then, to prevent the brood from being destroyed by cold, the careful bird covers the eggs with a quantity of dry hay, to keep them warm till her return."

When the worthy Professor wrote the above-quoted passage, I am sure that he had not the least doubt but that it was correct. Nine tenths of his readers would be of the same opinion with him. The errors it contains can only be accounted for on the score that our Professor, like many other naturalists of high note and consideration, has spent more of his time in books than in bogs. His deficiency in bog-education is to be lamented; for such an education would have been a great help to him in his ornithological writings. For my own part, I must own, that I have been more in bogs than amongst books; and have for years wandered "per loca senta situ," where, it is easy for the reader to imagine, that I must have had many corporal misadventures, and at the same time acquired some mental improvement.

After this statement, I trust that the Professor will not take it amiss if I do not agree with him in all his notions on waterfowl incubation. Many writers on natural history, on account of their situation in life, can only attempt to clear up doubts by means of theory. Others, again, who have had practice, have it in their power to adduce facts. Truth is the great object which all strive to reach. "Omnes eodem cogimur."

Let us now go to the marsh, and find a waterfowl's nest, with the old bird sitting on eggs containing embryo chicks. We will drive the bird gently off the nest, and we will stay full two hours near the place, to prevent the return of the bird. At the end of the two hours we will go away, and I will engage that the old bird will come back to her nest, and hatch the eggs which have been left uncovered all this time. This being the case, how stands the Professor's speculation, that the vicinity of the nest to moist plants, or to water, would certainly prove fatal to the embryo chicks, were the bird to quit the eggs for a moment unless she covered them with dry hay?

In 1826 I was helping a man to stub some large willows near the water's edge. There was a waterhen's nest at the root of one of them. It had seven eggs in it. I broke two of them, and saw that they contained embryo chicks. The labourer took up part of the nest, with the remaining five

eggs in it, and placed it on the ground, about three yards from the spot where we had found it. We continued in the same place for some hours afterwards, working at the willows. In the evening, when we went away, the old waterhen came back to the nest. Having no more occasion for the labourer in that place, I took the boat by myself the next morning, and saw the waterhen sitting on the nest. On approaching the place, I observed that she had collected a considerable quantity of grass and weeds; and that she had put them all around the nest. A week after this I went to watch her, and saw she had hatched; and, as I drew nearer to her, she went into the water, with the five little ones along with her.

Birds which, on voluntarily leaving their nest, cover all their eggs containing embryo chicks, equally cover those eggs before they contain an embryo chick, that is, before they begin to sit. Now, during the period of laying, the old bird seldom returns to the nest above once in twenty-four hours; and then only to lay an egg, and go away again. Are the eggs, then, covered these four and twenty hours, to keep them warm? Put your hand upon them, and you will find them "cold as any stone." Nay, more, you shall take one of these eggs, which you find covered before the bird begins to sit, and you shall immerse it for four and twenty hours in water; and if you put it back into the nest before the bird begins to sit, you will find that she will hatch it at the same time with the rest of the eggs.

If, then, this egg will produce a bird after being four and twenty hours in the water; and if the other eggs (in the case of the waterhen) containing embryo chicks will produce birds after being left uncovered some hours by the mother, may we not venture to hazard a conjecture that the Professor, somehow or other, has not exactly entered into the real notions of waterfowl for covering their eggs with dry hay when they leave the nest, both before and after they begin to sit?

I will here add an observation. "The Dabchick," says our Professor, "covers its eggs to keep them warm; for the vicinity of the nest to moist plants, or to water, would certainly prove fatal to the embryo chicks, were she to leave the eggs for a moment without covering them." But the wagtail will build her nest within a foot of the water, and yet she never covers the eggs when she leaves her nest. Now, the shell of the wagtail's egg being much thinner than that of the dabchick, might one not be apt to infer that the egg of the wagtail would suffer sooner from cold than the egg of the dabchick?

One is rather at a loss to know how the Professor disco-

vered that the eggs of the dabchick are affected by their near vicinity to moist plants or to water, unless they are covered either by the old bird, or with dry hay. The dabchicks raise their nests upon a superstructure far above watermark. Now, the height of the nest from the water, and the thickness of the materials with which it is lined, will effectually secure it from damp. Put your hand into the nest of the next dabchick which you discover, and you will find that it is quite dry.

The waterhen is another bird which generally builds its nest upon the sedges and rushes; and it carefully covers its eggs, both before and after it begins to sit: but sometimes this bird makes its nest in a place warm and comfortable.

In 1828 I formed a little structure, about a foot square, on a dry island. It was intended for a duck; and it was built of brick and mortar. The top was well secured with a flag; and there was a hole left in the side, just large enough to let in a duck. Some dry hay was put into the place, to serve as a nest for the duck. But it so happened that the duck had to go somewhere else to lay her eggs; for a waterhen took possession of this little structure; and I found her eggs covered with hay, both before and after she began to sit. Did she do this to keep the eggs warm, lest their vicinity to the water should prove fatal to the embryo chicks?

In 1826, a wild duck made its nest within two yards of the water's edge, and upon ground not more than three inches above watermark. She covered her eggs, both before and after she began to sit.

Another wild duck, in this same year, made her nest in the thick ivy, upon the top of an old ruin, full 18 ft. from the water; and she regularly did the same thing with regard to her eggs. Did the last duck do this to preserve the eggs from the fatal influence of the vicinity to water, full 18 ft. below her, with a thick wall intervening?

While this duck on the ruin carefully covered her eggs every time she voluntarily left the nest, a chaffinch, a wagtail, and a ringdove, building in the ivy of the same ruin, never covered their eggs at all on leaving the nest; while, in deep holes of the same ruin, a barn owl, a jackdaw, a starling, a house sparrow, and a redstart, had their eggs safely sheltered from wind, and cold, and rain.

I offer these facts and observations to young naturalists as a kind of Ariadne clew, to help them through the labyrinth of waterfowl incubation. Should they not suffice, all I can do is, to recommend the bewildered ornithologist to go to that far eastern country where the vizier of Sultan Mahmoud

understands the language of birds. Though, possibly, the vizier may be now dead, still his surprising knowledge has, no doubt, descended to his offspring; just in the same way as a hereditary knack at legislation goes down from father to son in our English peerage. We are told that —

> " Fortes creantur fortibus et bonis;
> Est in juvencis, est in equis patrum
> Virtus." *

CHARLES WATERTON.

Walton Hall, Sept. 27. 1831.

ART. X. *Notes on the Chimney Swallow* (*Hirúndo rústica*), *and on the Window Swallow, or Marten* (*Hirúndo úrbica*). By JONATHAN COUCH, Esq.

Swallow (*Hirúndo rústica*). First seen, April 10th, 1808; 13th, 1827; 15th, 1830; 16th, 1818, 1824; 17th, 1828; 21st, 1811, 1821; 23d, 1817, 1822; 26th, 1825; 28th, 1823; 30th, 1820: May 2d, 1812, 1815. — Disappeared, Sept. 24th, 1816; 28th, 1820; 29th, 1819; 30th, 1818: Oct. 2d, 1823; 3d, 1825; 7th, 1824; 11th, 1815; 29th, 1819: Nov. 1. 1805.

Marten (*H.* úrbica). First seen, April 16th, 1831; 20th, 1816; 21st, 1829; 22d, 1819; 23d, 1818; 24th, 1810, 1821; 30th, 1823: May 2d, 1812, 1815, 1820; 3d, 1817; 5th, 1825. — Disappeared, Sept. 28th, 1820; 30th, 1818: Oct. 2d, 1823; 3d, 1825; 5th, 1819; 11th, 1815, 1816, 1821, 1828, 1829; 13th, 1817; 14th, 1822; 15th, 1824, 1827; 27th, 1813: Nov. 1st, 1805; 6th, 1810: Dec. 13th, 1830.

FEW migratory birds have attracted so much observation as these, chiefly on account of the regularity of their movements, and the proximity of their abode to the residence of man: but though thus offering themselves continually to his observation, a satisfactory account of their migrations, and of the motives of them, is far from being obtained as yet; nor is this likely to be the case until the observations have been made for a longer period, and in different quarters of the world. For the furtherance of this object, the following notes are recorded: —

These birds, in crossing the Channel, reach the land near the shore, and in misty weather seem to have a difficulty in finding it: for I have been assured by intelligent fishermen, that, when the weather is hazy, swallows, martens, swifts, and other birds are accustomed to alight on their boats, at the distance of three or four leagues from land, either singly or in small flocks; at which time they appear so much fatigued, that the swallow is often only able to fly from one

* " The brave and good are copies of their kind;
In steers laborious, and in generous steeds,
We trace their sires." *Francis's Translation.*

end of the boat to the other, when an attempt is made to seize it. The swallow and marten come either singly or in small parties, and, if they do not happen to be our own residents, soon pass on to their accustomed haunts; so that after two or three have been seen, it may perhaps be a fortnight before others make their appearance. In 1831 a single swallow was seen by a fisherman near the Eddystone on the 4th of April; again, a company of four was seen on the 13th at sea, flying low, and making towards the land, at 3 o'clock P.M. Two martens were also seen on the 16th; but the first of either of these that I saw was on the 19th. Martens and swallows continued to fly on board fishing-boats, at the distance of ten leagues from land, through the whole of May; my last note of that circumstance being so late as the 28th of that month. There are rarely more than two or three in a company; and, considering that the wheatear and willow wren cross in safety, the state of fatigue in which they are seen is remarkable. One man informs me that in fine weather he has often seen them drop on the water, flat and with the wings expanded, and presently after fly off again, as if refreshed.

The extraordinary confidence which these birds repose in man, in placing their nests among his dwellings, is worthy of notice, and explains a circumstance that is singular in the feathered race: I allude to the fact of their singing on their nests, which can only take place where there is no desire of concealment. The nest of the swallow is commonly in an unused chimney, but I have known it on the rafters of a deserted house; and at Trelawny a swallow has for several years found an entrance through a loophole in a turret, and fixed its nest against a chamber-door. The nest of the marten is placed under the eaves of houses, and the birds usually dedicate a few hours in the morning to the work, leaving it to dry during the remainder of the day; but I have known them neglect a fine morning, and carry on the work through the afternoon, from no other apparent reason than the facility of procuring mortar at that period from a small distance, in a place which in the morning was covered by the tide. In selecting a place for the nest, they are much influenced by its affording them a favourable *fall* in taking flight: and I have known them forsake a situation in which they had long been accustomed to build, only because a low wall had been erected in a situation that interfered with their comfortably taking flight. Towards the end of the season, these birds congregate, in rather large companies, on the roof of a house, or other favourable situation; from which some are continually taking flight, and to which others are perpetually returning.

This congregation seems only to arise from a sociable disposition; yet it continues perhaps for six weeks, until the party is reduced by migration to a very small number.

My experience corroborates the remark, that the swallow tribe disappears earliest in the warmest seasons. This seems to be a mysterious circumstance, but may perhaps be explained by reference to the bodily constitution of the birds. It is well known that a certain temperature is necessary for hatching the eggs of birds, and that, if this be exceeded, the death of the embryo is the result. The temperature adapted to the incubation of most tropical birds appears to be too great for the eggs of the cuckoo and swallow. Under the direction, therefore, of a guiding Providence, which has implanted within them a sensibility of the due temperature, they pass into the northern regions at the proper season. When this great object has been accomplished, the body becomes fitted for another service. Birds that remain with us through the year require the warm temperature of autumn to enable them to moult. A degree of feverish action is necessary to this process; and by raising it artificially and prematurely, birdcatchers are known to accelerate the process of moulting. This fever, as in the disorder of the same name in the human body, is accompanied with a morbid sensibility, which renders painful those impressions of the air which before were pleasing. Instigated by these new sensations, they fly towards warmer regions; and, having there accomplished the natural process of renewing the plumage, a change of constitution again leads them to a cooler air. In many instances the marten has been known to remain late, for the purpose of feeding the young which have been slow to leave the nest; and, as the moulting fever does not commonly arise until the breeding constitution has ended, this does not usually produce inconvenience; but when the approach of the moulting constitution is felt before the young are able to fly, parental fondness yields to febrile excitement, and I have known them left to perish in the nest. It is easy, then, to imagine how a warm summer, by inducing the moulting fever early, causes their early departure; while a cold season delays them, by retarding it.

At the season of departure, the number of our resident birds lessens gradually; and even those that go away together soon separate. Neither do they proceed in haste: for those which I have seen migrating seem to be employed in hawking for prey as usual. The following notes confirm the remark that these birds pass off in small companies, and that those from more northern regions are often seen on the passage after our own birds have departed: —

In 1819, swallows were gone from our own neighbourhood on the 29th of September, and martens Oct. 5th; yet on the 29th of October two swallows appeared during a snow shower. They settled wherever they could find a place, lying on the belly, as if the feet were benumbed. They finally passed onward to the west. — 1825. Oct. 12. Two martens were seen ten days after all our residents had departed; the same happened two days after. — 1827. Our resident martens went off on October the 14th; and on the 29th of November two of that species arrived in the afternoon, and continued hawking for flies. In the previous week there had been frost and snow, with the thermometer 44° at noon. The previous night was a storm; the same day the thermometer 51°. Probably these birds had been blown out of their course. — 1828. Our residents departed on October 11th; but on November 9th a few appeared. — 1829. Martens decreased gradually until only four couple remained, which went off on October 11th; on the 27th, five birds appeared at about 11 o'clock, sporting about after flies. — 1830. Our resident martens disappeared on October 11th; but a single bird appeared on December 13th; the thermometer in the morning 38°, with frost. I was informed that a small flock was seen at Looe a few days previously, and a single one on the 16th. No one can suppose that these birds had remained through becoming torpid; for the weather had been mild, and that which I saw appeared on the only cold day we had had. The latter (single) bird seemed in no haste to go off; and I feel inclined to conclude that when instinct has been crossed or not obeyed at its first influence, the individual may cease to be influenced by it, and suffer on that account. It cannot be considered probable that these birds lie hid in torpidity for a month or more of mild weather, and then suddenly appear in that which is colder. J. C.

Polperro, Cornwall, June 22. 1831.

ART. XI. *An Introduction to the Natural History of Molluscous Animals.* In a Series of Letters. By G. J.

Letter 8. *On their Nervous System and Senses.*

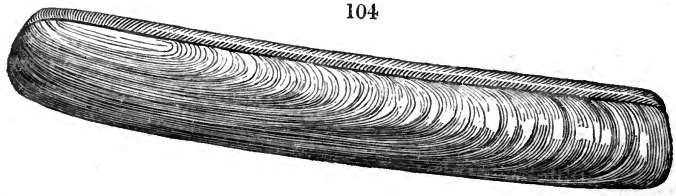
"WHEN we are in perfect health and spirits," says Dr. Paley, "we feel in ourselves a happiness independent of any particular outward gratification whatever, and of which we can give no account. This is an enjoyment which the Deity has annexed to life, and probably constitutes, in a great measure, the happiness of infants and brutes, especially of the lower

and sedentary orders of animals, as of oysters, periwinkles, and the like; for which I have sometimes been at a loss to find out amusement."* There is much of truth in these remarks of the great moralist; but, nevertheless, the enjoyments, even of the oyster, are not so few and unvaried as on a first glance we might deem they were. Among the numberless happy creatures which crowd our world, the shellfish and the still more helpless Ascídia play, it is true, no obtrusive part, yet neither do they mar the scene by their deprivations. The performance of every function with which their Creator has endowed them, brings with it as much pleasure and happiness as their organisation admits of: in the gentle agitation of the water which floats around them, in its varied temperature, in the work of capturing their prey, in the imbibition and expulsion of the fluid necessary to respiration, &c., they will find both business and amusement; and, in due season, love visits even these phlegmatic things,

"And icy bosoms feel the secret fire."

Oysters, then, and the erratic Mollúsca in a somewhat higher degree, are capable of having agreeable and varied sensations, which, however, are purely organical. They cannot recall them when past, to reenjoy ideal happiness; they are neither benefited by experience, nor guided to any act by intelligence. I am aware that some naturalists have gone so far as to say that, in some instances, they are so; but the facts, few and somewhat doubtful at the best, will by no means warrant such a conclusion. For example, we are told that oysters, when removed from situations that are constantly covered with the sea, from want of experience, open their shells, lose their water, and die in a few days: but, when taken from similar situations, and laid down in places from which the sea occasionally retires, they feel the effect of the sun's rays, or of the cold air, or, perhaps, apprehend the attacks of enemies, and accordingly keep the valves close till the tide returns.† When

104



divested of its hypothetical language, this fact assuredly affords no proof, as it was intended it should, that oysters

* Moral Phil., book i. chap. 6. † Bingley's Anim. Biog., iii. 564.

are "capable of deriving some knowledge from experience;" nor will the following anecdote of the spout-fish (*Sòlen síliqua, fig.* 104.), told for a similar purpose, strengthen the argument. "It is remarkable," says Mr. Smellie, "that the spout-fish, though it lives in salt water, abhors salt. When a little salt is thrown into the hole, the animal instantly quits his habitation. But it is still more remarkable, that, if you seize the animal with your hand, and afterwards allow it to retire into its cell, you may strew as much salt upon it as you please, but the fish will never again make its appearance. If you do not handle the animal, by applying salt you may make it come to the surface as often as you incline; and fishermen often make use of this stratagem. This behaviour indicates more sentiment and recollection than one should naturally expect from a spout-fish." * I think that it indicates neither; for nothing more can be safely inferred from it than that the creature has experienced, from the rough handling, a disagreeable sensation, which continues to operate for its safety for a time; and analogous facts meet us every where Do you irritate a snail for a few successive times, and, though apparently intent on a journey of importance, it will withdraw within its house, and your patience shall be exhausted before it will reissue; or make an unsuccessful attempt to detach a limpet from its rock, and it will not forego its firm hold until, perhaps, the flowing tide has again covered it.

Facts like these do not indicate intelligence. Neither is it from any consciousness of the existence of enemies that a little land snail (*Bùlimus obscùrus, fig.* 105.) covers itself with a coating adapted to the different situations in which it is found, so as to be detected with difficulty. "If its abode," according to Mr. Sheppard, "be upon the trunk of a tree covered with lichens, then is the epidermis so constructed as to cause the shell to resemble a little knot on the bark, covered with such substances. If on a smooth tree, from whose bark issue small sessile buds, as is frequently the case, it will pass off very well for one of them; and on a dry bank, or the lower part of the body of a tree splashed with mud, its appearance will be that of a little misshapen pointed piece of dirt."† This is an interesting passage in the history of the animal, not probatory of any superior "sagacity and intelligence" certainly, but illustrative of the care of its beneficent Creator, who has bestowed upon it the instinct to do this for a purpose of which it is itself wholly ignorant: "things reasonless thus warned by nature be." It is the same unerring and unvarying

* Phil. of Nat. Hist., i. 139. † Lin. Trans., xiv. 166.

principle which directs the Phólades in their operations, which moors the muscle to the rock, and to all others teaches them their proper devices.

The happiness of molluscous animals, then, depends on the possession of life, and on the play of its functions; and, if thence we estimate their pleasures at a low scale, we must remember that their pains and sufferings are proportionably slight. Their days pass away in an even stream of quietness: there is no anger to ruffle, no disappointments to sour them; they are amply provided by Him who careth for all, and they take no care for to-morrow; and, if it prove the precursor of evil, the evil has been unforeseen and undreaded. But many of this class of animals have additional means of enjoyment in the organs of sense with which they are furnished, and which vary in number and in perfection in the different tribes. Our account of these it may be convenient to preface with a very short and general sketch of the nervous system, as from it emanate all their powers.

In the Mollúsca, this system consists of a central ganglion, considered as being analogous to the brain, and placed above the intestinal canal; of a ganglion for each separate sense, and for the organs of locomotion; of some irregular visceral ganglia; and of nerves which connect the whole together, and which permeate every part of the body. To adopt an illustration from Cuvier, we may liken the system to a loose and complicated network, in which the greater portion of the threads communicate with each other, and in which there appear, at different places, masses or enlargements, more or less conspicuous, which may be considered as centres of communication *: and the comparison is the more apt, as these ganglionic enlargements are not masses of medullary matter, but appear rather to be knots, formed by a compact and intimate union of the filaments. The nerves themselves, however, cannot be resolved into smaller filaments, like those of vertebrate animals; they are formed apparently of a soft homogeneous medullary matter, surrounded with a sheath so loosely adherent thereto that it can be filled by injections; whence some have been led to suppose that the nerves are hollow, and others that the tunics are the vessels of the lymphatic system.† The colour of the ganglia in some Mollúsca is remarkable. Cuvier found them bright red in the Lymnæ`a stagnàlis and Planórbis córnea; in the Aplýsiæ they are blackish red and granular; and Carus asserts that

* Comp. Anat., trans., ii. 102.

