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# Field and Forest

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A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

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CHARLES R. DODGE, EDITOR.

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BULLETIN OF THE POTOMAC-SIDE NATURALISTS' CLUB.

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VOLUME II.

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# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.— JULY 1876.—NO. 1.

## Volume Second.

With a kindly greeting to all our readers, we present the first number of our new volume. The twelve numbers comprising Volume One have appeared—not as regularly as we could have wished, though under the circumstances the delay was unavoidable—and whether our little enterprise has been successful or not, our friends must decide. To our own mind, however, the limited space offered between its brown covers, precluding the possibility of our giving a *variety* of reading matter, has in a measure prevented the success we had hoped for it; but with the kind words of many friends in sympathy with us for encouragement, together with some substantial aid, we have decided to push on towards complete success, and, to that end propose to enlarge its size to at least twice the number of pages given in the former volume, with a promise of an additional number, if contributions and subscriptions shall warrant us in so doing.

Still the Bulletin of the Potomac-side Naturalists' Club, its pages will always be found to contain something of local interest, while its larger size, allowing space for the record of other localities than our own, will serve to give variety to its reading matter, and make it doubly interesting and useful.

We wish to make *Field and Forest* a journal of information for student naturalists and observers in the various walks of science, and, with each number to add something to our knowledge of the objects of nature everywhere around us; and as knowledge is but an accumulation of facts, we invite *all* our readers to become contributors, by

sending us a record of the little facts of current observation or investigation in the wide domain of Nature.

That we may enlarge our circle of readers and contributors, we shall publish an unusual edition of this number, and trust that all receiving it, who are interested in Natural History and the kindred Sciences, will aid us in making our little enterprise all we have claimed for it, a journal devoted to the advancement of our knowledge of the *fields and forests* of our country.

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## Peculiar Forms of Hail Stones.

About 1 o'clock, P. M., on the afternoon of May 22d, after a hot and sultry morning, a violent thunder storm passed over the section of the city in which I reside (19th near L streets, N. W.) and during the rain some hail stones fell of a somewhat unusual shape.

Thinking that no addition to our store of information as to these visitants from the upper regions would be entirely without value in the present state of our knowledge of the laws governing their formation, &c., I measured and weighed a few of the more remarkable with a view to presenting the results to our club, and they are herewith submitted, with sketches of some of the stones, hastily made with a pencil, while lying upon a piece of woolen cloth to retard melting :

| | *Weight.* | *Measurement.* |
|---|---|---|
| 1st Stone. | ——— | 7/8 in. by 5/8 in. |
| 2d " | 36 gr. | 1 1/2 in. by 7/8 in. |
| 3d " | ——— | 1 3/8 in. |
| 4th " | 37 gr. | 1 in. by 3/4 in. |

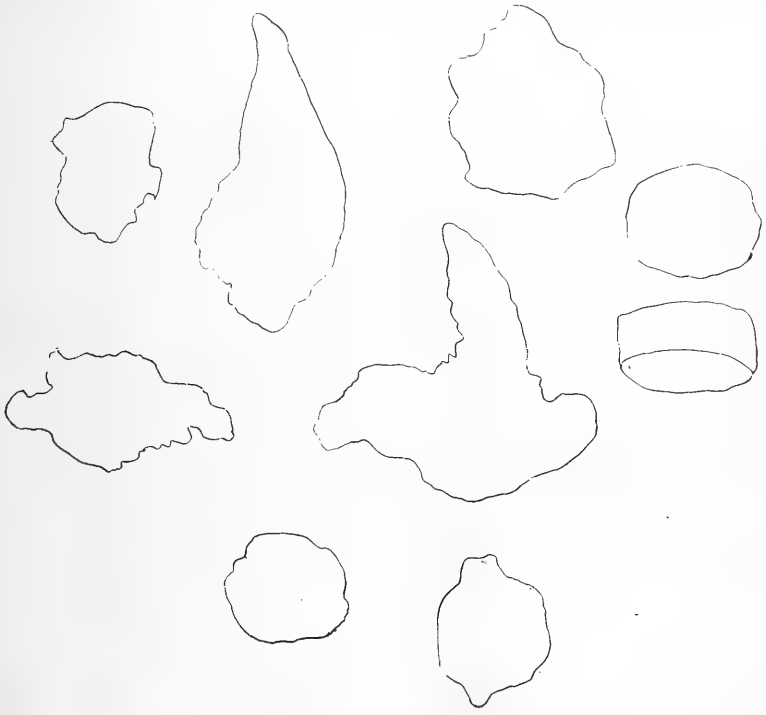
None weighed over 57 grains, and the average was much less. The third stone, the one shown in the sketch with three spines, was measured across the body and longest spine. The larger stones all averaged only 3/8 to 1/2 inches in their short diameter. The smaller stones, of flattened, oval or biscuit shape, showed less difference in their long and short diameter.