† Fleming's Phil. Zool., ii. 408.; Edin. Phil. Journ., xi. 419.

those of the common fresh-water muscle are invariably bright yellow.*

The brain, in the cephalous Mollúsca is composed of two similar parts, more or less closely united by a sort of commissure. In the Cephalópoda, it is enclosed in a cavity in the posterior part of the cartilage of the head, which is pierced by a number of holes to give passage to the nerves; but, in the Gasterópoda and others, it lies, protected only by the skin, above the œsophagus, and behind an oval mass of muscles which envelopes the mouth and pharynx. From the brain, the nerves which go to the tentacula and lips originate; it sends anastomosing branches to the ganglia of the other organs of sense, when they exist; and from it likewise proceeds a remarkable filament which surrounds the gullet like a collar.

The nerves of the skin, and of the organs of locomotion, issue from a single ganglion situated on each side, sometimes placed at a considerable distance from the brain, with which it always communicates by a nervous cord; more often so near that it seems a part of the same organ. In both cases, it is from this ganglion only that all the nerves depart which are distributed over the musculo-cutaneous envelope, and particularly to those parts of it which are subservient to locomotion, as to the foot of the Gasterópoda, the sac of the cuttlefish tribe, the fins of the Pterópoda, &c.

The visceral ganglia appear to be only two in number: one, supplying nerves to the organ peculiar to the male, is situated near the orifice by which this issues; the other, more constantly present, is usually placed near the stomach, and furnishes the intestinal canal with its nerves. Both ganglia send also branches of communication to the brain or œsophageal collar.

It may seem unnecessary to mention that the developement of the different parts of the nervous system is in proportion to that of the organs to which they belong; that, consequently, it is much more perfect in the cuttlefish, which are at the head of the class, than in the Patéllæ, which are at the bottom of it. The observation applies equally to the nervous system of the acephalous Mollúsca, in which, indeed, it is so little developed, that the very existence of it was for a long time not perceived. In them, the brain is a double ganglion, or rather a sort of flattened cord, situated always above the œsophagus, and from which the nerves in general originate. There does not appear to be any proper œsophageal collar; but

* Comp. Anat., t ans., i. 53.

from the brain two very long cords are sent out to establish a communication with the ganglion appropriated to the locomotive organs, and which is found below the posterior adductor muscle.*

I will now tell you all I know about the senses of the Mollúsca, and will begin with that of touch, as it is common to the whole class, and by far the most important.

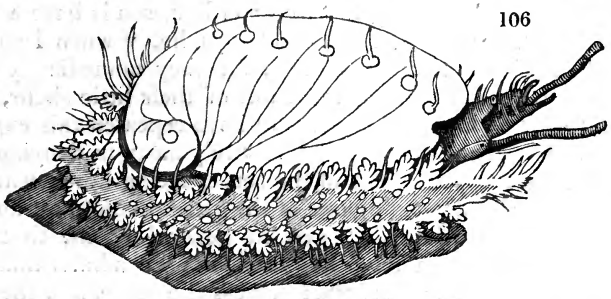
1. *Touch.* — The skin of the Mollúsca is a soft, spongy, mucous membrane, wrinkled and thickish where exposed, smooth and very thin where covered with the shell. It is never in the slightest degree hairy, or villous, or horny, but always kept in a moist state by a glutinous secretion, exuded in some instances from "little, glandulous, unequal grains," profusely scattered over the surface; in others, from crypts or glands confined to particular parts. It is a homogeneous membrane, not divisible into epidermis and cutis vera, like the skin of the vertebrate animals; and it is so intimately fixed to, or rather interwoven with, the subjacent muscular layer, that it is contractile at every point, and in all directions. It invests every part, sometimes closely, but more commonly there is "ample room and verge enough" to form folds and expansions; from which circumstance it has received the name of *mantle* or *cloak*. The blood-vessels distributed in its texture are very numerous, and the nerves are presumed to be at least equally so.

From this structure we might have concluded that the skin would be peculiarly sensible to external impressions; and this we know is the fact. Let your experiment be made with the lightest hand and the softest instrument, yet it cannot come into contact with the Mollúscum which will not feel the impression, and evidence its alarm by intelligible signs. The intimations which they receive by this medium are probably of a very general character, and have respect only to the motion, the temperature, the hardness or softness, of the impressing body. To judge of the position, and perhaps in some degree of the form, of bodies, they are provided with special organs, which, when situated on the head, or about the mouth, are denominated *tentácula*; but, when arranged along the sides or on the margins of the cloak, more commonly *tentacular filaments*. The former are two or four in number, of a cylindrical, tapered, or triangular figure, very flexible, and almost always capable of being withdrawn within a sheath or under the collar, at the will of the animal. These

* This view, sufficiently extensive and accurate for our purpose, is translated from Blainville's Manuel, p. 142, et seq.

filaments are sometimes retractile, and sometimes not: many species do not possess them; but, when they are present, they become the creature's chief ornament. The shell of the Haliòtis, for example, if we except the splendid iridescence of its interior, is sufficiently plain and vulgar; but behold it borne along by the living tenant, its garniture all displayed and vermicular in the smooth and crystal water, and it moves wonder and admiration. (*fig.* 106.) The *T*ròchi, and

106



many other univalves, afford equally fine illustrations. Among bivalves a fringe of these filaments is very general. In the genera which have the cloak completely open, as the oysters, or the sea and fresh-water muscles, the filaments fringe it all round; and in those in which the cloak opens by a tube only, these appendices are attached to the circumference of its orifice. Such is the case in the genera Vènus, Cárdium, &c.

Now, these tentacula and filaments are exquisitely sensible, and, in all likelihood, convey impressions of a more distinct character than the general surface. When the Mollúsca walk abroad, these organs are all extended to the utmost, and in perpetual motion; sentinels alive to every thing around, warning against foe or danger, and watchful of prey. By means of them they likewise feel their way, and ascertain the nature of the ground they traverse, as it seems evident from the manner in which they use them; but to this purpose the proper tentacula are never applied, at least when they carry the eyes on their tips; and they appear to be organs of some other sense. If removed, the snail creeps on as if it were unmutilated; and there are tribes, the Dòris is one, in which their position is such, that they cannot possibly be applied to objects either in front or around them.

2. *Taste.* — Swammerdam found, by experiment, that snails have "a nice appetite and taste;" and it seems necessary to suppose the existence of this sense in all Mollúsca, for they select particular articles of food in preference to others; and we know no other sense which is fitted to regulate the choice.

It must reside, of course, in the mouth; but, whether diffused over the whole, or limited to a certain space, it were hard to determine. Blainville thinks that in the cephalous Mollúsca the seat of taste may probably be in a knob or swelling at the lower end of the buccal cavity; and Cuvier conjectures that the tentacula, at the orifices at which the water, the vehicle of their aliment, enters, may exercise this sense in the acephalous ones.*

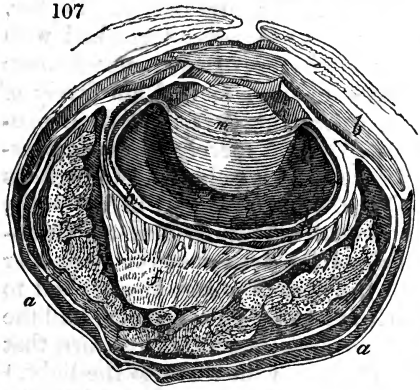
3. *Smell.* — According to Swammerdam, snails have a very quick smell. "This I observed," says he, "when I moved a little fresh food towards them, for they immediately perceived it by the scent, and crept out of their little shells, and came to it." † Gaspard appears to have repeated this experiment without success ‡; but he is surely hasty in denying, on that account, the existence of the sense, seeing how positively the contrary is affirmed by one of the greatest and most honest of naturalists. Blainville says, in general terms, that the acephalous Mollúsca have no smell, but he admits that the Cephalópoda and Gasterópoda possess the sense, and the terrestrial species in a degree of considerable delicacy, since we observe that slugs and snails seek out particular plants, where sight could not have availed them. According to Carus, it appears to be fully proved by the observation of the aversion of these animals, the *Sèpiæ* for instance, from strong-scented plants, that those Mollúsca which live partly in water and partly in air have an olfactory organ, but he denies its existence in those which live exclusively in water. § Admitting the existence of the sense in the cephalous families, there remains great uncertainty relative to its seat. Analogy is here at fault, for invertebrate animals have nothing similar to a nose. Cuvier thinks that a special organ may not be necessary, for the whole skin appears to resemble a pituitary membrane, and may, in consequence, be susceptible of receiving the peculiar impressions emanating from odorous bodies. ‖ If, however, a particular seat for the sense is to be fixed upon, he would place it at the entrance of their pulmonary cavity, because, in all vertebral animals, it is situated at the entrance of the organs of respiration; an argument of little value in the present instance. Blainville, whose opinion is always entitled to attention, states his belief that the proper tentacula are the olfactory organs, because the skin of them is more soft, smooth, and delicate than on any other part, and their

* Comp. Anat., trans., ii. 694.
‡ Zool. Journ., i. 179.
‖ Comp. Anat., trans., ii. 688.
† Book of Nature, p. 49.
§ Comp. Anatomy, i. 74.

nerves more considerable *; arguments of too general a nature to have any influence when adduced for a special purpose. He might have found, perhaps, a better proof in their position, for in very many genera the tentacula do not support the eyes, nor are they, nor can they be, employed in tracking the way. This is the case in the genus Dòris, in which the tentacula are situated on the back, point directly upwards, are remarkably large, and of curious and complex organisation.

4. *Sight.*—The tunicated and bivalved Mollúsca are destitute of eyes, but, with the exception of the Pterópoda, all the others have organs which have been generally considered as subservient to the purposes of vision. There can be no question of their function in the cuttle-fish, for in them the eyes are very large, and similar, in all material points, to those of vertebrate animals. They are two in number, one on each side of the head; they are capable of being moved to a slight extent; they are formed with coats, humours, and nerves, so arranged that, on physical grounds alone, we may confidently pronounce them to be optical instruments of considerable power. (*fig.* 107.)

107



The case is greatly different with the reputed eyes of the other Mollúsca. From their minuteness it is difficult to unravel their structure; and in many instances they are so situated, that, were they organs of vision, the creature, it is presumed, could be little benefited by them. Moreover, it

* Manuel, p. 107., or more particularly his excellent Principes d'Anatomie Comp., i. 341.

† The figure is a view of the eye of Octòpus vulgàris, copied from Cuvier. *a a*, A cellular and muscular tunic, the latter for opening the lids; *b b*, the conjunctiva; *c*, another tunic, enveloping the globe of the eye, and a pouch situated behind it (*e*), containing (*f*) the optic ganglia, and the glands which surround it (*g*). The pouch (*e*) is a transparent membrane, which occupies all the space between the globe of the eye and the tunics which go to its lids; so that the former actually fills only about a third of the greater globe, which, at first view, appears to be the eye itself. *h h*, The external coat of the proper eye, perforated with an infinite number of minute holes, for the passage of the filaments from the optic ganglion; and *i*, another coat, formed apparently by the expansion and netting of these nervous filaments. *m*, The crystalline lens.

has been asserted, that those of snails at least are in every respect insensible to light, for the creatures creep and climb as correctly in the dark as by daylight; they do not at any time perceive obstacles, placed of purpose in their way, until they touch them; and when deprived of the organs, they crawl on as unconcernedly, and guide themselves as safely, as they did previously to the mutilation. On these grounds some naturalists of eminence deny that the little black points, denominated eyes by the vulgar and the learned, are ocular bodies, and find in them nothing more than the organs of an exquisite sense of touch.*

Organs of touch they *may* be in snails (Hèlix, *L*ìmax, &c.), in which they are elevated on movable and filiform tubes capable of being directed to all points; but organs of touch they surely *cannot* be in the greater number of the class, on which they are placed, as it were purposely, to be removed from the contact of external objects. Such, for example, is their position in the whelks (*B*úccinum) and rock-shells (*M*ùrex), in the Lymnæ`æ, Turbónidæ, and others. Seeing, too, how amply the Mollúsca are otherwise furnished with tactic organs, additional ones might be deemed superfluous; and, notwithstanding the facts opposed to it, I am firmly of opinion that what have been called the eyes have been properly designated organs susceptible not merely of the impressions of light, but capable of distinguishing objects, and perhaps colours. They are placed on the anterior part of the body, as the eyes of every other animal are; their size and number are constant in individuals of the same species; they bear a very exact resemblance to the eyes of many insects, and to the stemmata of others, which are believed to be eyes; and the snail, when confined, makes unequivocal attempts to turn that part of the body which is furnished with them to the light.† I have occasionally, on a summer's dewy evening, when the animals were on the alert, made experiments on our common slugs and snails; and I am satisfied, as Lister appears to have been ‡, that they do perceive obstacles placed in their way, diverging from them when within from one to three inches. They rarely touch the opposing substance, but often they alter their course so slightly as to pass it by in freedom with a shortening of the tentaculum on the near side, while sometimes the track is changed entirely. Nay, I have seen, or imagined I have seen, in more than one instance,

* Gaspard, in Zool. Journ. i. 179.
† Müller Verm. Hist., i. præf. 3. et 4.
‡ Lister's Exercit. Anat. de Cochleis, p. 10. 1694. 12mo.

a snail follow, with apparent eagerness, the purple-coloured flower of a thistle held near its tentacula, and gradually withdrawn. Adanson says that the Cyprǽæ "se servent fort bien de leurs yeux;" and Swammerdam affirms that the Túrbo littòreus draws itself suddenly within the shell when any thing is suddenly presented to its eyes; "so that," he adds, "I may venture to affirm from hence, that this is the only species of snails that I know wherein any manifest signs of sight appear." * Further, such Mollúsca as have oculiferous tentacula do not use them in touching objects; for, as Mr. Guilding has properly observed, they carry them usually erect; and the inferior ones, with the lobes of the cheeks, are principally used as tactors.

I grant to you that these arguments are not decisive of the question, and that one drawn from the anatomical structure of the organs would be of superior convincement; and that argument is, I think, upon the whole, in my favour. In the Cyprǽadæ and the allied families, the structure of the eye is said to be by no means obscure; and the giant Strómbidæ, which inhabit the Caribbean Sea, have eyes more perfect than those of many vertebrated animals. They have, according to Mr. Guilding, a most intelligent and indefatigable naturalist, a distinct pupil and a double iris, equalling in beauty and correctness of outline those of birds and reptiles; and he discovers in the organ a vitreous and an aqueous humour, and the black pigment.* Mr. Gray, a naturalist of equal industry and accuracy, tells us that if they who have doubted concerning the nature of these organs "had examined the eyes of the marine carnivorous Mollúsca, *B*úccinum undàtum or Fùsus despéctus, and more especially some of the larger Strómbi, they would have found the eye as fully developed as in the cuttle-fish, showing the cornea and the nearly orbicular crystalline lens almost perfectly formed, as may be seen by any person simply cutting the cornea across, and slightly pressing it, when the crystalline lens will protrude." ‡ This evidence seems conclusive; for if the same parts cannot be demonstrated in the smaller or in the terrestrial Mollúsca, it is surely because of the minuteness of the organ and the difficulty of the dissection. But the fact is, that Swammerdam has described with great minuteness the eye of the common snail, in which he detected "five distinct and visible parts," viz. the uvea, the aqueous, the crystalline, and the

* Book of Nature, p. 81.
† Zool. Journ., iv. 172.
‡ Edin. Journ. Nat. Geogr. Sc., i. 52. new series.

vitreous humours, with the arachnoid tunic; parts which, he affirms, were as "clear as the sun at noon." He likewise observed that the eyes of the Lymnæ'æ were provided each with "its own proper crystalline humour." The accuracy of this description has been denied, and while I admit that recent observations render it doubtful, I am still unwilling to believe that they have proved it false or erroneous. Few, very few, have been gifted with the eye and hand of a Swammerdam, and his honesty is beyond impeachment. This good and great man seems to have foreseen that doubts would arise concerning the correctness of his account. "But who can credit this," says he, "for it seems indeed improbable, that on a point not bigger than the nib of a writing pen, such exquisite art, and so many miracles, should be displayed."

The eyes are always two in number, generally minute, although perhaps not disproportionably so, black, convex, and glossy, and incapable of any independent movements, but their position relative to the body is often altered by the motion of the parts on which they are placed. Sometimes they are placed on the body behind or between the tentacula, as in Apĭ́ysia; often they are at the base of the tentacula, and not unfrequently in a notch on their sides at a greater or less elevation. In some genera, as in Strómbus and Nática, the eyes are on the summit of pedicles appropriate to themselves; and in the Hélices and Limàces they terminate the superior tentacula. These are fleshy tubes, which, as you well know, may be drawn completely within the head, and again protruded by a motion similar to the evolution of the finger of a glove. The muscle which withdraws the tube arises from the muscles that draw the snail into its shell, and, running forward, is fixed to the extremity. When, therefore, it contracts, but still more when assisted by the contraction of the great muscle of the body, the apex of the horn is drawn inwards, in a manner which resembles the turning in of a stocking. The annular fibres, which encircle the horn throughout the whole of its length, unfold the internal part by successive contractions, and thus bring back the eye to its external position.*

The location of these organs has been varied according to the wants and habits of the animal, and to the medium in which it was destined to live; but neither this medium nor these habits have had the slightest share in producing the vari-

* Cuvier, Comp. Anat., trans., ii. 444.

ations; a remark so obvious, that it may well seem to you unnecessary, did not the language of too many naturalists imply something to the contrary.* The notion is akin in absurdity to another doctrine which Lamarck in particular has strenuously and long endeavoured to establish, viz. that the eyes (and of course the same reasoning applies to the organs of the other senses) are the products or manufacture of strong desires on the creature's part to enjoy the blessing of sight. "The production," he says, "of a new organ in an animal body is the result of a new supervenient need which continues to be felt, and of the new motion which this need has originated and keeps up: and as an illustration of this law, which he is careful to print in italic letters, he instances the snail, which, in crawling along, finds the necessity of touching the bodies which are before it, makes efforts to do so with some of the anterior prominences of the head, and sends there every moment waves of nervous fluid and of the other liquids. Now, the result of these repeated tides on the points in question, is a gradual extension of their nerves, a gradual growth of their substance, and the ultimate budding and evolution of two or four tentacula.† Think not I overstrain the doctrine, for indeed I translate the words of my author with sufficient closeness and sobriety; and had he not been silent on the points, I would also have told you wherefore the desire awoke in some and still sleeps in others; from what cause it happened that a creature born blind, and all unconscious, became conscious of the existence of light, and felt the wish to see this fair scene; and by what more than magnetic influence this longing wish arranged the particles, and moulded them so curiously, that an ordinary mind can perceive only the designing hand of an intelligent first cause. These are perhaps questions of little moment, and you must rest satisfied with the dicta of the teacher: —

"For when each would have open'd its eyes,
For the purpose of looking about them,

---

* See a very objectionable passage quoted from Férussac, in Zool. Journal, ii. 505.

† Anim. sans Vertèbres, i. 185. 188. — The doctrine of Lucretius, which is at antipodes, I nevertheless like rather better: —

"Note here, Lucretius dares to teach
(As all our youth may learn from Creech)
That eyes were made, but could not view,
Nor hands embrace, nor feet pursue:
But heedless Nature did produce
The members first, and then the use.
What each must act was yet unknown,
Till all is moved by chance alone." PRIOR.

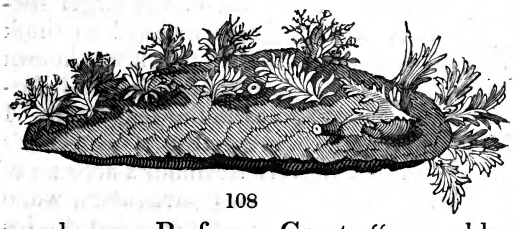
They saw they had no eyes to open,
And that there was no seeing without them !"

5. Hearing. — If sounds are heard only by such animals as have an organ framed like the ear, then very few Mollúsca can possess this sense; for traces of an auditory organ, somewhat similar to that of fishes, have been detected in the head of the cuttle-fish (Cephalópoda) only, and the organisation of it is so imperfect, and its situation so deeply concealed, that the impressions received and communicated must necessarily be obscure. All other Mollúsca, as I have said, are destitute of organs of hearing, and many of them at least are insensible to sounds. Snails are not affected by loud and harsh noises about them; nor are the periwinkle and whelk more susceptible in this respect. Baster, however, on the authority of the seamen engaged in carrying muscles to Holland, tells us that these shell-fish are grievously affected by any violent motion and concussion of the air; for if the ship is overtaken by a thunder-storm, or sails too near any other vessel which at the moment discharges its guns, the muscles, frightened with the tremor, shut their valves too suddenly, so as to expel the contained fluid, and in consequence soon die.* It is affirmed also, by Mr. Guilding, that the *Strómbidæ* possess the sense of hearing, or something allied to it. "I lately suspended," he says, "a number of large *Strómbi* by the spire, that the animal when dead might fall from the shell. They had remained in this situation several days, till the body, weak and emaciated, hung down nearly a foot from the aperture, and the eyes had become dim. I found that even before my shadow could pass over them they were aware of my presence, and endeavoured to withdraw into the shell. I then cut off the eyes, with the thick cartilaginous tentacula in which they were lodged, but the animals still continued to be sensible of my near approach, while hanging in this mutilated and painful condition."† The experiment is not conclusive, nor does it appear indeed that any noise was made. The impression which gave the alarm might perhaps be from the pulses of the atmosphere, thrown into motion by the approach of the experimenter, and acting on a skin morbidly sensible. On a summer evening I have observed the common spout-fish (*Sólen síliqua*) extended along the surface of the fine sand in which they burrow, enjoying apparently the calmness and mildness of the season, take alarm and instantaneously descend when I was yet distant several yards; and I can ex-

* Opusc. Subseciv., i. 109. † Zool. Journ., iv. 172.

plain this and similar facts only on the supposition of the existence of a sense of touch feelingly alive to impressions impalpable to our grosser sense.

Molluscous animals are dumb, one only (Tritònia arboréscens (*fig.* 108.) having been observed to produce a sound of any kind. The sounds this Tritònia produces, when in a glass vessel, says Professor Grant, "resemble very much the clink of a steel wire on the side of the jar, one stroke only being given at a time, and repeated at intervals of a minute or two: when placed in a large basin of water, the sound is much obscured, and is like that of a watch, one stroke being repeated as before at intervals. The sound is longest and oftenest repeated when the Tritòniæ are lively and moving about, and is not heard when they are cold and without any motion; in the dark I have not observed any light emitted at the time of the stroke; no globule of air escapes to the surface of the water, nor is any ripple produced on the surface at the instant of the stroke; the sound, when in a glass vessel, is mellow and distinct." The Professor has kept these Tritòniæ alive in his room for a month, and, during the whole period of their confinement, they have continued to produce the sounds, with very little diminution of their original intensity. In a still apartment they are audible at the distance of twelve feet. "The sounds obviously proceed from the mouth of the animal; and at the instant of the stroke we observe the lips suddenly separate, as if to allow the water to rush into a small vacuum formed within. As these animals are hermaphrodites, requiring mutual impregnation, the sounds may possibly be a means of communication between them; or, if they be of an electric nature, they may be a means of defending from foreign enemies one of the most delicate, defenceless, and beautiful gasteropodes that inhabit the deep." (*Edin. Phil. Journ.*, vol. xiv. p. 186.)



108

I am, Sir, yours, &c.

March 31. 1831. G. J.

ART. XII. *On a peculiar Species of Mite parasitical on Slugs.* By the Rev. LEONARD JENYNS, F.L.S.

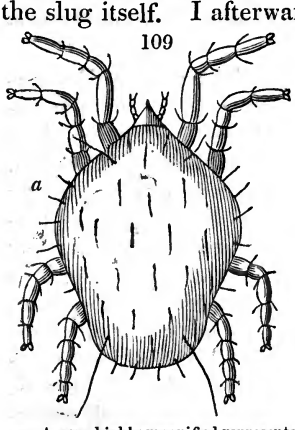
DURING a recent examination of our British *Limàces*, I observed a peculiar parasite infesting some of the larger species of that family, which, at first, I was inclined to think might prove new. I have since ascertained that it was known to Reaumur, and described by him in the *Mémoires de l'Académie Royale des Sciences*, so long ago as in the year 1710. I have also met with a short notice respecting it in Shaw's *Naturalist's Miscellany*. As, however, Reaumur's account of this insect differs from mine in one or two particulars, while that of Shaw's is a mere allusion to it, appended to his description of one of our British slugs, I have thought that some farther publication of its history, accompanied by a correct figure, might not be without interest; especially to those persons who, being unacquainted with the memoir abovementioned, may possibly have no knowledge whatever of the existence of this insect.

The parasite in question belongs to the *Acáridæ* of Lamarck; a tribe, perhaps, better known by the English name of mites; and, although extremely minute, is interesting, on account both of its usual place of residence and the singularity of its habits. I first noticed it on some specimens of the *Limax* variegàtus of Férussac, which were obtained from a cellar in Cambridge, and thought that, like many of its congeners, it was a species of a wandering disposition, which had only strayed upon these animals accidentally. I afterwards, however, found it upon the same kind of slug, obtained from another source, and have since met with it in great plenty at Swaffham Bulbeck upon the common black slug (Arion empiricòrum *Fer.*). I now feel satisfied that these insects are strictly parasites attached to this family of molluscous animals; an idea which receives full confirmation from the observations of the two authors above alluded to.

One of the most striking features in the history of this little insect is the circumstance of its not confining its abode to the external surface of the slug, but often retiring within the body of that animal; effecting its entrance by means of the lateral foramen which leads to the cavity of the lungs. Indeed, I am inclined to think that this cavity is its principal residence, whence it only comes forth occasionally, to ramble upon the surface of the body. In one instance, I confined in a close box a slug which, to all appearance, was free from parasites. On opening the box a day or two afterwards, I observed very many crawling about the slug externally, all

of which would seem to have proceeded from the pulmonary cavity. On another occasion, I observed these insects running in and out of this cavity at pleasure; and some which I saw retire into it never reappeared, although I watched the slug narrowly for a considerable time. It is remarkable, as Dr. Shaw observes, that the slug appears to suffer no particular inconvenience from these parasites, and even allows them to run in and out of the lateral orifice without betraying the slightest symptoms of irritation.

Another curious circumstance in the history of these insects is the extreme rapidity of their motions. One might have thought that so slimy a ground as the surface of a slug's back would have rather impeded their progress; but so far is this from being the case, that they are never to be seen at rest: indeed, they run with greater celerity than any other parasites of this tribe with which I am acquainted; these insects, in general, being rather slow in their movements than otherwise. From this circumstance, it becomes a difficult matter to secure them for examination, and the more so, their bodies being of a soft nature, and crushed by the slightest touch. My first attempt consisted in dropping the slug into water; but I was rather surprised to find that the *A*cari, although immersed, rose instantly to the top, and ran about with as much celerity upon the surface of the fluid as upon the slug itself. I afterwards tried the same experiment with weak spirits, which was attended by better success; the spirits having the effect of paralysing the limbs of the parasite, without immediately destroying life. It was, accordingly, in this manner that I was enabled to make the accompanying drawing (*fig.* 109.), and to note down the description of this insect, to which I shall now proceed.



a, A very highly magnified representation of this insect.
b, The terminal joint of the foot, still more enlarged.

Although this little *A*carus is not altogether new, I am not aware that it has ever received a name, or had its distinguishing characters accurately defined. It will not associate well with any of Lamarck's genera; and I am unacquainted with a more recent arrangement of this much-neglected tribe. It seems to bear some distant affinity to Erythræus, which it

resembles in the swiftness of its motions, and also in having a movable fingerlike process attached to the last articulation of the palpus. But it differs essentially from that genus in its place of residence, Erythræ'us not being parasitical; and in its being furnished with a haustellum, as far as I can perceive, instead of mandibles. The feet and palpi are also much shorter. If it be really hitherto undistinguished, as a peculiar genus, I would propose for it the following name and characters: —

PHILO'DROMUS.*

Gen. Char. — *Os* haustello terminali, brevi, porrecto. *Palpi* duo, rostrum longitudine paullulum excedentes, filiformes, quadriarticulati; articulo ultimo appendice mobili ad basim instructo. *Oculi* indistincti.

Corpus ovale, setigerum. *Pedes* octo, subæquales; unguibus instructi.

Sp. 1. P. *Lima'cum mihi.*

P. flavo-albicans, pedibus pallidè testaceis.

Insecte des Limaçons, *Reaum. Mém. de l'Acad. des Scien.* 1710. p. 305. pl. 8.

Long. vix $\frac{1}{4}$ lin.

Body oval, convex above, with the sides very much bulging between the second and third pair of feet, beneath which, in some specimens, it is slightly coarctate. *Colour* yellowish white, with the feet pale testaceous red; upper surface beset with short scattered bristles; with two longer pairs, of which one arises from the anterior part of the body, and is directed forwards; the other from the posterior part, immediately above the anus, and is directed behind. The *feet* appear to consist each of about five articulations, and are nearly of equal length; the first pair being somewhat longer than the others. The last joint terminates in a pair of strongly hooked claws, surrounded by a coronet of bristles. A pair of short bristles also arise at the junctures of the other articulations.

Such is the result of my own observations upon this parasite. The description which Reaumur gives of his insect agrees with mine in all essential particulars, as does his figure also, although this last is but rudely executed. There are, however, one or two differences in our respective accounts of its economy, which deserve to be pointed out: — First, he appears to have met with his specimens upon snails; and the species represented in his plate are evidently the Hèlix pomàtia and the Cyclóstoma élegans *Drap.* Neither does he make any mention of having seen these insects upon slugs. Secondly, he notices their singular habit of retiring occasionally within the body of the animal; but speaks of them as taking up their residence in the intestines of the snail, entering *per anum*, and only quitting their abode when forced from their retreat by the evacuation of the fæces. It is just possible that Reaumur's insect may have been of a different species from mine, although evidently of the same genus; and in that case it would be well characterised by these different, yet at

* From *phileō*, to love, and *dromos*, running.

the same time analogous, habits. But I am more inclined to the opinion that he has, in this instance, confounded the pulmonary foramen with the anus, and been thereby deceived as to the exact retreat of the parasite. Those who are acquainted with the anatomy of these Mollúsca are well aware that the two apertures in question are situate close to each other, and that, in the case of the snail, the anus may almost be said to terminate in the pulmonary cavity; the two together having but one opening externally, which is common to both. This common aperture, which is often very conspicuous from its size (the animal having the power of enlarging and contracting its dimensions at pleasure), is seated in that part of the cloak which is called the collar; and an ordinary observer, who saw the excrement passing out of it, would naturally suppose that it led directly to the intestines.

Reaumur also states another circumstance with respect to these insects, which deserves to be mentioned; and that is, that he could never meet with them in wet weather; but that if, at such times, he confined a number of snails in a close vessel, however free they might then be from these parasites, these last were sure to show themselves in plenty in a few days. I have not myself observed any particular connection between the appearance of these insects and the state of the weather; but the above circumstance will, perhaps, throw some light upon the fact which I mentioned in the former part of this article.

Dr. Shaw appears to have met with this parasite upon the great spotted slug, the *Limax* antiquòrum of Férussac; a species on which I have not hitherto observed it.

Swaffham Bulbeck, Cambridgeshire, L. Jenyns.
Sept. 13. 1831.

Art. XIII. *New Theory of the Ascent of the Sap.* By H.

Of all the various attempts to explain the laws of vegetable physiology, which have at different times engaged the attention of talented and scientific investigators, none have been so unsuccessful as those which attempt to elucidate the cause of the ascent of the sap. As obscure now as when Grew first published his theory to the world, the lapse of a century and a half has thrown no light upon the subject, though during that time many patient labourers were engaged in that arduous field of discovery. The results of their labours were so unsatisfactory when given to the world,

that now not a single ray remains, not even the shadow of a hope, to give encouragement to future researches. Nature, indeed, seems to throw an impenetrable veil over the mysteries, and guard with a jealous care the theory of vegetable formation.

After such disheartening results, any farther attempt to illustrate this subject might appear but lost labour; but it is the business of the philosopher to be checked by no difficulty that may be interposed between him and the object of his research; and, at the same time, to conceive nothing inexplicable, which has not yet received a probable explanation. Under the influence of such feelings, I have placed together the following hints, which, should they be thought of sufficient importance, may perhaps engage the attention of some of your readers, who probably may have better opportunities of conducting such enquiries than myself.

What appears to me of great weight in this theory is, that it is founded on nutrition, and consequently dependent on the vital principle; an argument against which many of the abandoned theories could make no stand.

The theory I wish to prove is the following:—The sap, in its ascent in the stem, becomes deprived of some of its constituents, more especially of its aqueous part; this deprivation is effected by the vital principle of the plant decomposing the aqueous part, and assimilating the resulting gases to its own constituents. As the assimilation takes place, a partial vacuum is formed by the change of gases to a solid form; and this vacuum is immediately filled, by the sap rushing into it, according to the well known law of the tendency of fluids to rush into any cavity deprived of the presence of air.

In order to strengthen this theory, it is necessary to bring forward some arguments which prove the changes the sap undergoes in the stem, and also to prove, that some of its elements are there appropriated to its growth.

It is now received on all sides that the sap ascends through the wood, and in greater quantity in the newest layers; in fact, so true is this, that in the innermost layers, where the vessels have become gradually obstructed by the deposition of ligneous matter, vitality in time ceases, and they decay away, as we see in very old trees, where the internal part has been quite removed, and an external tube now serves to carry on the functions of the tree. Here the vessels become gradually hardened, and in the course of time perfectly obstructed, by the deposition of matter resulting from the decomposition of some of the aqueous portion of the sap, and

carbonic acid, some of which is always held in solution; the carbon, hydrogen, and part of the oxygen going to form the wood. That a portion of water is removed is evident from an experiment of Mr. Knight, who found that sap taken from a plant varied in specific gravity in proportion to the distance from the root at which it was taken.

It might also be added, as a proof of this, that, according to the analysis of the woody fibre given by chemists, it is found to consist of carbon, hydrogen, and oxygen; the two latter in the proportion to form water. It has been observed by vegetable physiologists, that light, heat, and electricity all concur in accelerating the ascent of the sap: these agents are well known to hasten chemical decomposition. By an action of this kind, the sap, when exposed to their influence, may undergo changes with greater rapidity, and consequently give increased energy to the motion of that fluid.

I have yet to mention another argument, which, if it remained unanswered, might have great weight in crushing the theory I am attempting to explain. I refer to the tendency of fluids to occupy a vacuum. It might be thought that this law is incapable of acting in the vessels of plants; but the experiments of M. Amici of Modena are, I think, sufficiently satisfactory to prove its possibility, and, at the same time, its reality. Assisted by the microscope, he has discovered that each cavity is of itself a complete organ; and that in this space the fluids of the plant move independent of the neighbouring cavities, so that by the assimilation of part of the fluid contained in one cavity, that cavity becomes a partial vacuum to those places near it. As the earth is the source of nourishment, the motion must necessarily be upwards, and there being no limit to its ascent, it rises with as much ease in the stately cedar as in the humblest annual.

London, March, 1831. H.

ART. XIV. *On the recent and rapid Formation of some Peat Bogs in Ireland.* By GEORGE ENSOR, Esq.

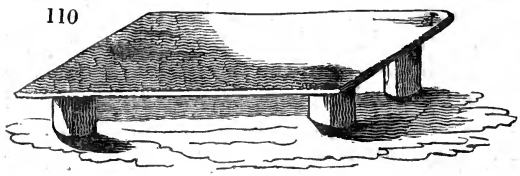
Sir,

AMONG the advances of the knowledge of mankind is the admission of the vast antiquity of the earth's existence. The *Quarterly Review* for October, 1830, p. 425., in its notice of Lyell's *Principles of Geology*, states "that no doubt can at present be entertained, from the evidence of organic fossils alone, exclusive of other cumulative proofs from the igneous and stratified rocks, that before the creation of any of the existing species of animals, of which MAN seems to be the

most recent, the earth had been inhabited by innumerable other species, and other genera, successively created and extinguished during a lapse of time wholly immeasurable, but which must have comprehended millions of ages, rather than of years."

As many changes on the earth's surface involve millions of ages, others are of yesterday. This has happened in respect of some at least of the peat bogs in my neighbourhood. A stool (*fig.* 110.) was found in my turf or peat bog;

110



22 in. long and 18 in. broad: the supporters are cut out of solid timber of the willow kind. It was found about 4 ft. under the surface by the turf-cutter. At Derrycaw, about three miles from my residence, the workmen of Mr. Bond, in sinking trenches in the bog near his house, discovered the foundation of a timber house on the earth; the mortises in the door-case are stated as remarkable. Since the preparation of the materials for that habitation, the bog has accumulated to an immense height, and the Blackwater river has been formed. These changes have probably been recent; yet there is no report or story of the change, unless in the general language of the country, which now denominates the land hills, peering throughout the bogs, islands: this may be metaphorical, yet it appears probable to me that it truly declares they were encircled with water. But what proves the late creation of our bogs or mosses, for they have both these names in this country, is, the blade of a knife found in the inside of a fir tree. Two sawyers, of the name of Short, were employed by me about ten years ago. In the course of conversation with them, they mentioned having found the blade of a knife in sawing a fir tree. The account is as follows: —

The Rev. Mr. Steward being promoted to Grange, he was obliged to repair the dwelling-house and offices. For that purpose he had some bog fir brought from his estate in Tyrone. The Shorts were employed by him to saw it. In cutting one log, they were arrested, and the saw damaged. They then reversed the position of the tree, and proceeded in their task. As they approached where they had been stopped, the timber divided, and the blade of a knife dropped. There was a hole in the tree, beginning at the upper end of the blade, which the sawyers conjectured to have been formed

by the rotting of the handle. Nothing can be ruder than the blade; it is about 2½ in. long, and the third of an inch broad; high on the blade, where the maker's name on Birmingham articles is placed, are three figures, 16 3; the figure between 6 and 3 being obliterated. Let that figure be what it may, from the time the knife was discovered by the sawyers to the time it was stuck into the growing tree could not have exceeded two hundred years. This tree, observe, was dug out of the peat bog, 12 ft. below the surface, and the knife was 6 in. within the solid sound timber. I asked the sawyers why they did not offer it to Mr. Steward, or tell him something about it. They said they had no talk with his Reverence, and that he would care nothing for such a *curosity*. They brought it to me without any promise of reward. They were willing to make affidavit of the truth of their statement. They have been examined by others; and very lately I had the account repeated by the surviving brother. I have no doubt of their veracity.

GEORGE ENSOR.

August 17. 1831.

ART. XV. *Notice of the Volcanic Island lately thrown up between Pantellaria and Sciacca.* By WILLIAM AINSWORTH, Esq., M.R.S.L., Member of the Royal Geographical Society, &c.

THE ejection of volcanic masses, or the elevation of the strata of the earth above the level of the soil or sea by natural causes, is of importance, remotely to all theories of the earth, and proximately to the true origin and formation of pseudo and active volcanic rocks and of craters of elevation.

This branch of geological enquiry has received a new impulse from the late researches of De Buch and Elie Beaumont, and every circumstance which tends to give consistency to opinions more or less theoretically deduced is advantageous to science.

The elevation of Graham Island, in lat. 37° 11′ N., and long. 12° 44′ E., in the Mediterranean Sea, between Pantellaria and Sciacca, which took place in the month of July, 1831, has been observed at different stages of its progress, and has been attended with phenomena of such decided utility to this enquiry, that they will be my excuse for intruding upon your pages some remarks connected with its origin and general character.