The unusual feature in most of the stones was the presence of one or more spines or projections from the central mass. In the one referred to above there were three such radiations, all showing a slight

curve in one direction, and suggesting the influence of a rotary motion of the stone on its short axis.

Of the smaller stones, one (shown in two positions in the sketch) was a section of a perfect oval cylinder, cut at right angles with nearly perfect edges.

Nearly all of the stones observed were semi-transparent, and showed a whitish ring in the centre, generally oval, but sometimes circular.



Forms of Hail Stones.

Inside and outside of this ring they were usually clear, but some had also a whitish nucleus in the centre. Some of the smaller ones were whitish and opaque throughout. The stones were examined while the hail was yet falling, and were taken from some young grass where they were not liable to be broken in the fall. From persons at other points in the city I learned that the distribution of the hail was very singular, at some points scarcely any being noticed.

Having frequently observed hail before, I have never noticed the presence of the spines referred to, and think it a somewhat exceptional phenomena. In the hail-storm, which visited this city June 21st, 1857, the large stones were all flattened ovals, and much thicker in their short diameter than these just mentioned. On that occasion I measured one an hour after it had fallen with the respective diameters of 1 8-10 inches, 1 7-10 inches and 8-10 inches.

E. M. SCHAEFFER.

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## Invertebrates which prey upon Fishes, Reptiles and Amphibia.

During the months of August and September last I had the opportunity of observing the habits of some water insects in relation to their contact with the smaller species of fishes. The habits of the cray fish, *Cambarus obesus*, were also studied in this connection. A very small aquarium contained about a dozen *Cyprinids*. A few young chubs, *Semotilus corporalis*, a few of *Argyreus nasutus*,* and a few red-lined minnows, *Chrosomus erythrogaster*. Some *fronds* of the *Anacharis Canadensis* did duty as oxygen generators.

Among these I placed a large water beetle, *Dytiscus*, a *Ranatra* and a steamboat bug, *Belostoma grandis*. For a few hours they seemed to live together peaceably enough.

During the same day a partly grown green frog, *Rana halecina*, was put into the aquarium. As he swam awkwardly around the side of the glass case the *Dytiscus* discovered him and made an eager rush in his direction. The frog was alarmed, whether because he knew he was near an enemy, or that any confusion or movement in the water increased his agitation, incited by captivity, was not easy to decide. The frog passed out of sight behind the leaves of the plant, but was not wise enough to remain in comparative safety and continued his journey around the glass. The *Dytiscus* evidently knew him as his natural victim. Whenever he came in view he swam eagerly toward him. About the third circuit he succeeded in grasping him, and

* Cope, in his synopsis of the *Cyprinidae* of Pennsylvania, has only seen this species from the slope of the Alleghanies. It is a common form in the tributaries of Lake Michigan.

placing his two anterior pairs of legs around the body behind the arms of the frog, he set his mandibles into the skin of the belly. He paid little attention to the frog's struggles, rapidly gnawing away the viscera, and in about ten minutes had entirely cleaned the abdominal cavity. He then released the carcass and paid little attention to the other denizens of the tank.

In the evening a very small painted turtle, *Chrysemys picta*, was put into the aquarium. Next morning his empty shell was discovered, the *Dytiscus* having attacked him from behind and eaten into the shell, devouring the viscera, leaving the head, fore limbs and one hind limb nearly intact.

The fish put within his reach he would grasp and eat, but he was little disposed to attack them of his own accord. He was allowed to remain undisturbed in the aquarium, and never left it except at night, when we could occasionally hear him buzzing about the room.

The *Belostoma* would lie floating at the surface with his legs in passive condition until a fish swam within his reach when he would immediately stretch them forward and attempt to grasp him. Frequently he succeeded and immediately fixed his proboscis into the flesh of the fish. Death ensued very rapidly. From all appearances there was some benumbing paralyzing influence from the secretions in the vicinity of the proboscis. After he had sucked for a time he would withdraw and insert his proboscis in a new place. He rarely made three insertions, but after the second allowed the dead fish to float away.