The drawings which accompany this notice are from the pencil of Mr. W. Russell, of His Majesty's Ship St. Vincent, and are fac-similes of the drawings sent by the same gentleman to His Royal Highness the Duke of Sussex, and since published by Ackermann; and of those transmitted to the Admiralty, and published in the *Journal of the Royal Geographical Society*. In both these cases the artists have made such alterations, in rounding the outline and altering the true configuration of the island, as materially to affect their utility in a scientific point of view.

According to published documents (*Times*, August 31. 1831; *Journal of the Royal Geographical Society of London*, 1830-31) the Neapolitan schooner Psyche discovered, on the 12th of July, smoke on the water between Sicily and Pantellaria, where the island is now situated; and, on the 17th of July, the master of the brig Adelaide, from London, distinguished fire; and it is probable that at this period the land rose to the surface. On the 18th of the same month, Commander C.H. Swinburne observed, from on board His Majesty's ship Rapid, a long irregular column of smoke or steam, accompanied by eruptions of fire, bearing south by east; the town of Marsala bearing by compass east half north 9 miles. On nearing, a small hillock of a dark colour was observed a few feet above the sea. The volcano was at this period in a constant state of activity, discharging dust and stones with vast columns of steam. The island appeared to be 70 or 80 yards in its external diameter, and the lip as thin as it could be, consistent with its height, which might be 20 ft. above the sea in the highest, and 6 ft. in the lowest part, leaving the rest for the diameter of the area within.

From information accompanying Mr. Russell's sketch, it appears that the circumference of the island on the 23d was $\frac{3}{4}$ of a mile. The highest point was 80 ft. above the level of the sea, and the jets of water rose to a height of from 800 to 1000 ft., and bore up immense quantities of cinders and stones, which sometimes attained nearly double that height.

On the 3d of August, Captain Senhouse of the St. Vincent effected a landing in the Hind cutter, and hoisted the British flag, calling it Graham Island. The form of the crater was found to be nearly a perfect circle, and complete along its whole circumference except for about 250 yards on its south-eastern side, which were broken and low, not apparently more than 3 ft. high. The height of the highest part was found, upon a rough computation, to be 180 ft.; the whole circuit of the island was from a mile and a quarter to a mile and a third. It bore the general appearance of

two longitudinal hills, connected by intermediate low land sending up smoke and vapour in abundance. The circular basin, the centre of theis land, was full of boiling salt water of a dingy red colour; and the vapour was very oppressive, causing nausea and faintness.

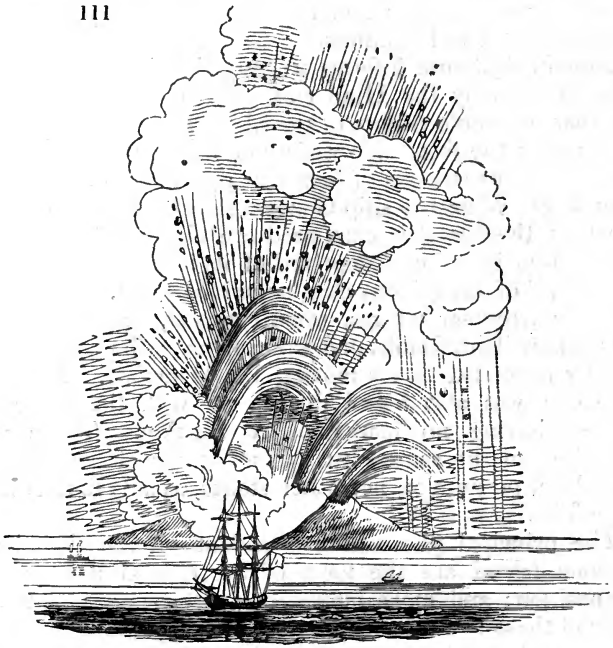
Captain Senhouse informs us that the fragments of rock brought away by the Hind cutter are compact and heavy, and that the whole surface of the island is dense and perfectly hard under the feet. No variety of lava was procured, nor even any jet or streams of lava seen; and Mr. Osborne, surgeon to His Majesty's ship Ganges, states that the substances of which the island is composed are chiefly ashes, the pulverised remains of coal deprived of its bitumen, iron scoriæ, and a kind of ferruginous clay, or oxided earth. The scoriæ occur in irregular masses, some compact, dense, and sonorous, others light, friable, and amorphous, with metallic lustre, slightly magnetic, barely moving the loadstone. A piece of limestone was also found thrown up with the other substances, having no marks of combustion. There were, according to the same observer, no traces of lava, no terra puzzolana, no pumice, nor other stones, usually found on volcanic hills.

The principal phenomena attendant on the elevation of Graham Island are the form of the ejected mass and its composition; and more information will be contained in the study of these two features, than in any hypothetical surmises on the mode of ejection, and on the character and nature of the action by which this took place.

It will at once be observed, in the sketches of the island which accompany this notice, that its appearance differs very much according to the distance at which it is viewed. In *fig.* 111. it is the summit of a volcano, a cone of eruption slightly elevated above the level of the sea; but, on a nearer approach, its form is found to be that of a circular crater with more or less perpendicular walls (*fig.* 112.), like most of the craters of elevation surrounding the internal craters of volcanoes, or the islands and insulated formations of supposed similar origin. The internal crater on the left-hand side of *fig.* 112., which presents the most striking manifestation of this disposition, has been obliterated in the sketch contained in the *Journal of the Royal Geographical Society*, and occupied by smoke and a prodigious flash of lightning.

There is every reason to believe that volcanic eruptions take place at the bottom of the sea, in the same manner as on the surface of a continent; and Mr. Osborne points out the

fact that, in the elevated sides of the external ridge of the island, the sides fall down in abrupt precipices; and each

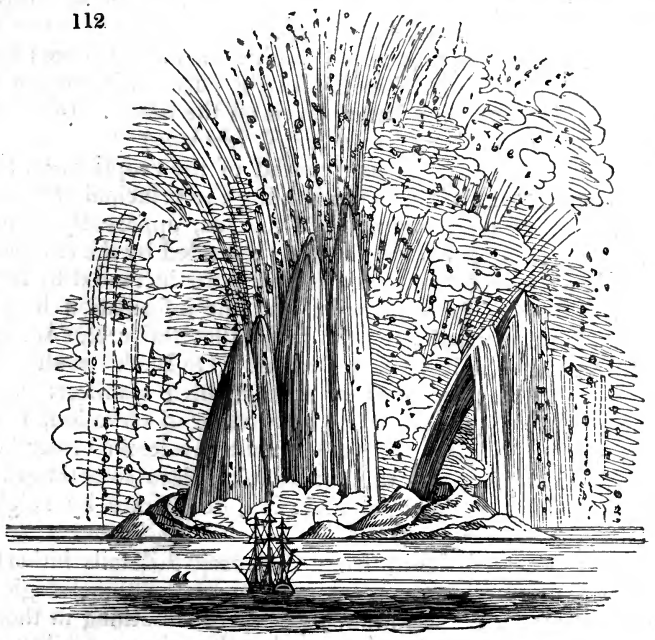


stratum could be distinctly discerned, the water evaporating having left an incrustation of salt, which now appears a white firm layer, plainly marking the regular progress and formation of the island. It is very evident that this kind of action and succession could not have taken place above the level of the waters either of the sea or of the internal crater; as it further demonstrates that horizontal beds of volcanic matters, accumulated over each other, can be directed on a given point without any violent contortion or derangement of their symmetry and parallelism. Nor have we, in the present case, any invasion of the sea or explosions posterior to the formation of the cone, if we may judge from the details transmitted to us of the elevation and appearance of the island, to account for the well characterised circus or mural precipice which surrounds the canal of communication or crater of eruption.

It does not farther appear, from the soundings, that this island is the summit of a cone of eruption with an open crater. Captain Swinburne found, within 20 yards on the western side, 18 fathoms soft bottom; and Capt. Smith found,

at 100 yards, the island bearing from N. to N.W., from 60 to 64 fathoms; at 80 yards, the island bearing N.E., 70 to

112



75 fathoms; at 150 yards, the island bearing E., 62 fathoms, cinders: the soundings continuing the same to the distance of five or six miles; that is to say, varying from 60 to 70 and 80 fathoms, sand and small gravel. The extent of the action by which this island was elevated from below is uncertain. It is a curious fact, that the tides were higher at that period at Gibraltar than they were ever known to be; but the connexion of this phenomenon with the elevation of submarine formations requires the evidence of correlative observations.

Captain Swinburne observed the interior of the crater to be filled with muddy water, violently agitated, dashing up and down, and shooting hot stones and cinders into the air; and occasionally running into the sea, over the edge of the crater, which was broken down to the level of the sea on the west-south-west side for the space of 10 or 12 yards. This edge he supposed, from these appearances, to be formed of cinders and mud: a supposition which is contradicted by the consideration that an embankment of such materials, and of such slight thickness, could never retain the mass so violently

agitated in the interior; and is farther opposed to the statements of Captain Senhouse and Mr. Osborne.

The isolation of the volcanic action is also demonstrated by the fact, that the temperature of the sea, within ten or twelve yards of the crater, was only 1° higher than the average; and to the leeward, in the direction of the current, it was not at all affected, though a mirage played on the island. (*Captain Swinburne; Report to Admiral Sir H. Hotham.*)

There was, at a subsequent period of the eruption, on the south-west side of the island, adjoining the principal crater, a terrific ebullition and agitation of the sea, apparently seated in another canal of communication; attended by the emission of a dense white steam, and a temperature increased to 190° Fahr. (*Letter of Mr. Osborne*); and the information has, I believe, since reached the Admiralty, that this crater is now elevated above the level of the waters. De Buch has already pointed out, that the internal action which manifests itself at the surface of the soil or sea by a crater of elevation, may constitute at the same time a permanent volcanic crater beneath; the eruptions of which may take place sometimes by the centre of the crater of elevation, sometimes by neighbouring points.

Though it is difficult, from the meagre details hitherto obtained, to form any correct opinion of the mineralogical character of the upraised mass, yet there is nothing in those details to warrant the supposition that there is no stability or permanence in the composition of the island. The pulverised remains of coal deprived of its bitumen, the hard scoriæ, dense and sonorous (phonolites?), the amorphous rocks with metallic lustre and ironstone clay, would appear to associate the eruption with the rocks of the carboniferous series; an opinion which receives additional probability from the ejection of unchanged pieces of limestone: as we see, between Pettycur and Bruntisland in Fifeshire, beds of limestone and of non-bituminous coal elevated by rocks of plutonic origin, and argillaceous and argillo-calcareous rocks changed into leucostines and spilites. If this is the case, a farther and more accurate investigation of the mineralogy of Graham Island will be of as much utility to the study of changes produced by volcanic action, as the forms and characters of the upraised formations have been in pointing out their geological age and associations.

ART. XVI. *Hail in the South of France, and Insurance against Loss by it.* By JAMES MITCHELL, Esq. LL.D.

THE calamity of hail, which is but little formidable in our climate, is justly a subject of terror in many districts of France, not only for the injuries done to the corn, but for the destruction of vines and olive trees, which many years may not repair. As illustrative of this phenomenon, it will not be foreign from the objects of this Magazine to give an account of a society at Toulouse, formed for insuring against loss by it.

In the years 1799, 1800, and 1801, the storms of hail had been more than usually prevalent, and many families had been reduced to ruin. Appeals to the benevolence of the public were numerous, and consequently were but little productive in any one case. Many proprietors were driven to the necessity of disposing of their whole lands, and were thus reduced to an inferior rank in society, and in many cases to irremediable poverty. Considerable uneasiness was excited in the minds of those whose fields had fortunately escaped the calamity, lest, in the next or some future season, they should be visited by similar destruction.

This state of things suggested to M. Barrau, of Toulouse, the establishment of a mutual indemnity insurance company against hail.

To his benevolent mind it occurred, that if the whole extent of the calamities of those years had been equally divided amongst the whole inhabitants, although still severe, it would have been endurable; and the more space the evil was made to spread over, the less was the intensity in any one place: but, if the whole inhabitants could not be induced to unite together, and divide the evil amongst them, the calamity might still be mitigated, if a sufficient number united to effect such a security that a portion of the property of those that escaped would be sufficient to save from ruin the members of the society on whom the visitation had fallen.

This scheme had this circumstance in its favour, that it was less liable to fraud than insurance against fire; for although a man may burn down his own house, he cannot produce a storm of hail.

Insurance even against fire was at that time but little understood in France, and hence there were many defects in the plan. The premium of three per cent was charged for insurance on fields in all situations, without distinction; whereas it was found from experience that along the banks of rivers,

and on lands intersected by rising grounds, the calamity more frequently occurs. No higher charge was also made for insuring the vines than for corn, although these crops are exposed to the danger three months longer; and tremendous hail-storms are more frequent during the latter part of the season. The society also, at the end of every year, had a general account taken, and if any surplus remained, it was divided amongst the members, instead of being laid up as a fund to meet the losses of a more calamitous season.

The results of nine years were as follows: —

1st, As to corn: —

In six of these years there was a considerable surplus after paying all the amount of losses; but, in the other three of these years, the amount of corn destroyed considerably exceeded the amount of the premiums, and in one year was about six per cent of the whole amount insured that year, or twice the amount of the premiums. The aggregate net premiums of the whole nine years were 502,944 francs, 22 centimes, and the losses 589,286 francs, 72 centimes. If the premium had been $3\frac{1}{2}$ per cent, and the profits of one year had been reserved to meet the losses of the next, the society might have paid all the losses in full.

2d, As to the vines: —

Except in the first two years, when the business of the society was very small, and very fortunate, the premiums were insufficient, and, on the aggregate of the whole nine years, did not amount to so much as one third of the losses; the net premiums being 107,769 francs, 96 centimes, and the losses 340,807 francs, 23 centimes.

The society, to have been able to make good all claims upon it, ought therefore to have charged about 10 per cent per annum.

The society was proceeding favourably, under the management of M. Barrau, and was acquiring confidence by having its affairs submitted to the superintendence and control of the general meetings of the members, when all at once it excited the jealousy and fear of the imperial ruler, and, by one of those acts of tyranny which tend so much in despotic countries to cripple commercial enterprise by destroying confidence, a decree was issued from the camp near Vienna, on the 15th of October, 1809, and the society was thereby dissolved. Four years afterwards this decree was recalled; but, in such a state of insecurity, no one was then willing to hazard his property in attempting to revive a society which otherwise might have been flourishing and beneficial.

PART II.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Monthly Calendar of Nature for Scotland.*

Extracts from the Meteorological Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the Level of the Sea 172 Ft., and 15 Miles from the Coast; being the Mean of daily Observations at 10 o'Clock Morning and 10 o'Clock Evening.

Results for August.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
August 1. to 10.	65·1°	62·3°	55·7°	29·71	1·06	·57
10. to 20.	61·6	59·6	51·5	29·8	·1	·78
20. to 31.	58·1	55·4	49·9	29·68	·46	·42
Monthly mean	61·6°	59·1°	52·3°	29·73	1·62	1·77

The temperature for August, this season, is 3·4° above the ordinary average, equal to the temperature for that month in 1826. The fall of rain is nearly 1 in. less than the average fall in the month of August during the last nine years.

Results for September.

Month.	Mean temperature.	Dew Point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
Sept. 1. to 10.	54·1°	52°	45·9°	29·6	1·4	·49
10. to 20.	57·	53·8	48·	29·71	·1	·38
20. to 30.	53·9	50·8	46·9	29·5	·6	·51
Monthly mean	55°	52·2°	46·9	29·6	2·1	1·38

The temperature for September is nearly ·5° above the ordinary mean; and the rain amounts exactly to the usual average. The air, as will be seen from the high temperature of the dew point, was generally moist; and the operation of cutting down the latter part of the crop was often performed in the afternoon, the copious dews during the first fortnight of this month not being dried up till near the middle of the day.

The warmest day in August was the 4th: mean temperature, 69·5°; wind easterly. The coldest day was the 26th: mean temperature of that

day, 54°; extreme cold on that day, and throughout the month, 48°; wind westerly. The wind blew from easterly points on 8 days; on 21 days from westerly points; and on 2 days it was variable. The atmosphere was clear on 15 days; on 6 days there was partial sunshine; and on 10 days the atmosphere was cloudy. The warmest day in September was the 30th: mean temperature of that day, 58°; extreme heat, 60°; wind easterly. The coldest day in that month was the 21st: mean temperature of that day, 52°; lowest temperature, 46°; extreme cold throughout the month, 42°. The wind blew from easterly points on 5 days: from westerly points on 23 days; on 2 days the wind was variable, and on the 22d it blew a strong gale from the north-west.

The high temperature in the summer months, followed by warmth and clear sunshine in August, and with little moisture in the soil, produced an early and simultaneous ripening of the crops all over the country. Some oats on dry and open soils ripened prematurely, and were not well filled. In the early districts, there was little of the crop exposed by the end of the first week in September: since then, rains have been frequent, and the air generally moist.

In the moors, the heath (Callùna vulgàris) came in flower on the 1st of August; the Coreópsis verticillàta and scarlet turk's cap lily (*Lílium chalcedónicum*), in the garden, on the 2d; 14 days earlier than last year, and 9 days earlier than on an average of seasons. Barley that came in the ear on the 28th of June was ripe on the 10th of August, a period of 43 days: mean temperature of that period, 62°. Last year, barley that grew near the same place was 56 days between the periods of earing and ripening, under a temperature of 56·6°; giving 13 days in favour of this season, under a temperature of 5·4° higher. Wheat sown in spring, that came in the ear on the 29th of June, was ripe on the 22d of August, a period of 54 days: mean temperature of that period, 61·2°. Partridges are in great plenty, but many of the birds are unusually small. The apple moth has not been so destructive in this as in former seasons; and the wheat fly has not accomplished more than a fourth part of its usual mischief. — *A. G. Oct.* 1. 1831.

Art. II. *Retrospective Criticism.*

Swainson's Zoological Illustrations. — I must inform your correspondent A. R. Y. (p. 459.), with all good feeling, that his arguments touching this work are built on a false foundation, and that his inferences consequently are unjust. 1st, The work is not published by subscription; therefore there can be no subscribers. 2d, The prospectus of the new series stated that it would be published similarly to the old series. There is therefore nothing "unwarrantable" in the charge he complains of. The purchasers are told at the commencement what they are to *pay*, and what they are to *expect*. They may purchase the work, or they may let it alone; but if they do the former, they have no right to turn round afterwards, abuse the author, and complain of their pennyworth. As my friend Professor Henslow very justly observes (p. 459.) on the abuse that has been so unsparingly cast upon Mr. Stephens, "Those who are not content with an author's mode of publication might easily discontinue their support, without attempting to prejudice the minds of others by asserting that the author was actuated by dishonourable motives."

I feel obliged to A. R. Y. in other respects for his good opinion, but I have no cause to complain of the public regarding the sale of the work. Had I the time to attend to its management, it would be a lucrative undertaking. Purchasers have frequently to wait a long time before they can

procure a missing Number. The 17th and 18th came out but a month ago, and yet all the copies, I believe, are sold. I have not even myself a perfect copy of the work, and the publishers have long been without one. Such only (not being my personal friends) as are quick and *regular* in their application, have a chance of being served. A. R. Y. will really oblige me by returning his copy to me through Messrs. Longman, that it may be sent to one out of the many who desire to possess the work.