I am informed that an examination as to the character of the saliva of this genus has been made in Germany and that it was decided that it contained no poison. An empirical observation would impress upon the observer that the effect was otherwise.

The *Ranatra* paid no attention to the vertebrate forms, but attacked insects and specimens of *Gammarus fasciatus*, placed in the tank.

A few weeks later a large *Cambarus obesus* was put into the aquarium, together with some *C. propinquus*. Though not seen to capture the smaller craw fish, their shells were found at the bottom of the tank until all were devoured. As only *Cyprinids* were in the jar there is no probability of anything else having done the mischief. In one other case he was seen to have within his grasp a minnow which he had gnawed down in several places to the vertebral column. While resting on the gravel,

at the bottom, minnows swimming in the vicinity of his long antennæ always induced him to raise himself and make an awkward grasp in their direction with his large claws. I did not have the good fortune to see him grasp one, but taking a minnow in a pair of forceps and brushing it against his feelers he would reach out and succeeding in taking it would immediately draw it back to his eating feet. The corpses of the minnows were seen floating about in the aquarium soon afterwards until all but one had disappeared. Whether this is the habit of all other species of cray fishes I am not informed, though I suppose it quite likely most of them capture living food.

JAMES W. MILNER.

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## The Vitality of Seeds.

(*Continued from page 63, of Volume 1.*)

In addition to the references given previously, the following, of a more general character, deserve consideration:

Sketches of Creation, Prof. Winchell. Entomologist and Botanist, 1870, Dr. G. Vasey. Isis, 1836, Heft., 3, S. 231, Oken. Botanische Zeitung, January 21st, 1876, Prof. Ernst. Nature, Vol. xi, p. 154. Die Natur, 1851, Ule and Muller. Revue des deux mondes, 1861, January. Flora, 1835, Regensburg. *Popular Science Monthly*, April 1875.

One of the most enthusiastic believers in the extended duration of the vitality of seeds is Prof. Winchell, author of "Sketches of Creation." Chapter xxiii begins: "For some years I have been inclined to believe that the germs of vegetation, which flourished upon our continents previous to the reign of ice, and many of which must have been buried from 20 to 100 feet beneath the surface of the glacial rubbish, may have retained their vitality for thousands of years, or even to the present time." To support this opinion numerous cases are quoted of great durability in such vegetable matter, as charred piles, buried cedars, etc., also the numerous observed variations of spontaneous growth under altered conditions of the earth's surface, and finally some of the facts we have already mentioned, adding from Carpenter an instance of the growth of the beach plum, *(Prunus maritima)* on sandy soil thrown out of a well near the Penobscot river, Maine,

40 miles from the coast, a year after the soil was exposed. Now, it seems to us if these plum stones were in the soil when first exposed, they should have grown at once, also it is well known that birds scatter the seeds of various *Pruni* far and wide, and 40 miles from the nearest trees would be but a couple of hours flight. Pigeons were shot near Albany, N. Y., with green rice in their crops, they must have gathered 700 miles distant. (See G. P. Marsh, *Man and Nature.*) A little careful observation might have given this case an importance it does not now possess, for the seeds in question are so large they could readily have been discovered if present in the dirt as thrown out of the well. In conclusion, Prof. Winchell admits that "the crucial test is yet to be made." His statements were reviewed by Dr. Geo. Vasey, in the *American Entomologist and Botanist*, for July and August, 1870.

*Flora, 1835, S. 5.* The early volumes of this work are rare in this country. The matter of this reference appears identical with that of the article in *Isis*, described below.

*Isis.* At a scientific convention held in Stuttgard, December 18, 1834, Count Sternberg stated that some wheat, from Egyptian tombs, sent home by Lieut Von Prokesh, was sown after being soaked in oil and rolled in dust, that two seeds grew and ripened, ears similar to wheat grown in Spain and Southern France called Talavera. Drs. Zollikoffer and St. Gall observed that Dr. Gay, in Paris, had obtained similar results and Herr Marteus added that corn from the graves of the Inca's, of Peru, had sprouted.

This reference is probably the original form of a statement often quoted. It would now be difficult to ascertain how well the alleged facts were established, but the utter failure of all direct experiments with seeds from Egyptian tombs compel serious doubts of the accuracy of this statement.

G. P. Marsh, in *Man and Nature*, thinks that "the vitality of seeds seems almost imperishable, while they remain in the situations in which nature deposits them." In addition to pressing into his service observations by Darwin and Wittwer, which they explain in a different way, he draws from Dwight's Travels, instances of the spontaneous substitution of hickory for a natural growth of white pine after long intervening cultivation at Panton, Vt., and a change to white pine after clearing up oak and chestnut at Northampton, Mass. Examples of this class are certainly curious but far from decisive. They may be

explained by assuming the conditions of germination more favorable to the seeds which grow, than to others, admitting that all kinds were equally distributed over the given locality. Of course in case only a single kind is sown no other explanation is needed.

*Botanische Zeitung.* Prof. Ernst, of Caraccas, Venezuela, describes the appearance of species of plants before unnoticed on soil freshly exposed by grading the market place. But the ground was disturbed 30 years before, hence the circumstances do not appear to require a greater duration of vitality than has been proved by direct experiment, especially as with one exception all the species noted belong to the vicinal flora. The exception was *Capsella bursa-pastoris*, that is very common in most places, bnt not near Caraccas.

*Die Natur.* H. B. Beta refers chiefly to the alleged growth of some peas found in an Egyptian tomb, the produce of which is for sale. The article reads more like the advertisement of a thrifty gardener than the report of a scientific inquiry.

*Revue des deux Mondes.* Michalet observes that after moving diluvial sand in the neighborhood of Dole, it became covered with *Galium anglicum*, a plant before unknown in that neighborhood.

*Popular Science Monthly.* In miscellany, refers to alleged growth of peas from Egyptian tomb. No reference is given, but the statement is similar in form to the article by H. B. Beta above referred to in *Die Natur.* Prof. Heldreich, of Athens, Greece, states that on removing the mass of slag, accumulated in working the Laurium silver mines, 1,500 years ago, a quantity of a species of *Glaucium* or horn poppy appeared, which is thought to be a new species and has been called *G. serpieri.*

We believe that later examinations have thrown some doubts as to this poppy being sufficiently distinct to justify making a new species of it, and until that is settled it must take its place with the cases of spontaneous appearance of well-known species in new localities.

The *Popular Science Monthly* adds, "the fact that the green sand marl of New Jersey, sown upon lands almost sterile brings in white clover *(Trifolium repens)* where it was not known before. This is true, but if it has any relation to the vitality of seeds it must mean that the seeds were in the marl when spread, which we think would hardly be maintained by any one familiar with the substance. We have known heaps of it exposed several seasons, and believe it unusual for

anything whatever to grow on it spontaneously until it is mixed with soil or altered in texture by long exposure. The white clover is a common plant, perfecting its seed often unobserved, as it is very low and trailing, and it spreads rapidly when assisted by its favorite manures,—often merely by a coat of fine sand, in which other plants liable to choke it out do not readily flourish. In order that the appearance of plants, new to any given locality should be a proof that the seeds from which they spring are very old, we regard it essential that the presence of the seeds in the soil referred to should be proved, before it is exposed to the possibility of receiving them from recent sources. Mr. Meehan, the well-known editor of the *Gardener's Monthly*, has examined the soil of a street newly graded near his home, and finds the first six inches of surface soil usually contains abundance of seeds, the next six inches fragments of roots, below that little or nothing of vegetable origin. It is true that moisture-seeking roots run several feet deep, but the quantity of these is small compared with those more superficial. We have repeated Mr. Meehan's experiments on soil from various places near Washington with similar results. The examination is not difficult, as it merely requires that a portion of the given soil be thoroughly stirred up with three or four times as much water, and allowed to settle, when all vegetable matter will be found floating on top or resting on the mud. Tested in this way we doubt if living seeds, a century old, could be proved to exist in any of the earth's strata, at any rate the impression made by our examination of the subject is, that no proposition so generally believed as that of the extended duration of vitality in seeds rests upon so little proof.

Most of the alleged facts, often quoted in periodicals or newspaper literature, are either modifications of old statements, or prove based on entirely insufficient evidence when examined.

While writing this article we have had the opportunity of examining a considerable collection of seeds made by Dr. Edward Palmer, taken from Indian graves in Utah. These seeds were placed in earthern vessels in the burying places and are no doubt of great antiquity. They were chiefly of four species, one belonging to the *Compositæ* and three to the *Chenopodiaceæ*, * and appeared similar to seeds now used for food by the Indians of that region. There was no evidence of

* See *American Naturalist*, May 1876, for instance of the occurrence of seeds of *Salvia Columbaria* in these graves.

exposure to the action of fire, * or of any agent likely to injure their vitality, and to the eye they looked almost as if fresh, the shape and appearance being perfectly preserved. But the least pressure showed the albumen and embryo were quite gone, leaving nothing but the in tegument or testa, and a trace of dust, so that there was no possibility of their germination.