I did not express my meaning clearly (p. 273.) regarding cheap publications in natural history; I know not, in fact, who are their authors or compilers. To a certain extent, if done with judgment, they are eminently useful; they excite a taste in young minds for studying the wonders of creation; and from what I have seen (by extracts in the papers and in this Magazine), Mr. Rennie's *Insect Architecture* more especially deserves commendation. I wish such books, in short, to be encouraged; but there is a wide difference between *dispersing* that knowledge which *has been* acquired, and *adding* to that which we are already possessed of; between putting the details in a pleasing form, and combining them to illustrate the general laws of nature. The simple-minded mechanic makes the iron work of a steam-engine, but it is the intellectual engineer who applies it to regulate the workings of the machine itself. Such, without any disparagement to the abilities of either party, is the parallel between them. Those who exalt one class over the other put us in mind of the fable of our early days, "there is nothing like *leather*." If such books only as those I alluded to are fit to be encouraged, and all learned, scientific, or abstruse publications are to be thrown aside, then it appears to me that the public taste is vitiated, as it generally is. I have, as I have already intimated, no reason myself to complain on this point; but I wish to see the erudite labours of others share also in some part of this patronage. Cheapness is no recommendation, otherwise Mr. Thompson would not have publicly complained that his admirable although unattractive work, *Zoological Researches* [reviewed p. 256.], received no encouragement. The price of this modest but highly valuable publication is only 3*s.* 6*d.* a number, and it is certainly replete with more original information than all the books put together that have been published in England for the last ten years; and yet, out of *one thousand members*, or thereabouts, belonging to the Linnean and Zoological Societies, this little work is suffered to languish for want of encouragement. Look, again, at Lane's exquisite figures of the *Parrots*, now publishing; why has this not been noticed and done ample justice to in this Magazine? Every scientific institution and public library ought to possess it, as being, next to Audubon's, the most beautiful and *masterly* work, delineating birds, ever published in Britain. Look, again, at Dr. Horsfield's *Javanese Insects*. Let this be on the same list. These, with Mr. Sowerby's *General Conchology*, will render every library perfect in the most valuable works, *both in point of science and execution*, now printing in England, on the three most attractive branches of zoology. I could continue the list, but time with me is precious. — *W. S. September*, 1831.

Mr. Davis's Remarks (p. 303.) *on the recent Mode of publishing the Numbers of Stephens's "Illustrations of British Entomology."*— Sir, Observing, by the cover, that it is the intention of Mr. Stephens to reply in your pages to my article (p. 303.) on the publication of his *Illustrations of British Entomology*, I beg to state, that, as I have dealt only with facts, when Mr. Stephens's reply shall appear, the case will be so fully before your readers, that I shall not feel myself called upon, under any circumstances, to offer further remarks on the subject.

I state this, as some of your correspondents seem so strongly to disapprove of your pages becoming the vehicle of frequent and extended controversy. I am, Sir, yours, &c.—*A. H. Davis. Nelson Square, Sept.* 19. 1831.

P.S. I trust you will not adopt Professor Henslow's recommendation, and send Mr. Stephens's reply to me for approval: I have no wish to see it till it appears in your pages. — *A. H. D.*

Agronome's Reply to the Animadversions of B. and J. S., p. 77, 78. 81.— Agronome supplied us with this communication immediately after our publication of the animadversions alluded to, and we have kept it back thus long from deeming the early part of it not perfectly congenial to the tenor of the Magazine. Still, however, there is so much of natural history in the latter part of it, and we find it so perfectly impossible to alter or deduct any portion of the early part of it, without marring the unity of the whole, that we feel constrained to give it entire; and we are also desirous of doing this out of our sincere regard for Agronome himself, whom we are as anxious to allow to justify himself as any other contributor. Determining, then, to publish his reply, we do so ere we close the volume in which the animadversions on his previous article have appeared. — *Cond.*

Dear Sir, I feel sorry that you have been obliged to apologise for inserting my letter of May, 1830. (Vol. III. p. 507.), on the blowing up of Stobs's powder-mill; and it well becomes me to apologise to you for writing it. I assure you, Sir, that letter contained nothing but the truth, though not a tenth part of the whole truth. The substance of it was in all the newspapers at the time, but there were many circumstances connected with the event not known to the public.

You must know, Sir, that very many of my relations lived at that time on the spot. My brother-in-law, William Allan, was the first and only man who dragged the live sufferer from the burning mass; and he also assisted in collecting the fragments of the other. I was at that time a journeyman gardener with the Earl of Hopetoun, Hopetoun House, but I was near the place of explosion, on a visit, in the week following. John Paterson, the smith, who, I believe, is still alive there, will point you out the spot where he picked up great part of the man's bowels, and brought them home in his leather apron. Several of my friends attended on the dying sufferer till he breathed his last, and his groans and exclamations made a deeper impression on their memories than could the most sublime description of the direst torments. Instead of treating the subject with levity, as one of your critics says, I never think of it without horror and awe; else how should it be retained so fresh in my memory for above twenty-eight years?

I can say, with the Ettrick Shepherd, "I have great reason to be thankful that I never told a deliberate lie in my life." The only falsehood in the letter arises from a mistake of your own, in placing Stobs's powder-mill in Peeblesshire; it being in Mid-Lothian, only three miles from Dalkeith, and nine from Edinburgh. I am sorry you have been obliged to insert two miraculous stories, in order to ridicule my marvellous one; but your reviewer has not given my letter a fair reading. The stone which struck Mr. Hunter killed him stone dead in a moment, some of the bones of his shoulder being driven clean into his lungs, though the people imagined he was only in a swoon at first. I have no objection to believe a marvellous story if told by a respectable person; but I despise a miraculous story, even if told by the pope. I was sixteen years of age before ever it came into my head to doubt of the existence of ghosts, witches, brownies, or fairies; it took seven years more to convince me that there were no such creatures in ancient times; and for the last twenty years of my life I have believed that there never was, nor ever will be, any thing supernatural in nature. It is upon this ground that I have presumed to think or call myself a naturalist, because I endeavour to find a *natural cause* for every phenomenon in nature. I do not believe in the miracles of Prince Hohenlohe, however well authenticated: what is more, I do not believe in the miracles of the great Signor Blitz, although performed right before my eyes; even when I see him not only bring the dead to life, but fairly put

life into dead inert matter, and make even calcined clay, in the form of plates and dishes, to dance a jig all about my feet. No, Sir, I cannot believe that he works miracles, for I can perform nearly all his tricks myself, only not half so cleverly as Signor Blitz.

Your reviewer says, "he can make neither head nor tail of my letter." This may be more his fault than mine. Perhaps I got beyond his depth, or out of his element; but I was not beyond or out of mine. As a naturalist, I have as good a right to exercise my *imagination* as the divine has to exercise his *faith*, for the purpose of trying how far either will stretch. I have not yet got farther than the Georgium Sidus, but all betwixt there and here is within the grasp of my imagination. How far beyond this *faith* might carry me, I cannot tell; but the contemplation of such subjects is truly pleasant, and of *high* importance. The new system of geology is the tail of my letter. If, Sir, your Magazine of Natural History is to contain nothing but disquisitions on ant-hills, wasps' nests, and species of pimpernel, and if such letters as mine are to be excluded, I must say, with your reviewer, that you had better shut up your office and close your Magazine. The natural history of man must be of more importance than the history of either monkey or maggot, mammoth or magpie.

My adventure with the snake had certainly nothing to do with the former part of my letter; but there is much natural history of the snake there, contained in few words: 1st, that the snake lives on toads; 2d, that it swallows them whole; 3d, that it retreats on the approach of a human being; 4th, that it will take to water in case of danger, or to transport itself from one side of a lake or river to another; 5th, that the snake is quite harmless. It can neither bite nor sting to hurt a man; but this I could never have believed had I not seen our shepherd frequently play with them, and provoke them, and turn them into his naked bosom, let them crawl round his body, and out at the sleeve of his shirt. Nevertheless, I would advise no one to try such experiments who does not know the difference betwixt a snake and an adder. The snake, when first caught, will generally discharge a white slimy liquid, which, if it fall on a tender part of the skin, will cause a smarting redness, and even blisters, but no other bad consequences. This may be occasioned by the food eaten by the snake; a toad, for instance.

The toad is truly a venomous reptile, but its venom lies all in its skin, in the protuberances on its back. When provoked or hurt, it will discharge at these protuberances small particles of white poison: hence there are few dogs that will worry a toad; but a good dog will fasten upon any thing. I have seen the mouths of dogs swelled fearfully from worrying toads. There are neither toads in Ireland nor snakes to eat them; neither did I ever see a mole there: but whatever James Hogg may say in favour of moles, I am of St. Patrick's opinion, that they are noxious vermin, and ought to be extirpated the kingdom.

Perhaps this letter also has "nothing to do with natural history, nor the plan of your Magazine." If so, all I can say is, I am sorry for it. Yours, truly, — *Agronome*. *Feb.* 1. 1831.

Art. III. *Queries and Answers.*

Whirls of the Tumbler Pigeon. — I have never paid attention to the singular habit in this bird, enquired about by your Southampton subscriber. (p. 473.) Buffon's opinion is obviously erroneous. Your correspondent would do well to observe if this movement is common to both sexes, or only practised, as I suspect, by the male. He should likewise ascertain whether it is done at all seasons, or only at particular times, as, for instance, when

the female is sitting. My present impression is, that the movement is indicative of pleasure, or of excitement. The catbird of Wilson (*Orpheus félivox Swains.*) throws itself into grotesque attitudes. The male of the yellow-breasted chat (Ictèria polyglótta *Swains.*), *while the female is sitting*, will "sometimes mount up into the air, almost perpendicularly, to the height of 30 or 40 ft., with his legs hanging; descending as he rose, by repeated jerks, as if highly irritated; or, as is vulgarly said, dancing mad." (*Wilson, Am. Orn.*) These unusual motions in the air, practised by a few other birds, *during the season of incubation only*, seem to me analogous to that of the tumbler pigeon. — *W. S. Sept.* 1831.

Polyómmatus Argìolus, Melitæ'a Euphrósyne, and M. Silène. — Sir, In answer to queries by the Rev. W. T. Bree (p. 477.), I may observe that Polyómmatus Argìolus is double-brooded. By constantly visiting the neighbourhood of Dartford, in Kent, I am able to assert that this insect is, in certain spots, plentiful and in perfection about the 14th to the 25th of April; it is worn and faded in May, and scarcely to be seen in June; on the 1st or 2d of July, it reappears in the very same localities in abundance and perfection. Melitæ'a Euphrósyne makes its appearance in Darent and Birch Woods, in Kent, towards the latter end of May, literally by thousands: it lasts in a faded and worn state until the end of June, and *never* appears again during the year. Melitæ'a Silène is found in the same woods, but more rarely, fifteen or sixteen days later than Euphrósyne. It lasts until the end of July in a faded state, and *never* reappears during the year. I am, Sir, yours, &c. — *Edward Newman. Deptford, Sept.* 19. 1831.

Dáphne Mezèreum, *calyx and corolla of.* — L. D. asks (p. 188.) which of these terms should be applied to the coloured envelope which supports and defends the stamens and pistil of the *D. Mezèreum.* Apply either or both; for L. D. shows that Linnæus thought it composed of both: and L. D. will find, on dissecting the next blossoms he meets with, that the envelope is formed of two separate tunics in its tube part, and that there is a hollow space between the tunics which obviously distinguishes them: hence, probably, the idea that this envelope consisted of calyx and corolla united. If L. D. does not find this the case in *D. Mezèreum*, he will in *D.* Laurèola; but I am nearly confident that *D. Mezèreum* is the species in which I have observed it. The two tunics coalesce in the upper part of the tube, and in the segments also; hence this floral envelope is a calyx, according to Lindley's definition in his *Principles of Botany* (p. 52. No. 282.), viz. "when a plant has but one floral envelope, that one is *calyx*, whatever be its colour or *degree of developement.*" Smith, too, in his *English Flora*, vol. ii. p. 228., says, the genus *D*áphne is devoid of corolla. — *J. D.*

Art. IV. *Obituary.*

Wilson, the celebrated Ornithologist, died a short time since. This enthusiastic naturalist was interred in the cemetery of the Swedish Church, in the district of Southwark, Philadelphia. We read, in the *Ballot* newspaper, that "he expressed a wish to be buried in some rural spot, sacred to peace and solitude, whither the charms of nature might invite the steps of the votary of the muses and the lover of science, and *where the birds might sing over his grave.* It has been matter of regret to those of his friends to whom was confided the mournful duty of ordering his funeral, that his desire had not been made known to them, otherwise it would have been piously observed." The editor of the *Mirror* (Sept. 10.), quoting the above, adds, "We participate in their regret; for, if ever superstition be sweet to the soul, it is in the fulfilment of such last indications of the ruling passion as poor Wilson is said to have expressed. It not only hallows the memory of the dead, but cherishes the enthusiasm of the living."

APPENDIX.

Controversy between N. A. Vigors, Esq. A M. F.R.S. &c., and W. Swainson, Esq. F.R.S. L.S. &c.

(Received on Tuesday, Oct. 18., at 4 o'clock P.M., and printed at the expense of the writer.)

My dear Sir,

I CORDIALLY agree in opinion with two of your correspondents (*Magazine of Natural History*, p. 455.), that the late controversy in your journal, in which I was reluctantly forced to bear a part, was altogether unworthy of a place in your columns. The introduction of personal attacks and defences into a scientific work is decidedly to be condemned, more especially when it tends to the exclusion of more relevant and valuable matter. Conscious of this truth, I could not avoid apologising to yourself and your readers, in the letter which I sent to your July Number, for introducing my private feelings into your pages, even though I was the aggrieved party, and was forced into the contest.

The only reparation I can make for the share I have had in occupying so much of your valuable space, and thus withholding from your readers more eligible matter, is to request of you to publish, in your next Number, such a surplus portion of the really important materials which I know you have always in hand, as will equal the space taken up by my communications; for the expenses of which surplus matter I shall feel great satisfaction in being responsible.

I have also to suggest, for the future satisfaction of your scientific subscribers, that all matters of controversy should be printed *separately* at the end of your Number, and at the expense of the combatants. In this case your subscribers may throw into the fire all the extraneous and offending matter, if they deem it unworthy (which, I suspect, will generally be the case) of being bound up with the more interesting subjects. The tax, also, will fall where it ought. When a naturalist volunteers to attack his fellow-labourers in science, it is generally for the purpose of attracting notice to himself and his scientific merchandise; and he is bound in justice to pay for the advertisement.

I have to request of you to publish the following letter, which I have just received from Mr. MacLeay. Although I do not think it possible that a second person exists who would persist in charging me, or indeed any person who is not altogether excluded from civilised society, with publishing in an unauthorised manner, private and confidential communications, not intended for the public eye, I feel a satisfaction

in bringing the positive testimony of my valued friend to exculpate me from the malignant accusation.

I am, my dear Sir, faithfully yours,

Chester Terrace, Oct. 14. 1831. N. A. VIGORS.

My dear Vigors,

ON considering your request that I should state to you whether the papers printed in the *Zoological Journal*, and bearing my signature, were regarded by me as private communications when written, I suppose you are referring to the charge which Mr. Swainson has brought against you, of having, in an unauthorised manner, published my private and confidential correspondence. On this head I conclude that it will be sufficient for me here to declare, in the most explicit manner, that you have published no paper as mine which I did not write for publication; and that if you had not acted the part of a friend, and published the letters in question, I should most certainly have adopted other means for bringing the substance of them before the world.

My friend, Mr. Swainson, is very kind in thus taking up his unsolicited cudgel in my behalf; but I really think the general practice in all such cases to be much more convenient, which is, to leave the resentment of *a private injury* to the person immediately concerned. If the poor devil be so casehardened as to be incapable of perceiving the grievance, another may have the right to advise him, but scarcely to break a spear in his behalf. Sufficient for each are the quarrels thereof.

As to Mr. Swainson's assertion, that although I have expressed myself with a degree of ridicule and contempt of my opponents perfectly allowable in a private letter, yet that there has appeared too much of the said feeling for the public eye, I really will not dispute it; because thus the whole question becomes merely one of degree, and therefore one of opinion. Were I, for instance, to say, that, in this very paper which contains the charge against you, Mr. Swainson has not shown how you have deserved so bitter an attack from him, no doubt he in like manner would dissent from my opinion; and all, therefore, I can state in my own favour, is, that whereas I, like the humble worm, have merely turned when trodden upon, and in short have acted entirely on the defensive, Mr. Swainson has most chivalrously been warmed into offensive operations by Mr. Bennett's display of the dishonest practices of some Frenchmen.

Ever yours,

Havana, Aug. 10. 1831. W. S. MACLEAY.

GLOSSARIAL INDEX.

Ad vivum, to the life, 381.
Ægagrópilæ (*aigagros*, a wild goat, *pilos*, a ball), 287.
Agarics, species of *Alcyònium*, with a filiform stem and a kidney-shaped case, 473.
Albinoes, a term originally applied to human beings of a deadly white occurring amongst the negroes of Africa, the copper-coloured Indians of the Isthmus of Darien, and in other places, 208.
Albúrnum, the living and incompletely formed external layers of wood, 152.
Alcyonite, a fossil state of some species of the genus of marine zoophytes *Alcyònium*, 469.
Algology, the knowledge of the *Algæ*, 57.
Alignation, line of direction, 82.
Anal fins, those of the vent, 215.
Anthocephalites, fossils resembling heads of flowers and buds of blossoms, 295.
Anthracite described, 191.
Anus, the orifice at which excrements are ejected, 540; *per anum*, escaping by the anus, 540.
Aórta, the great artery proceeding from the left ventricle of the heart, from which all the other arteries mediately or immediately proceed, 407.
Apices, tips, uppermost points, 230.
Appéndices, appendages, 529.
Appéndices lùteæ, yellow appendages to the intestines, 95.
A priori reasoning, reasoning before facts, 461.
Auldcodus, with a furrowed tooth, 252.
Auer cake, cake made of oatmeal, 301.
Basset edge, the edge of a stratum which has risen to the surface is so called, 442.
Belemnites, fossil shells of a conical figure, 295.
Bezoar, explained, 286.
Bipectinate, toothed, and the teeth again toothed, 22.
Birring, whirring, 123.
Blepharophthálmia (from *blephara*, the eyelids, and *ophthalmia*, a disease of the eye), signifies, literally, a disease of the eyelids, 14.
Braird, the first leaf emitted from sown corn, 75.
Bránchiæ, gills, 504.
Branchiópoda, Crustàcea destitute of feet, in place of which each side is furnished with ciliated branchiostegous appendages for swimming, 530.
Buccal, belonging to the cheek, 530.
Buccinàtor muscles, muscles of the cheeks, so called from their office of forcing out the breath, 405.
Búlla óssea, a bony knob, 406.
Calamite, of the nature of cane, or of rush, 374.
Caloric, the cause of the sensation of heat, 386.
Campylòtes, curvity, crookedness, 255.
Canàlis lachrymàlis, channel for tears, 404.
Cancélli, lattice-work; applied to the reticular substance in bones, 241.
Cephalópoda, Mollúsca having the head furnished with appendages for progressive motion, 527.
Chorion, explained, 15.
Choroid, explained, 15.
Choroid membrane, 129; explained, 15.
Choroid pigment, 129; explained, 15.
Choroid membrane, in insects, the tissue of tracheæ and pigment, 229.
Cilia, the eyelashes, 404.
Cirri, tentacula, feelers, 282.
Climate, explained, 246.
Climatology, the knowledge of climates, 247.
Cóchlea, a snail's shell, an internal part of the ear resembling it, 382.
Cóncha, the external tube of the ear, 404.
Conchoidal, resembling a shell, 191.
Condyloid forámina, orifices in bones at their joints, 406.
Condyloid processes, processes of bones at their joints, 406.
Córnea transpàrens, explained, 15.
Crànium, the skull bone, 404.
Cràter, a bowl, the mouth of a volcano, 548.
Cricoid cartilage (from *krikos*, a ring, and *eidos*, likeness), a gristle of the windpipe, 405.
Crops out, beds are said to crop out when they make their appearance on the surface from beneath others, 462.
Crùsta petròsa, rocky crust, 240.
Crypts (from *kruptō*, to hide), the little rounded appearance at the end of the small arteries, 528.
Cul de sac, a pouch, 408.
Cùmulus, clouds in a convex or conical heap, increasing upwards from a horizontal base; plural, *cumuli*, 444.
Cutis vera, the true skin, 528.
Cyclóstoma (*kuklos*, a circle, and *stoma*, a mouth), 540.
Débris, ruins, rubbish, fallen fragments, 26.
Depressor muscles, muscles which depress or draw down the parts to which they are fastened, 405.
Detritus, fragments of rocks, 90.
Dicta, precepts, plural of *dictum*, 535.
Dipterous, two-winged, 220.
Ductus ad nasum, duct leading to the nose, 404.
Egésta, excrements, matters expelled, 157.
Electro-magnetism, that condition of matter in which electricity and magnetism coexist, 141.
Encrinites, fossils resembling the blossoms of lilies, 295.
Enterolite, a stone found in intestines, 286.
Entomóstraca, a division of Crustàcea, 501.
Epiphyte defined, 285.
Excùbitor, a watcher, 342.
Exùviæ, withered remains, 22.
Ferrugineo-calcareous, calcareous with the colour of rust of iron, 383.
Foràmen, an orifice, 541.
Foràmen ovàle, an oval opening, 409.
Forámina, orifices, 405.
Fórmulæ, prescribed things or forms, 192.
Gasteropodes, Mollúsca having the belly furnished with the organs of progressive motion, 537.
Gravàmen, the weight, 330.
Gryphites, fossils of the shells Gryphæ'æ, 295.
Haliótis, sea ear, 529.
Haustellàta, insects endowed with suckers, 490.
Hippolite, a stone found in a horse, 286.
Holocéntrus (*hólos*, all, *kentron*, a spur), i. 163; given erroneously, iii. 570; corrected, iv. 77.
Hyperboloid, a solid formed by the revolution of a hyperbola: a hyperbola is a particular kind of curve, formed by cutting a cone in a direction parallel to its axis, 427.
Hybernàculum, winter residence, 239.
Hypochondrìasis, dejection, depression of spirits, 14.
Ileum, the third intestine, which begins where the jejunum ends, and is so called from *eileō*, to involve, from its many and complicated folds, 95.
Incontractile, uncontractable, 389.
Imàgo, the winged or perfect state of an insect, 284.
In situ, in its place, 243.
Instinct, defined, 157.
Invertebrate, devoid of a backbone, 260.
Iodine, a solid substance, principally obtained from kelp, 88.
Jejùnum, the second portion of the small intestines, so called because it is usually found empty, 195.