Perhaps we may summarize our present knowledge on this subject as follows. It is established by direct experiment that under ordinary conditions of preservation most seeds lose their vitality in three years or less, in some kinds vitality has been retained for 43 years, the *Leguminosæ* being the longest lived. There are two instances which appear to be well authenticated of the growth of seeds taken from tombs which were several hundred years old.

The theory of the preservation of vitality in seeds depends on whether we consider the seed merely as a definite chemical compound in which it is possible to suspend all molecular change, or whether we believe it a necessary condition of the continuance of its vitality that the processes which are to result in germination must continually go on with a rapidity determined by warmth light &c.

If the latter view be accepted it is clear that the life of seeds must have a limit, and the experiments which have been tried might be considered as going far to establish its duration.

If on the other hand the first be considered a correct view it is only necessary to determine the conditions which arrest molecular change, to render its duration unlimited.

In the cases where it is alleged seeds have been preserved for centuries, they have been buried so far below the surface as to almost entirely remove them from the effect of variations in temperature or moisture, or any action of the sun's rays. This has not always been the case in experiments, and so far they are not conclusive. But the extreme difficulty of preserving absolute uniformity in the surrounding conditions seems to us an obvious reason why the life of seeds is not prolonged.

WM. H. SEAMAN.

* These Indians are said to have practiced cremation. Perhaps these seeds were placed by the ashes of the corpse.

## On the Habits of Steganopus Wilsoni.

The Wilson's *Phalarope* is one of the handsomest and finest of all our waders, quiet and modest in its habits, graceful in its carriage, elegantly neat in its plumage, it wins at once a favored place in the heart of the naturalist.

There is also much in its mode of living so different from most waders that a careful study of its habits is quite sure to reward the observer with a considerable degree of satisfaction.

A very interesting feature in the habits of this bird is that the male attends to the duties of incubation almost entirely alone, while his much richer dressed mate idly gossips and gambols with her friends on the shore. The ordinary provision of nature in dressing the female bird in a more sober garb than the male is in this instance reversed, not only is the female much more brilliant in plumage, but also considerably larger. Another point where the superiority of the female of this species is apparent, is that unlike most birds, the female makes the advances to the male during the pairing season. It is quite usual to see two females pursuing one male, instead of two males one female, as is ordinarily the case with others.

Of the large numbers of these birds which I have examined in their breeding season the male had invariably the naked and wrinkled belly, characteristic of incubating birds, while the female did not show anything of the kind; neither does she evince the distress and concern of the male when the eggs or young birds are approached, in fact I have taken the eggs of this bird when I could have caught the male with my hand, while examining the nest and eggs he would often drop as if shot, within two feet of me, and feign the most distressing pains; the female did not even approach within gun shot, and this only once during the half hour I remained near the nest.

The nest is often built in a tussock of grass much in the same manner as the *Agelæcus phoeniceus*, though of course the bird makes no use of the blades of grass to support the nest, which is merely a flat, loosely, constructed affair. They seldom breed in the immediate vicinity of lakes, preferring the adjoining grassy marshes. I have taken a nest, four miles from the nearest sheet of water, in a little slough on a high prairie.

They are very quiet and still birds, the only note I ever heard them

make being a weak nasal quack, uttered six or seven times in quick succession, this is particularily the case with the male when you approach the vicinity of the nest.

The young are conducted to the shore soon after they are hatched, and if suddenly surprised take to the water and swim and dive with the greatest ease.

The *Phalaropes* live on the best of terms with their neighbors, and no birds evince more heartfelt sympathy for the misfortune of a fellow wader than these do.

They congregate in considerable flocks in the latter part of July, when the young are fully fledged. They seldom swim as *P. hyperboreus* does, though I have often seen them associated with these birds some distance from shore, but never more than two, or three under such circumstances, and these were birds (I conjecture) which had become detached from the main flock of its own species and sought the society of its near relative.

A. L. Kumlien.

*Univ. of Wis., Madison, Wisconsin.*

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## Potomac-Side Naturalists' Club.