Làbium, lip, 405.
Lasso, a cord for catching wild horses, 30.
Le jour de noces, the wedding day, 119.
Leucothýreus (*leukos*, white, *thureos*, a shield), 252.
Lìber, the woody fibre and ducts found in the bark, 152.
Lithóphaga, stone-caters, 356.
Lyceum, academical institutions are sometimes so called from a celebrated academy at Athens, 293.
Madrepores, a tribe of animals inhabiting the seas, adhering to marine vegetables and the softer zoophytes, 287.
Madreporites, fossil madrepores, 295.
Malic acid, an acid obtained from apples, by saturating the juice with alkali, and pouring in the acetous solution of lead until it occasions no more precipitate, 461.
Mammæ, breasts, 210.
Marsupial, furnished with a pouch, 258.
Mastoid processes, processes of the neck bone shaped like the nipple of the breast, 406.
Matèria médica, medical matters, 472.
Máxima, greatest or highest degrees, 169.
Measures, coal, strata alternating with beds of coals, 462.
Meàtus auditòrius extérnus, the outer auditory passage, 406.
Mediastìnum, the double skin or membrane, which stands in the middle of the breast, and divides it into two parts, right and left, 407.
Meteorite, a meteoric stone, 139.
Miásma, pestilential vapour, 90.
Mirage, an optical delusion, 548; explained in detail, iii. p. 200. 484.
Moniliform, necklace-shaped, 285.
Mandibulàta, insects endowed with mandibles, 490.
Musculo-cutaneous, of the double nature of muscles and skin, 527.
Nickel, a metallic substance, 139.
Nigrum pigméntum, explained, 15.
Núcleus, kernel, an included body, 469.
O'cciput, hind-head, 406.
Oculiferous, eyebearing, 533.
Œsophageal, belonging to the gullet, 527.
Œsóphagi, plural of *œsophagus*, 408.
Orbiculàris òris, a muscle belonging to the mouth, 405.
Opercular, of the nature of a lid, 218.
Oology (*ōon*, an egg, *logos*, a discourse), a treatise on eggs, 428.
Opérculum, lid, a covering, 76.
Opossum shrimp, a species which carries its young in an external pouch, as the opossum does, 257.
Orbital, pertaining to the orbit or socket for the eye, 405.
Ornithoscope, an optical instrument for viewing distant birds, 464.
Ornithotrophe, a refectory for birds, 412.
Œsóphagus, the swallow, the throat, 362.
Os fróntis, forehead bone, 405.
Os hyōïdes, a forked bone at the root of the tongue, so called from its resemblance in figure to the Greek letter Υ, 405.
Os occípitis, a bone at the back of the skull, 405.
Ossa parietàlia, the two sides of a skull, 405.
Os sphenōïdes, a wedge-like bone in the facial part of the skull, 405.
Ossa témporum, bones of the temple, 405.
Ossa triquetra, triangular-shaped bones, 405.
Ova, eggs, 151.
Oxalic acid, the acid of sugar obtained from the plant *O'*xalis, 149.
Oxide of zinc, a substance formed by the union of oxygen with zinc, 25.
Oxided, impregnated with oxygen gas, 547.
Oxygenation, the process of imbuing with oxygen, 259
Pábulum, food, 157.
Pálpebræ, the eyelids, upper and lower, 404.
Papillonist, collector of butterflies, 148.
Paraselènes, mock moons, 171.
Parasite, defined, 285.
Parietes, walls; example, the valves or halves of an oyster shell, 526.
Pár vàgum, a pair of nerves arising below the auditory ones from the sides of the oblongated marrow, 405.
Patelliform, cup-shaped, 485.
Pedicles, stalks, 232.
Peristome, the fringe of hairs which closes the mouth of the thecæ or seed-vessels of mosses, 135.
Per se, by itself, of itself, 507.
Perticatòres, perchers, 181.
Phàrynx, the upper part of the gullet, consisting of three pair of muscles, 405.
Pigméntum nìgrum, explained, 15.
Pineal gland, a small heart-like substance, about the size of a pea, situated immediately over the corpora quadrigemina. It is so called from its supposed resemblance to the fruit of a pine, 286.
Plexuses, foldings, reticulations, 392.
Plutonic, volcanic, 549.
Pluviometer, a rain-gauge, or instrument to show the quantity of rain that has fallen, 75.
Procéssus dentàtus, a tooth-like projection, 515.
Pro re nata, as occasion may require, 208.
Pseudo, spurious, imperfect, 545.
Pseudo-metallic, resembling metal, 191.
Púncta lachrymàlia, the orifices or openings of the lachrymal canals, 209.
Púnctum lachrymàle, lachrymal orifice, 404.
Pùpa of the eye, explained, 15.
Pupil, explained, 15.
Pygmæ'us, dwarf, pygmy, 255.
Pyriform, pear-shaped, 232.
Ràdii, rays, 285.
Ràdius, the bone of the fore-arm; so called from its supposed resemblance to the spoke of a wheel. It is of a triangular shape, like the ulna, alongside of which it lies, and forms with it what is termed the brachium or fore-arm, 241.
Raid, inroad, 412.
Réctum, the straight and last intestine in animals, 96.
Rejectaménta, things cast up, 220.
Rète mucōsum, explained, 392.
Sáccus lachrymàlis, lachrymal sac, situated in the internal corner of the eye, which receives the tears from the lachrymal orifices, and conveys them into the lachrymal duct, 404.
Scansòres, climbers, 181.
Schneiderian membrane, the membrane that lines the nostrils, named after its discoverer, Conrad Victor Schneider, 210.
Scirocco (Italian), south-east wind, 264.
Sclerotic tunic, explained, 15.
Scòriæ, masses of dross from melted metals, 547.
Scrattle, scratch, 410.
Sélla túrcica, so called from its supposed resemblance to a Turkish saddle; a cavity in the sphenoid bone, containing the pituitary gland, surrounded by the four clinoid processes, 406.
Semiperlaceous, half-pearly, 356.
Sensòrium, the seat of sensation, 12.
Sepia, a black or brown liquid, furnished by the Nautilus, 138.
Sépta, partitions, 137.
Sètæ, bristles, 509.
Siphunculated, furnished with a little siphon, 138.
Speat, a sweeping torrent after rain or thaw, 380.
Steppes, heaths, deserts, 255.
Stérnum, the breast-bone, 405.
Stylo-pharyngei muscles, muscles of the pharynx attached to the styloid process of the temporal bone, 405.
Subclavian, the subclavian arteries, right and left, proceed under the clavicles (shoulder blades), and give off in their course the mammary, cervical, vertebral, and upper intercostal arteries. The subclavian vein receives the blood from the veins of the arm, and runs into the vena cava superior, 407.
Subgelatinous, somewhat jelly-like, 259.
Subtrigonal, nearly triangular, 475.
Sulphuric acid, an acid consisting of sulphur, its basis, and of oxygen,
Supercìliary arch, arch of the eyebrows, 40.
Talus, the slope or inclination of a wall, where-

by, reclining at the top, so as to fall within its base, the thickness is gradually lessened according to the height, 244.
Tarsi, in birds, the shank, answering to the heel in quadrupeds, 147; in insects, tarsus implies the foot, 476.
Tentácula, feelers, holders, 475.
Térra puzzolàna, earth of which a cement is made, from Puzzuolo, in Italy, 547.
Thalámi nervòrum opticòrum, the source whence the optic nerves originate, 16.
Thòrax, chest, 258.
Thyroid cartilage, a shield-shaped gristle, which forms the fore, upper, and largest part of the larynx, 405.
Toise, a French long measure, equal to 6·395 English feet, 369.
Tràchea, the windpipe, 21.
Trilobites, fossil shells which are three-lobed, 295.
Tròchi, Mollúsca with a one-valved spiral shell, 529.
Tùnica conjunctìva, a delicate membrane of the eye which lines the eyelids, and is reflected over the anterior part of the bulb, 404.
Tùnica nictitans, the winking membrane, 210.
Umbo, boss, knob, most prominent part, 356.
Uterus, the womb, 258.
Uvea, explained, 15.
Vadatòres, waders, 181.
Vara, a Mexican measure equal to 33⅓ English inches, 30.
Vena càva, the largest vein in the body, so called from its great cavity or hollow space, 408.
Vértebræ, joints of the backbone, 241.
Viscera, bowels, 504.
Viva túttì, all alive together, 419.
Whernstone, quernstone or gritstone, 277.
Zygomatic processes, processes of the cheek-bone, and bone of the temple, 406.

INDEX TO BOOKS REVIEWED AND NOTICED.

GENERAL SUBJECT.

Annales des Sciences Naturelles, 125.
Branston and Co.'s Young Lady's Book, noticed, 67.
Brayley's Utility of a Knowledge of Nature considered, noticed, 262.
Bulletin des Sciences Naturelles, noticed, 84.
Bulletin de la Société Impériale des Naturalistes de Moscou, reviewed, 251.
Cheek's Edinburgh Journal of Natural and Geographical Science, noticed, 66.
Companion to the British Almanac for 1829, including "Observations of a Naturalist," reviewed, 428.
Drummond's Letters to a Young Naturalist, on the Study of Nature and Natural Theology, announced, 67; reviewed, 421.
Encyclopædia of Introductions to Natural History, announced, 86.
Gardening and Naturalist's Annual, announced, 67.
Grammar of Natural History in preparation, 262.
Journal of a Naturalist, noticed, 184. 190.
Murray's Aerial Electricity and Researches in Natural History, 2d edition, 84. 151.
Scientific Annual, announced, 67.
Stark's Introduction to Natural History, noticed, 86.

ZOOLOGY.

Archiv für Anatomie und Physiologie von Meckel, noticed, 124.
Gardens and Menagerie of the Zoological Society delineated, noticed, 64.
Richardson's Fauna Boreali-Americana, 334.
Swainson's Zoological Illustrations, 273. 457. 459. 484. 554.
Thompson's Zoological Researches and Illustrations in Natural History, rev. 256. 555.
Timbs's Zoological Series of Why and Because, or Knowledge for the People, reviewed, 422.
Wilson's Illustrations of Zoology, Nos. viii. and ix., reviewed, 261.
Youatt's Treatise on Canine Madness, noticed, 66.
Zoological Journal, 98. 329. 482.

ORNITHOLOGY.

Hewitson's British Oology, or Illustrations of the Eggs of British Birds, noticed, 428.
Jardine's Wilson's American Ornithology, announced, 67.
Lane's Figures of the Parrots, noticed, 555.
Rennie's Architecture of Birds, reviewed, 380. 426.
Rennie's Montagu's Ornithological Dictionary, announced, 67; reviewed, 422. 516.

ENTOMOLOGY.

Curtis's Guide to an Arrangement of British Insects, noticed, 429.
Fischer's Notice sur le Tettigópsis, nouveau genre d'Orthoptères de la Russie, rev., 261.
Horsfield's Javanese Insects, noticed, 555.
Müller's zur vergleichenden Physiologie des Gerichtssines, noticed, 124.
Rennie's Insect Architecture, rev., 39. 555.
Rennie's Insect Transformations, noticed, 53.
Stephens's Illustrations of British Entomology, 303. 488.

CONCHOLOGY.

Sowerby's General Conchology, noticed, 555.

BOTANY.

Banks's Plymouth and Devonport Flora, noticed, 429.
Flora Altaica, noticed, 252.
Greville's Algæ Britannicæ, reviewed, 57.
Maycock's Flora Barbadensis, noticed, 66.
Sowerby's Supplement to English Botany, reviewed, 64.
Stokes's Botanical Commentaries, rev., 55.
Wakefield's Introduction to Botany, 10th edit., containing an Appendix explanatory of the Natural Arrangement, 382.

GEOLOGY.

Hutton's Notes on the New Red Sandstone of the County of Durham, noticed, 66.
Woodward's Synoptical Table of British Organic Remains, noticed, 65.

GENERAL INDEX.

Abbotsford, birds in the plantations at, 166.
Abies of Cæsar, the Abies Picea of modern botany, 3.
Ægèria crabronifórmis in Devonshire, 445.
Ægèria tipulæfórmis, its attacks on currant bushes, 6.
Æsculus Hippocástanum (the horsechestnut), a description of, 238.
Æthtes, or eagle-stone, iii 484, iv.190. 468.
Adages on the weather, 264. 469.
Adder and its eggs in Essex, 268.
Agapánthus umbellàtus, water secreted by, 33.
Agronome's reply to the remarks of B. and J.S., 556.
Algæ, British, the inarticulated, genera and species of, 57.
America, North, letters descriptive of a natural history tour in, 108. 289; aboriginal natives of, 110; trees and plants of, 110, 111.
Anagállis arvénsis and cærùlea, their specific relation, iii. 537.; criticism on, iv. 79. 277, 278. 466.
Anatomical dissections and examinations invigorate the mind, 14.
Anatomy and physiology of the organs of vision of man and other animals, treatise on, 14. 207.
André, Major, incidental notice of, 112.
Anemòne nemorósa, fragrance of the flowers of, 442.
Anemòne ranunculóides found in Suffolk, 450.
Animalcules, luminous ones in the sea, 285. 500. 505.
Animals and vegetables, analogy in the structure and functions of, 385.
Animals, instances of monstrous formations of, 403.
Animals, molluscous, history of, 523.
Answers and Queries, 86. 187. 278. 383. 470. 559.
Ants, a battle of, 149.
Apócynum androsæmifòlium, its manner of entrapping flies, 190. 422.
Aponogèton distàchyon, a notice of, by Mr. Gorrie, 177.
Araucària brasiliénsis, nuts or seeds much eaten by man, quadrupeds, and birds, 396.
Atmosphere, temperature of, in different parts of the earth's surface, 245.
Auditory apertures in the skulls of quadrupeds and birds, as auxiliaries in classification, 9.
Bear, black, in the forests of America, 110.
Bedford, journal of the weather at, 170; nuthatch and cuckoo near, 275.
Bedfordshire, natural history in, 160.
Bee, secretion of wax by the, 185. 276; history of the, 234; various species of, their erosions in flowers, &c., 46, 47. 93. 479.
Beetle, common black, some account of, 477.
Belfast museum, 167.
Bezoar, the constituents of, 383.
Birds at and near Londonderry, 269. 452.
Birds, British song, some account of, 118. 412.
Birds, in Suffolk, 449, 450; in the plantations at Abbotsford, 166; land birds met with at sea, 145; new British species of birds described by Mr. Yarrell, 116; new mode of examining, 145; criticism on, 381. 464; migratory species, date of the appearance of, in 1830, in Nottinghamshire, 70; species of Renfrew and its eighbourhood in 1831, 269. 464; rare British species of, notice on, by Mr. Yarrell, 118; rare species killed in Suffolk, 163; species shot at Greenhow, North Shields, Northumberland, in 1829-30, 448.
Birmingham, diluvial gravel and deposits near, 372.
Bittern, habits of the, 464; remarks on, 423.
Blackbird crowing like the common cock, 433.
Boa, breathing-tube of, 20. 279.
Bogs, peat, recent and rapid formation of, in Ireland, 543.
Bohemian waxwing (Bombycívora gárrula), 164, 165. 344. 425.
Bómbyx castrénsis, 150. 434; *B.* antìqua, 150.
Book-trade in periodicals, custom of, 496.
Botany, local, hints on, 181.
Botany, see Plants.
Botanical exchange, 166. 470.
Bots in horses, some account of, 477.
Brazil, Russian natural history expedition in, 394.
Britain, natural productions indigenous to, 1; criticism on, 273. 467.
British Entomology, Stephens's. See Davis, and Stephens.
Brute animals, faculties of, auditory, 9. 536; visual, 14. 124. 207. 220. 363. 531; sentient, 528; intellectual, 498; olfactory, 530; taste, 529.
Bullfinch, its destructiveness to the buds of trees, 428.
Butcher bird, some account of, 342.
Butterflies, fossil trilobites resembling, 443.
Butterfly, azure blue, double-brooded, 477.
Calendar of nature for England, 167; in 1830, 383; for Bedford, 170; for Bungay, Suffolk, 173.
Calendar of nature for Scotland. See Scotland.
Cálla (Richárdia) æthiópica, water secreted by, 33.
Callimórpha domínula in Devonshire, 446.
Canal in America, connecting the Hudson and Delaware rivers, 295.
Cape and Mauritius shells, a list of, 470.
Carpenter. See Obituary, 192.
Cats, domestic, education of, 511; diving for fishes, 430; plunging into water for rats, 430.
Cervical vertebræ, unusual structure of, 513.
Chaffinch (*Fringilla Spiza Rennie*), 424.
Chatham, fossils, and jaw and teeth of a mammoth, found near, 240; geology of the neighbourhood of, 243.
Cheshire, natural history in, 73.
Chrysomèla cereàlis, various recent captures of, in Wales, 22, 23.
Claw of the nightjar or goatsucker, 425.
Collectanea, botany, 157. 437; geology, 443; meteorology, 444; zoology, 142. 430.
Collectors of the objects of natural history, in Norfolk, 177.
Comparative calendar of nature for the spring of 1829 and that of 1830, 36.
Controversy, the recent, in this Magazine, remarks on, 455.
Cornfield, Mr., his academy at Rectory Grove, Clapham, and tuition of natural history to his pupils, 69.
Córnus máscula, fluid matter evolved by its leaves, 32.
Cornwall, list of rare plants found in, 161.
Cornwall Literary and Philosophical Institution, established 1818, 267.
Cow, ball of hair found in the stomach of a, 187.
Crab and the oyster, 157.
Crake, meadow (Rállus *Créx*), habits of young of, 83.
Crocodile's flesh used as food by the Indian tribe Bororos, 399.
Crustàcea and insects, discoveries of Müller and others on the vision of, 124. 220. 363.
Cuckoo, at the "witching hour of night," 147; departure of, 275. 466; singing at the "witching hour" of night, 147. 466; deposits its egg

in the titlark's nest, 302; habits of, 270. 184; near Bedford, 275.
Cumberland and Westmoreland, tour in, 297.
Currant bushes, branches of, attacked by *Ægéria tipulæfórmis*, 6.
Cyclops, genus and species of, 509.
Cypérus fúscus proved to be a British plant, 186.
Cypress tree, account of two enormous ones in Mexico, 30, 31.
Davis's remarks on the mode in which Stephens's *Entomology* is published, 303; Professor Henslow's animadversions on, 459; animadversions on, by a Purchaser of Stephens's *Entomology*, 496; reply to the remarks (p. 303.) on the recent mode of publishing Stephens's *Illustrations of British Entomology*, by Mr. Stephens, 488.
Deal fish of Orkney, its identity with the vaagmaer of Iceland, 215.
Deer in the forests of America, 110.
Depôt, at Preston, for the sale and exchange of objects of natural history, 72.
Devonshire, climate in, as to birds, 445; insects in, 445.
Dew point, remarks on the, 192.
Diluvial gravel and deposits near Birmingham, 372.
Dissemination, artificial, of exotic plants, 439. 441, 442.
Dog, spaniel bitch, remarkable physiological fact connected with, 142; church-going dogs, 142; dogs, their aversion to worry a toad, 557.
Dorsetshire, natural history in, 73.
Dragon-fly, grey (*Libéllula vulgáris*), compound eyes of, 221.
Duck, wild, habits of, 519.
Eagle-stone (*Ætites*), iii. 484, iv. 190. 468.
Eagle, white-headed, 425.
Earth, the, its vast antiquity, 543.
Earwig, the smaller (*Forficula minor*), instance of the flight of, 436.
Eggs of birds, notice of Hewitson's *Illustrations of British*, and of M. Glöger's theory applied to, 429.
Eggs, mode of blowing for preservation in cabinets, 145.
Elms in Catherine Hall grove, Cambridge, on the death of, 153.
England, calendar of nature for, 167. 383.
English counties, natural history in, 70. 159. 265. 445.
Entomological tour in Wiltshire, Hampshire, Oxfordshire, &c., 265.
Epiphyte and parasite distinguished, 285.
Equinoxes, their precession explains the phenomena of geology, 308.
Erica mediterránea found in Ireland, 167.
Essex, adder and its eggs in, 268; glance at the geology of a part of, 447; glance at the oryctology of a part of, 447; rarer plants of, 446.
Exchange of specimens in natural history, 178, 470; in botany, 166, 470.
Eye, structure of, and the manner in which rays of light act upon it, 15.
Faculties. See Brute Animals.
Fagus of Cæsar, the *Quércus Ballóta* of modern botany, 4.
Falcon, peregrine, 146.
Falconry, description of, 431; notice of, 425.
Fall of rain, monthly, in different places, 248.
Fawn suckled and brought up by a spaniel bitch, 142.
Fishes, small, to obtain skeletons of, 433.
Fishes, the domestic cat diving for, 430; voice of fishes, 148.
Flora of Richmond, Yorkshire, as compared with that of Thirsk, 24; criticism on, 276. 467.
Foreign countries, natural history in, 263.
Foreign insects, trade in, 148.
Forficula minor, instance of the flight of, 436.
Forests the source of rivers, 33.
Fossils found in a flint quarry near Chatham, 240.
Foul weather, forewarner of, 444.
Fox, a destroyer of beetles, 24; auditory aperture of the, 11.
French naturalists, Swainson's defence of certain, 97; a farther defence, 316, 481.
Fritillary butterfly, large and small pearl-bordered, single-brooded, 478. 558.
Frog, *Górdii*, beetles, and *Dyticus* found in the intestines of a, 95.
Frogs, torpidity of, 147.
Functions and structure of animals and vegetables, analogy in the, 385.
Fungus, light-coloured, on a subterraneous tree, 70.
Game, cause of the scarcity of, 180; hawks, owls, &c., useful to game, 180.
Geographical Society, report of the, 69.
Geography of plants, iii. 410, iv. 27. 360.
Geology and mineralogy of Richmond and Thirsk, Yorkshire, 25.
Geology, glance at part of that of Essex, 447; that of the neighbourhood of Birmingham, 372.
Geological formations, 243.
Geological phenomena, explained by the precession of the equinoxes, 308.
Geological relations of plants, iii. 410, iv. 27. 460.
Geological Society, report of, 69.
Geómetra trepidária Haw., male and female, taken on Schichalion, 22; why distinct from *Bómbyx Sabini*, 22.
Glaciers, the origin of rivers, 33.
Glöger, M., his theory on the eggs of birds, 429.
Goatsucker, pectinated claw of the, 275.
Goitre, remarks on the cause of, 86. 89.
Graham Island, volcanic formation of, 545.
Grampus (*Delphinus Orca*), some account of, 338.
Habitats of plants, on changes in, 437.
Hail, in the south of France, and insurance against the loss of crops by it, 540.
Hare, the auditory aperture of the, 9.
Hares taking the water, 143. 274. 382. 463. 464.
Hawk, tame, anecdotes of a, 19; its battles with *Strix brachyótus*, the smaller horned owl, 20.
Hedgehog, auditory aperture of the, 13. 382.
Hedgehogs said in Cambridgeshire and Suffolk to suck the teats of cows by night, 425.
Hermaphrodite insects, 150. 434.
Heron, *Ardea cinérea*, 425.
Hesperia Ofleus, notice of, 22.
Highlands, American, described, 289.
Hints for improvements, 177.
- Botanist's Guide, a new edition of, suggested, 181.
- Botany, local, hints on, 181.
- Collectors, British, of objects in natural history, proposed to be registered in this Magazine, and instanced, 177, 178. Controversial papers to be submitted, prior to printing, to the parties controverted, suggested, 459; gainsaid, 556.
- Depôt for exchange of specimens, suggested, 178; instituted 470.
- Entomology, British, a dictionary of, suggested and sketched, 278. 471.
- Forest trees of Europe, as elements of landscape, Mr. Strutt's articles on, should be continued, 456.
- Game, hints for rendering it more abundant, 180.
- Grebes, a monograph on the, wanted, 78.
- Larks, a monograph on the, wanted, 78.
- Meteorology, Mr. Brayley's introductory sketch of the objects and uses of, should be continued, 456. Microscope, a cheap work on, with lithographic plates, suggested, 180.
- Monographs, or complete histories, of families of animals, suggested, 78.
- Monographs, or complete histories, of families of insects, suggested, 78.
- Ornithology, improvements in the terms of, suggested, 181.
- Pteróstichus parumpunctátus, two distinct insects confounded under the account of, iii. 447; as shown by Mr. Westwood, iv. 85.

Queries unanswered. See Queries and Answers.
Rainbow, double, E. G.'s problem on, proposed, iii. 544; noticed as remaining unsolved, iv. 79.
Sandpipers, a monograph on the, wanted, 78. Shakspeare's allusions to natural objects proposed to be identified with the particular species in natural history alluded to, 425.
Whitethroats, a monograph on the, wanted, 78.
Widgeons, a monograph on the, wanted, 78.
Hints on local botany, 181.
Horsechestnut tree (*Æ'sculus Hippocástanum*), description of, 238.
Hydróphilus píceus, nest of, 151.
Hygrometry, remarks on, 192.
Hymenopterous insect parasitic in a nidus of a spider, 236.
Incubation of water-fowl, Waterton's remarks on, 516.
Ink, Indian, derived from the sepia of the *Naútilus*, 138.
Insects and Crustàcea, discoveries of Müller and others on the vision of, 124. 220. 363.
Insects captured by Mr. Dale in Hampshire, Dorsetshire, Devonshire, Cornwall, &c., in 1829 and 1830, 265; captured by Mr. Hewitson, in Wiltshire, Hampshire, Oxfordshire, &c., in 1831, 265; some caught on the top of a stage-coach, 265.
Insects, foreign, trade in, 148; humane method of depriving of life, 149; killing large ones, 149; hermaphrodite, 150. 434; from Melville Island, 22; instrument or trap for catching all flying kinds of, 436; rare species taken in Yorkshire, 166.
Instinct, definitions of, 157. 498.
Instrument for catching all kinds of flying insects, 436.
Intellectual faculties of brute animals, 498.
Ireland, natural history in, 167. 269. 452.
Ireland, recent and rapid formation of peat bogs in, 543; *I'ris tuberòsa*, a native of Ireland, 28. 439.
I'ris tuberòsa, a native of Ireland, 28. 439; remarks on its rate of flowering in gardens, 29.
Island, Graham, volcanic formation of, 545.
Italy, natural history in, 263.
Kelp principally derived from the British *A'lgæ*, 61.
Kingfisher, habits of, 82; in Buckinghamshire, 267; in Suffolk, 450; occurs only in winter in one part of Yorkshire, in Warwickshire all the year, 275.
Kitten, suckled and brought up by a spaniel bitch, 142.
Knife found in timber, buried in Iri$h peat bogs, 534.
Lambs, monstrous, 404. 431.
Lancashire, natural history in, 72.
Land birds met with at sea, 145.
La Plata, the river, source of, 397.
Leicestershire, plants found in, 162.
Lesson, M., his reply to Mr. Vigors, 487.
Lombardy poplar, water secreted by, 32. 34.
London, natural history in, 65. 158.
Londonderry, birds at and near, 260. 452; quadrupeds at and near, 452.
Limestone, magnesian, used by farmers as manure, 157.
Limpet, habits and locomotion of, 346.
Linnean Society, reports of, 68.
Luminosity of the sea, 500. 505.
Maccaw, hyacinthine, observations on, 104. 211. 486.
Magazine, management of, 455, 456.
Mammæ in males, 210.
Mammoth, jaw and teeth, description of, 240.
Manchester, some account of the Banksian Society in, 448.
Marten, a new species of, 147; late appearance of, 431; the black (*Hirúndo A'pus*), on, 344.
Martens, swallows, swifts, habits of, 38. 520.
Melitæ'a Euphrósyne and Selène, single-brooded insects, 478. 558.
Melville Island, insects from, 22.
Mendip hills, potato stone of the, 190. 383.
Menzièsia polifòlia, and *polifòlia* white, found in Ireland, 167.
Meteoric stone, account of the fall of, in Oxfordshire, 139.
Meteorology. See Weather, Calendar of Nature, Scotland, and Collectanea.
Microscope, a cheap work on, with lithographic plates, wanted, 180.
Mineral treasures of Britain, 2.
Miscellaneous Intelligence, 68, 158. 263. 378. 445. 565.
Missel thrush, on the, 183; song of, 144.
Mite, a species of (*Philódromus Limàcum Jennings*), parasitic on slugs, 538.
Mollúsca, burrowing and stationary, 351.
Molluscous animals, history of, 351. 523; their nervous system and senses, 523; sense of feeling, 528; of taste, 529; of smell, 530; of sight, 531; of hearing, 536.
Monstrosities in quadrupeds, 403. 431; in insects; Chrysomèla hæmóptera, with part of an extra leg, 21; an E'mphytus (?), with a complete extra leg, 21; E'later murinus, with a branched antenna, 476.
Moral influence of natural history, 41. in the note.
Mosses, use of the hygrometrical peristomes of, 135.
Moth, death's head (*Sphínx A'tropos*), met with far at sea, 436; the Atlas, 150.
Müller and others, their discoveries on the vision of insects and Crustàcea, 124. 220. 363.
My'ses, are marine scavengers, 258.
Natural history expedition, Russian, in Brazil, 394. 467.
Natural history in the English counties, 159. 445.
Natural history, moral influence of, 41. in the note.
Natural productions indigenous to Britain, 1. 273. 467.
Nature, on the study of, 5. 41.
Naútilus, description of the animal, 138; fossil *Naútilus*, found in the isle of Sheppey, 137.
Nepénthes distillatòria, water secreted by, 32.
Nettle, its sting analogous to that of the wasp, 393.
Nidus of a spider, including a hymenopterous insect, 236.
Nightjar (Nyctichelidon europæ'us *Rennie*), 424.
Nightjar, or goatsucker, pectinated claw of, 425.
Nóctua præ'cox, vitta, valligera, sagittifera, in Devonshire, 445.
Nomenclature, changes in, by Mr. Rennie, 424.
Norfolk, collectors of the objects of natural history in, 177.
Norfolk and Norwich museum, 269.
Northumberland, birds shot at Greenhow, near North Shields, 448.
Nottinghamshire, natural history in, 70.
Nuthatch, near Bedford, 275. 465.
Oak trees, two found in the bed of the river Trent, 70.
Obituary: Thomas Carpenter, Esq., 192; Wilson, the celebrated ornithologist, 558.
Observations, original, their importance, 426.
Orkney and Shetland, ornithological visit to, in 1829, 193; deaf fish of Orkney, 215.
Oriole, the golden (*Oriòlus Gálbula*), shot in 1830 in Cheshire, 73.
Ornithological Dictionary, Waterton's remarks on Rennie's edition of, 516.
Ornithological terms, improvement in, 181.
Ornithological visit to Shetland and Orkney in 1828, 193.
Ornithology. See Birds.
Oryctology, glance at that of part of Essex, 447.
Oryctology. See Fossil.
Owl, auditory aperture of the, 12; its utility in game preserves, 180, 181; white, a notice of, 428; the smaller horned (*O'tus brachyòtus*), its mode of defence in fighting with a hawk, 20.
Oyster and the crab, 157.
Paraguay river, source of, 396.

Parasite and epiphyte, distinguished, 285.
Pàri, species in the plantations at Abbotsford, 166.
Partridge, Guernsey (*Pérdix rùfa*), 425; the Virginian, attempts to naturalise in England, 16.
Pastor, rose-coloured (*Pástorròseus*), shot in 1830 in Cheshire, 74.
Peat bogs, recent and rapid formation of, in Ireland, 543.
Peregrine falcon, 146.
Periodical publications, Swainson's remarks on, 272; A. R. Y.'s reply, 457; Swainson's second reply, 554.
Phenomena of geology explained by the precession of the equinoxes, 308.
Philódromus *Limàcum*, parasitic on slugs, 538.
Physiology of the organs of vision of man and other animals, 14. 207.
Pigeon, tumbler, cause of the whirls of, 473. 557.
Pimpernel, red (*Anagállis arvénsis*), and blue (*A cærùlea*), specific relations of, iii. 537; criticism on, iv. 79. 277, 278. 466.
Pinus Cémbra and *Làrix* europæ'a (commùnis) contribute to the formation of streams, 33.
Pisa, weather at, 263.
Plants, dried specimens of, to be bought in London, 382; exotic, artificial dissemination of, in Britain, 439. 441, 442; on the relative scarcity of certain species, and on changes in their habitats, 437; species noticed by Mr. Dale, 266; notice of the physiology of, 126; poisonous, botanical characters of, 188. 383; rarer species in Cornwall, 161; in Essex, 446; in Leicestershire, 162; in Worcestershire, 451; species of, producing varieties with differently coloured blossoms, 71; the localisation of plants by man, 432. 441, 442; their absorption by their roots, 157; useful application of the dead and dry stems of the herbaceous species of, 443.
Polecat, the auditory aperture of the, 10.
Polyómmatus *Argiolus*, a double-brooded insect, 477. 558.
Poplar trees, water secreted by, 32.
Potato-stone of the Mendip hills, 190. 383.
Preston depôt for the sale and exchange of objects of natural history, 72.
Productions, monstrous, instances of, 21. 403. 431. 476.
Proofs of certain statements in the *Gardens and Menagerie of the Zoological Society delineated*, 199.
Publications, periodical, Swainson's remarks on, 272; A. R. Y.'s reply to, 457; Swainson's second reply, 554.
Quadrupeds at and near Londonderry, 452.
Queries and Answers, 86. 187. 278. 383. 470. 559.
Accentuation, q. 278; answer, 278.
Ætites, or eagle-stone, iii. 484; answer, iv. 190. 468.
Alligator, substance (bezoar) found in the stomach of, iii. 447; q. iv. 96; answer, 286. Nos. 7. and 8.
Anatomical specimens, cheap preparations for, q. iii. 92; answer, iv. 473.
Antennæ, branched in Ephemera murinus, q. 476; partly answered, ii. 302. fig. 86, iv. 21.
Anthracite found in clay, q. 191; answer, 191.
Animalcules in sea-water, q. iv. 285; answer, i. 54. 56. 304, iii. 308, iv. 284. 500. 505.
Animal and vegetable, perfect definition of, q. 279.
Aster which rolls back its corolla, q. 285; answer, 285.
Atmosphere never dark on a windy night, why, q. 288.
Ball containing an insect, q. 93.
Batrachians, on the gastric juice of, q. 95.
Bees, corollas perforated by, q. 93; partly answered, 47. 479.
Beetles, *Gòrdii* and *Dyticus*, found in the intestines of a frog, q. 95.
Bewick's Birds, new edition of, q. 92.
Bezoars found in the stomach of an alligator, iii. 447; q. iv. 96; answer, 286, Nos. 7. and 8: in the stomach of a horse, q. 90; answer, 187. 286, No. 8: in the stomach of a cow, q. 187; answer, 285: constituents of, q. 96; answer, 285. 383.
Bird-stuffing, what work on is best and cheapest, q. 473.
Boa, breathing tube of, q. 20. 279; Bombardier beetle (Brachìnus [*Cárabus*] crépitans), explosion and odour of, q. iii. 477; answer, iv. 94.
Butterfly, azure blue, Polyómmatus Argìolus, is it single or double-brooded? q. 477; answer, 558.
Cabbage caterpillar, flies produced from, q. iii. 476, 477; answer, iii. 51. 452, iv. 94, 95. 284.
Campánula *hederàcea* at High Beech, q. 182; answer, 479.
Caprimúlgus europæ'us in a cage, q. 91.
Cárabus nemoràlis of Illiger, *C. horténsis Fabr.*, q. iii. 477; answer, iv. 94, 95. 188.
Caterpillars, greenish black-marked, on cabbages, q. iii. 476; answer, iii. 51. 452, iv. 94, 95. 284.
Caterpillar infesting the sycamore tree, q. 93; answer, 284.
Cérthia familiàris, migratory or not, q. 473.
Cerùra vínula, electricity of the caterpillar of, q. 281.
Clay, black mineral substance (anthracite) found in, q. 191; answer, 191.
Climate of England almost unchanged, q. 480.
Còlias Edùsa, appearance of, in 1830, q. 188.
Corollas perforated by bees, q. 93; partly answered, 47. 479.
Cow, substance (bezoar) found in the stomach of, q. 187; answer, 285.
Cynthia cárdui, appearance of, in 1830, q. 188.
Dáphne Mezèreum, is the envelope of its blossoms a calyx or corolla? q. 188; answer, 558.
Depôt for the exchange and sale of specimens in natural history, q. iii. 185. 470, iv. 178; answer, 470.
Dictionary of British Entomology, q. 278: answer, 471.
Dracæ'na surculòsa, 384; answer, 384.
Ducks, habits of the long-legged whistling, of the West Indian Islands, q. 474.
Dyticus, beetles, and *Gòrdii*, found in the intestines of a frog, q. 95.
Eagle-stone, or Ætites, q. iii. 484; answer, iv. 190. 468.
Eagle, white-tailed, is Fálco *Ossífragus* a yearling of? q. 187.
Eggs and nest, q. 91.
Eggs, a publication on, q. 92; answer, 428.
Eggs, exchanging of, q. 470; answer, 470.
Ephemera murinus with a branched antenna, q. 476; partly answered, ii. 302. fig. 86, iv. 21.
Electricity of the caterpillar of Cerùra vínula, q. 281.
Entomology, British, dictionary of, q. 278; answer, 471.
Epidéndrum fuscàtum, q. 285; answer, 285.
Eriophýllum cæspitòsum, q. 384; answer, 384.
Exchange and sale of specimens in natural history, depôt for, q. iii. 185. 470, iv. 178; answer, 470.
Exchanging of eggs, q. 470; answer, 470.
Fálco *Ossífragus*, is it a yearling white-tailed eagle? q. 187.
Filàriæ, origin and end of, q. 476.
Flies produced from the cabbage caterpillar, q. iii. 476, 477; answer, iii. 51. 452, iv. 94, 95. 284.
Flukes, in sheep, q. 284; answer, 472.
Fritillaries, Melitæ'a Euphrósyne and Selène, are they single or double-brooded? q. 478; answer, 558.
Frog, *Gòrdii*, beetles, and *Dyticus*, found in the intestines of, q. 95.
Frog, solvent powers of the stomach of, q. 95.
Frosts, on the unequal action of, q. 480.
Fungus, a phosphoric species, q. 86; a species also in touchwood, q. 189.
Goître, the cause of, q. ii. 301. 403; answer, iii. 191. 446. 470, iv. 86. 89.
Goldfinch losing its note, q. 473.
Gòrdii, beetles, and *Dyticus* found in the intestines of a frog, q. 95.
Gòrdii, origin and end of, q. 476; food for frogs, 95.
Grubs detected by rooks, q. 92; answer, 280.
Hairworms, origin and end of, q. 476; food for frogs, 95.
Horse, substance (bezoar) found in the stomach of, q. 90; answer, 187. 286, No. 7.
Housefly's duration, rate of increase, and deposition of its eggs, q. 479.
Housefly, lobster-like insect attacking the leg of, q. 94; answer, 283, 284. 479.
Indications of spring, comparative ones, q. 192.
Insect contained in a ball, q. 93.
Kaulfússia amellöides, q. 285; answer, 285.
Lace-bark, q. 479; answer, 480.
Lady Der-

wentwater, q. 92; answer, 279. Lobster-like insect attacking the leg of a housefly, q. 94; answer, 283, 284. 479. Louse, its origin on the cleanest of children's heads, q. 477. Luminosity of the sea, q. iv. 284; answer, i. 54. 56. 304, iii. 308, iv. 284. 500. 505.

Man-of-war, Portuguese, q. 96; answer, 96. 282. 475. Marine globular substance, q. 383. Melitæ'a Euphrósyne and Selène, are they single or double brooded, q. 478; answ., 558. Meteorology, retrospective, q. 480. Mezereon (*Daphne Mezèreum*), has it a calyx or corolla? q. 188; answer, 558. Mineral substance, black, found in clay, q. 191. Monthly Guide for young Naturalists, q. iii. 468; answer, iv. 94. Moorhens persecuted by partridges, 91. Morgan's, Mr., worms, q. iii. 476; answer, iii. 51. 452, iv. 94, 95. 284.

Necróphorus germánicus, q. 187; answer, 188. Nidus on a rush, ii. 104, iii. 458; answer, ii. 303. 405, iv. 94. Nuthatch, a mason bird, q. 465. Nuthatch, a migratory bird, at Bedford, q. 275; answer, 465.

Olorina and Typha latifolia, identity of, q. 189.

Partridges, their animosity to moorhens, q. 91. Physiology, vegetable, the best work on, q. 96; answer, 96. *Picus minor*, q. iv. 187; answer, iv. 187, iii. 475. Pigeon, tumbler, whirls of, q. 473; answer, 557. Pipe for blowing eggs, 145; q. 474. Plants, poisonous, the botanical characters of, q. 188; partly answered, 383. Plants, varied effect of frost upon, q. 480. Poisonous plants, the botanic characters of, q. 188; answer, 383. Polyómmatus Argiolus, azure blue butterfly, is it single or double brooded? q. 477; answer, 558. Portuguese man-of-war, q. 96; answer, 96. 282. 475. Potato-stone in the Mendip Hills, q. 190; answer, 383.

Rooks detecting grubs, q. 92; answer, 280. Rot in sheep, 173, q. 284; answer, 472.

Sale and exchange of specimens in natural history, q. iii. 185. 470, iv. 178; answer, 470. Sea and sea-water, luminosity of, and animalcules in, q. iv. 284; answer, i. 54. 56. 304, iii. 308, iv. 284. 500. 505. Sheep, rot in, 173, q. 284; answer, 472. Sheldrake, the habits of, q. 474. Snakes taking the water, q. and answer, i. 397, ii. 450, iv. 279, 280. 474. Snakes, trade in, the object of, q. 279; answer, 471. Spring, comparative indications of, q. 192. Spynie, loch of, uncommon plant in, q. 188. Stone, the potato, of the Mendip Hills, q. 190; answer, 383. Stuffing birds, what work on is best and cheapest, q. 473. Substance, marine globular, q. 383. Swans, their affection for Olorina, q. 189. Sycamore, caterpillar infesting, q. 93; answer, 284.

Tapeworm, origin of in man and animals, and how it propagates its species, q. 477. Touchwood, luminousness of, q. 189. Tree creeper, *Certhia familiaris*, migratory or not, q. 473. Trilobite, a species of, q. 287. *Typha latifolia* and Olorina (*Leslie*), identity of, q. 189. *Typha latifolia*, its eligibility for the haunts of swans, q. 189.

Water-beetle, iii. 148, q. iv. 476. Weather, on the, q. ii. 177; answer, iii. 486; q. iii. 487; answer, iv. 191. Whirls of the tumbler pigeon, q. 473; answer, 557. Windy night, atmosphere never dark on a, why, q. 288. Woodpecker, lesser spotted, iv. q. 187; answer, iv. 187, iii. 475. Worms, intestinal, their origin in man and other animals, q. 477.

Zoology, how to pursue, q. 86; answer, 86.

Rain, the monthly fall of, in different places, 248.

Raining trees, 32.

Rats, the domestic cat plunging into water for, 430.

Redstart (*Sylvia Phœnicùrus*), unusual appearance of, 431.

Redwing, notice on the, 270.

Remarks on the spring of 1829 and 1830, 35.

Renfrew and its neighbourhood, birds in, in 1831, 269.

Rennie's edition of Montagu's *Ornithological Dictionary*, 422; Waterton's remarks on, 516.

Rennie, J. Esq., his appointment to the office of Professor of Natural Philosophy in King's College, London, 69.

Retrospective Criticism, 76. 183. 272. 381. 455. 556.

Adages on the weather, 264, 469. *Ætites*, or eagle-stone, iii. 484, iv. 194. 468. Agronome's article on the explosion of Stobs's powder-mill, iii. 507, iv. 47. 81. 556. America, North, T. W.'s original letters on, iii. 489, iv. 77. 108. 289. *Anagállis arvensis* and *cærùlea*, specific relations of, iii. 537, iv. 79. 277, 278. 466. 559. Animals, typical formation of all, i. 97. 309, ii. 128, iv. 82. *Apócynum androsæmifolium*, its manner of entrapping flies, 190. 422. A Purchaser of Stephens's *Illustrations of British Entomology*, remarks by, 460; remarks in reply to, 498.

Bee, secretion of wax by the hive, 51. 185. 276. Bezoars, constituents of, 285. 287. 383. Birds forsaking their nests, i. 376. 496, ii. 113, iv. 83. Birds of Renfrew and its neighbourhood, 269. 464. Birds, new mode of examining, 145. 381. 450. 464. Bittern, habits of, i. 495, iii. 423. 464. Britain, increasing taste for natural history in, 776. 335. in the note; natural productions indigenous to, 1. 273. 467. British snipes, ii. 143, iii. 27, iv. 78. British willow wrens, iii. 518, iv. 78.

Calendar of Nature in England (J. G. Tatem's) for 1830, 168. 383. 469. Cássida, on the metamorphoses of, iii. 523, iv. 85. Controversy in the fourth volume of this Magazine, 97. 199. 206. 211. 303. 316. 319. 455, 456. 481. 487, 488; uses of controversy, 481. 486. Cuckoo and the swift, departure of, iii. 154. 450, iv. 172. 184. 275. 466. Cuckoo at the "witching hour of night," 147. 466. Curculios, two, iii. 477. iv. 85. *Cypèrus fúscus*, a British plant, 65. 186.

Davis, Mr., his remarks on the mode in which Stephens's *Illustrations of British Entomology* have been published, 303; criticised, 459; confirmed, 460; replied to by Mr. Stephens, 488; by Mr. Davis, 557. Decline of science in the present day, 97. 335. 484. Disseminating exotic plants, on, i. 378, ii. 400, iii. 460, iv. 86. 439. 441, 442.

Eagle-stone, or *Ætites*, iii. 484, iv. 190. 468. Editor's duty, 76.

Flora of Richmond, Yorkshire, as compared with that of Thirsk, Yorkshire, 24. 276. 467.

Geological relations of plants, iii. 410, iv. 460. Glossarial Index, iii. 569, iv. 76. Goatsucker, or nightjar, pectinated claw of, iii. 30. 188. 296. 449, iv. 275. 425.

Hares taking the water, 143. 274. 382. 463. 464. Hedgehog, auditory aperture in the skull of the, 13. 382.

Increasing taste in Britain for natural history, 76. 335. in the note. Introductory papers on the branches of Natural History, promised in early numbers, discontinued subsequently; the discontinuation criticised, iv. 183; the cause assigned, iv. 183.

Kilkenny meteorological journal, ii. 97, iv. 469. Kingfisher, habits of, i. 23, ii. 206. 457, iii. 175. 448, iv. 82. 267. 275. 450.

Magazine of Natural History, i. ii. and iii., its office, merits and demerits, iv. 76. Management of the Magazine. Articles to be continued, i. 147. 153. 242. 248, iv. 456; answered, 457; introductory papers promised in some early numbers, reason why they have not been inserted given, 79, 183. Missel thrush singing on the wing, 183. 274; song of, iii. 193, 473, iv. 183. 274. Molluscous animals, G. J.'s letters on, ii. 22. 148, iii. 39. 249. 335. 525, iv. 79. 351. 523. Monography, the great utility of, ii. 143, iv. 78. in note.

New mode of examining birds, 145. 381. 450. 464. Number xvi. iii. 489., remarks on, iv. 76. Nuthatch in the neighbourhood of Bedford, 171. 275. 465.
Peltry, scientific, 331. 484. Periodical publications, iii. 297. 549. in note, iv. 273. 457. 556. Pimpernel, red and blue, specific relations of, iii. 537, iv. 79. 277, 278. 466. 557. Plants, dried ones, not to be bought in London, 178; yes, they are, 382; botanical characters of poisonous ones, 188. 383. Potato-stone of the Mendip Hills, 190, 383. Pterόstichus parumpunctâtus, iii. 51. 477, iv. 85. Pyrenees, Ainsworth's notes on the, iii. 496; corrections to, iv. 81.
Rainbow, singular appearance of, iii. 544, iv. 79. Renfrew and its neighbourhood, birds of, 269. 464. Robin's, the, or Redbreast's, forsaking its eggs after they have been touched by man, i. 376. in the note, 496, ii. 113, iv. 465.
Sandstone of the Isle of Sheppey, 137. 383. Science, its decline in the present day, 97. 335. 484. Shadow, double, (optical phenomenon) ii. 108. 488, iii. 468, iv. 86. Snakes taking the water, i. 397, iii. 450, iv. 82. 147. 279. 280. 474. 559. Snipe's beak, iii. 29. 449, iv. 383. Spiders, aerial, on their powers and mode of flight, i. 157. 304. 320, ii. 116. 299. 396, iii. 147. 189. 456, 457, iv. 83, 84. 186. Stephens's *Illustrations of British Entomology*, Mr. Davis's remarks on the mode of publishing, 303; criticised, 459; confirmed, 460; replied to by Mr. Stephens, 488; by Mr. Davis, 555. Sticklebacks, iii. 521, iv. 78, 79. Stobs's powder mill, Agronome's article on, iii. 507; criticised, iv. 77. 81; reply by Agronome, 556. Strutt's *Sylva Britannica* reviewed, iii. 546; the review of Williams's matchless woodcuts in that review, noticed, iv. 80. Swainson's *Zoological Illustrations*, iii. 549, iv. 272. 459. in the note, 554. Swallows, migration and breeding of, iii. 194. 474, iv. 38. 185. 275. 520. Swift, and the cuckoo, departure of, iii. 154. 450, iv. 172. 184. 275. 466.
Tatem's journal of the weather at High Wycombe, Bucks, for 1830, 168. 383. 469. "Trunk," the term in entomology, i. 227, iii. 458, iv. 85. 186. T. W.'s "Original Letters" on North America, iii. 489, iv. 77. 108. 289.
Vignette for titlepage, i. 94. 301, iii. 89, iv. 76.
Winter of 1829-30, Rev. L. Jenyns's remarks on, iii. 538, iv. 79; similar to the same winter in Ireland, 453.
Reviews, 39. 251. 380. 421.
Richmond and Thirsk, Yorkshire, Floras of, 24 criticism on, 276. 467.
Rivers produced by forests and plants, 33.
Robin, habits and manners and song of, 118. 410; forsakes not its eggs after they have been touched by man, 465.
Rook (*Córvus prædatórius Rennie*), 424.
Rose of Jericho (Anastática hierochuntîna), mechanism of, 32.
Rough notes of a tour in Westmoreland and Cumberland, 297.
Rúbus filiæfólius found in Ross-shire, 166.
Russian natural history expedition in Brazil, 394.
Sap, new theory of the ascent of, 541.
Sandstone of the Isle of Sheppey, 383.
Sarracèn*ia* adúnca, and other species of, water secreted by, 32.
Satúrni*a* Pavòni*a* minor, in Devonshire, 446.
Scarcity of game, cause of, 180.
Science, its decline in the present day, 97. 335. 484; on the study of, 8. 41, in the note.
Scólytus destrúctor (*auctorum*, S. insons *Denson MSS.*), never a destroyer of healthy trees, 152.
Scotland, calendar of nature for, in October and November, 1830, 74; in December, 1830, 175; in January, 1831, 176; in February, 270; in March, 271; in April, 378; in May, 378; in June, 453; in July, 453; in August and September, 553.
Scotland, natural history in, 166.
Sea, land birds met with at, 145.
Sea, luminosity of the, 500. 505.
Sea, shrimps and Mŷses scavengers in the, 258.
Sea, *Sphinx A'tropos* (death's-head moth), met with far at, 436.
Sea weeds, British, 57.
Seal-catching in the Shetland isles, 195.
Sedge warbler sings at night, 466.
Sensibility of vegetables, 134.
Sepia, a liquid from the Naútilus, forms Indian ink, 138.
Shakspeare, the allusions in his writings to objects of natural history, 425; an identification of these with the species of naturalists desirable, 425.
Shells, a list of species from the Cape and Mauritius, 470.
Sheppey, isle of, fossil *Naútilus* found in, 137; sandstone of, 383.
Shetland and Orkney, ornithological visit to, in 1828, 193.
Shrikes, habits and nidification of the British species, 341.
Skeletons of small fishes, a mode of obtaining, 433.
Slugs, a species of mite parasitic on, 538.
Snakes charming or fascinating their prey, explained, 280.
Snake (*Cóluber constrictor*), its heart beat for several minutes after being detached from the body, 294; adder's heart did also, 268.
Snakes taking the water, i. 397, iii. 450. 510, iv. 82. 147. 279, 280. 474. 557; water ones, accounted for, 148.
Snipe's beak, remarks on, 383.
Soils and plants, their mutual relation, 27. 460.
Solitary thrush, 213.
Song birds, British, some account of, 118. 412.
Spaniel bitch, a fawn and a kitten suckled by, 142.
Sparrows, notice on, 428.
Sphinx A'tropos (the death's-head moth), met with far at sea, 436.
Spider, on a beautiful nidus of, and a hymenopterous parasite found within it, 236.
Spider of Solomon, 151; spider's web, 151; water spider, 151.
Spigèlia marilándica, native situation, and style of growth, 111.
Spring of 1829 and that of 1830 compared, 35.
Stage-coach, insects captured on the top of, 265.
Statements in the *Gardens and Menagerie of the Zoological Society delineated*, proved, 199.
Stems, dead and dry, of umbelliferous and other herbaccous plants, useful application of, 443.
Stephens's *Illustrations of British Entomology*, Mr. Davis's remarks on the recent mode of publishing, 303; remarks by others, 459, 460; Mr. Stephens's reply to, 488.
Stoat and the swallow, 146.
Stomach of a cow, ball of hair found in, 117.
Stool dug out of peat bogs in Ireland, 544.
Stork (*A'rdea Ciconia*) shot near Mildenhall, 344.
Structure and functions of animals and vegetables, analogy in, 385.
Structure, unusual, of cervical vertebræ, 513.
Succulent plants, mention of, 32.
Suffolk, birds in, 163. 440, 450; *Anemòne ranunculòides* found in, 450; calendar of nature for Bungay in, 173.
Sussex, large whale found in the Channel near Brighton, 163.
Swainson's defence of certain French naturalists, 97. 316. 456. 481; note from Mr. Swainson, 456; his final reply to Mr. Vigors, 481; Swainson's *Zoological Illustrations*, 554.
Swallow and the stoat, 146.
Swallows, early appearance of, in Yorkshire, 71; in Devonshire, 445; late appearance of, 431.
Swallows, martens, swifts, habits of, 38. 520.
Swift, on the, 184; its late appearance, 431.
Swifts, martens, swallows, habits of, 38. 520.
System, Rennie's remarks on, 426.
Tapir, Indian, discovery of, 101, 201.

Temperature of the atmosphere on different parts of the earth's surface, 245.
Tenaciousness of life in the serpent tribe, 268. 294. 472.
Thirsk and Richmond, Yorkshire, floras of, 24; criticism on, 276. 467.
Thrush, missel, habits of, 270: singing on the wing, 274; song of, 144.
Thrush, in-door nests of, 433.
Thrush, the solitary, 213.
Tillándsia, water secreted by, 32.
Tin produced in Britain, 2.
Titmouse, four species of, in the plantations at Abbotsford, 166.
Trap for catching all kinds of flying insects, 436.
Tree, a petrified, in Dorsetshire, 73; large oak trees dug up in Nottinghamshire, 70: description of a beautiful tree, 238.
Trees, healthy ones never destroyed by Scólytus destrúctor *auctorum*, S. insons *Denson MSS.*, 152.
Trilobites, fossil, resembling butterflies, 443.
Trunk, the term, in entomology, 85. 186.
Toad, poisonousness of the, 557.
Tomtits, notice on, 428.
Tour to the lakes of Cumberland and Westmoreland, 297.
Umbelliferous and other plants, useful application of the dead and dry stems of, 443.
Vaagmaer of Iceland, its identity with the deal fish of Orkney, 215.
Vegetables and animals, analogy in the structure and functions of, 385.
Vegetables, their sensibility, 134.
Vertebræ, cervical, unusual structure of, 513.
Velélla limbòsa, found in Devonshire, 282.
Vèlia rivulòrum and cúrrens, 150.
Vigors, N. A. Esq., remarks on, 98; Mr. Vigors's reply, 206; Mr. Vigors's reply to Mr. Swainson's defence of certain French naturalists, 319; Mr. Swainson's final reply to, 481; M. Lesson's reply to, 487; remarks by Mr. Vigors, see Appendix.
Vine, grape, mode of pruning at Pisa in Italy, 264.
Viper's tenaciousness of life, 268. 294. 472.
Virginian partridge, attempts to naturalise the, in England, 16; the habits of this species, 17.
Vision, organs of, in man and other animals, on the anatomy and physiology of, 14. 207; of insects and Crustàcea, 124. 220. 363.
Volcanic (Graham) island, formation of the, 545.
Wagtail, habits of, 518; pied wagtail (*Motacilla lòtor Rennie*) 424.
Warblers, British, some account of, 118. 412.
Warwickshire, Bohemian waxwing found in, 164; in Suffolk, 165. 344; remarks on, 425.
Washington, General, incidental notice of, 113.
Wasp, a paper-maker, 48; its sting analogous to that of the nettle, 393.
Wasps, the habits of, 6; nests of, affixed to rafters, 6; the structure of those nests, 7; the larvæ of, fed by the old ones, 7.
Water-fowl, incubation of, Waterton's remarks on, 516.
Water-hen, habits of, 517. 519.
Water secreted by trees and plants, 32.
Water spider, 151.
Waterton's remarks on Rennie's edition of Montagu's *Ornithological Dictionary*, 516.
Wax, secretion of, by the hive bee, 51. 185. 276.
Weasel, the, habits of, 337.
Weather, adages on, 264. 469; at and near Londonderry, 452; foul, a forewarner of, 444; journal of the, kept at Bedford, 170; Tatem's journal of the, 168.
Westmoreland and Cumberland, tour in, 297.
Whale, found in the Channel near Brighton, 163.
Whelk, waved (*Búccinum undàtum*), habits of, 361.
Whern, quernstone, or gritstone, 277.
Willow trees, water secreted by, 32.
Wilson. See Obituary, 560. 558.
Wolf in the forests of America, 110.
Woodchat, some account of, 343.
Woodcuts in the *Library of Entertaining Knowledge*, remarks on, 378.
Worcestershire, rarer plants of, 451.
Wren (Anorthùra communis *Rennie*), 424.
Wryneck, remarks on the, 450.
Yorkshire, natural history in, 71; rare insects taken in, 165.
Zoological Garden on the Surrey side of London, 159.
Zoological Illustrations, Swainson's, 554.
Zoological Society, remarks bearing some reference to, 97. 273. 319. 482; reformation needed in, 486; reports of, 68. 158.
Zoology, instances of monstrous productions in, 21. 150. 403. 434. 476, 513.

END OF THE FOURTH VOLUME.

LONDON:
Printed by A. & R. Spottiswoode,
New-Street-Square.