*June 5th, 1876, (206th meeting.)*

Mr. Charles B. Beckham was elected a member.

Mr. Ward exhibited specimens of *Myrica cerifera*, *Pyrola chlorantha*, and other plants.

The Secretary exhibited specimens of insects, one found destroying the foliage of the elm, pronounced by Mr. Dodge to be *Galeruca calmariensis*, the elm beetle, the other attacking the petals of roses.

The Secretary then read a paper upon a collection of plants made by Dr. Coues along the line of the Northern Boundary Survey, during the summers of 1873–74, supplemented by a catalogue of plants collected by the British Boundary Commission.

The whole number of species is 686, which number would be largely increased had collections been made during the months of May and June.

Of these, 390 are common at the East, 80 are distinctly Western, and 215 are confined to the region of the plains and the Rocky

Mountains. *Compositæ* and *Leguminosæ* are well represented, also *Carices* and *Gramineæ*.

Attention was called to the importance of noting those plants which occurred in masses, so as to give character to the landscape, during inflorescence. This catalogue will be published with the report of the Northern Boundary Survey.

Prof. Seaman called attention to the interesting and extensive display in the department of Botany, especially the different woods, at the Centennial.

*June 26th, (207th meeting.)*

Mr. Seaman in the chair. Mr. Ward was chosen Secretary, *pro tem.*

Dr. Vasey from the Committee on the Catalogue of plants of the District, reported that it was nearly completed and now being published.

The committee appointed to report upon the Geology of the District reported, through its chairman, Mr. Seaman, that while a final report could not now be made the subject had received consideration.

Mr. Dodge then read a paper on the "Comparative Scarcity of Insects in the Rocky Mountains." Remarks were made on the subject of the paper.

Adjourned, to meet at the call of the Secretary at the usual time for the first fall meeting.

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## FLORA COLUMBIANA.

*Continued from page 87, Vol. 1.*

A CATALOGUE of the plants growing without cultivation in the District of Columbia:

### CUCURBITACEÆ.

SICYOS.

264. angulatus, L.

### UMBELLIFERÆ.

HYDROCOTYLE.

265. Americana, L.
266. ranunculoides, L.

SANICULA.

267. Canadensis, L.
268. Marilandica, L.

ERYNGIUM.

269. Virginianum, Lam.

DAUCUS.

270. *Carota*, L.

HERACLEUM.

271. lanatum, Mx. High Island.

PASTINACA.

272. *sativa*, L.

ARCHEMORA.

273. rigida, D. C. Rock Creek.

ARCHANGELICA.

274. hirsuta, Torr. & Gray.

THASPIUM.

275. barbinode, Nutt.
276. aureum, Nutt.
277. trifoliatum, Gray.

ZIZIA.

278. integerrima, D. C.

CICUTA.

279. maculata, L.

SIUM.

280. lineare, Michx.

CRYPTOTÆNIA.

281. Canadensis, D. C.

CHÆROPHYLLUM.

282. procumbens, Lam.

OSMORRHIZA.

283. longistylis, D. C.
284. brevistylis, D. C.

ERIGENIA.

285 bulbosa, Nutt.

## ARALIACEÆ.

ARALIA.

286. spinosa, L.
287. racemosa, L.
288. nudicaulis, L.
289. trifolia, Gray.

## CORNACEÆ.

CORNUS.

290. florida, L.
291. sericea, L.
292. stolonifera, Michx.
293. alternifolia, L.

NYSSA.

294. multiflora, Wang.

## CAPRIFOLIACEÆ.

SYMPHORICARPUS.

295. racemosus, Michx.
296. vulgaris, Michx.

LONICERA.

297. sempervirens, Ait.
298. Japonica.

TRIOSTEUM.

299. perfoliatum, L.

SAMBUCUS.

300. Canadensis, L.

VIBURNUM.

301. nudum, L.
302. prunifolium, L.
303. Lentago, L.
304. dentatum, L.
305. acerifolium, L.

## RUBIACEÆ.

GALIUM.

306. Aparine, L.
307. concinnum, Torr & Gray.
308. trifidum, L.
309. pilosum, Ait.
310. circæzans, Michx.

DIODIA.

311. teres, Walt.

CEPHALANTHUS.

312. occidentalis, L.

MITCHELLA.

313. repens, L.

HOUSTONIA.

314. purpurea, Gray, var. longifolia Gray.
315. cærulea, Gray.

## VALERIANACEÆ.

FEDIA.

316. radiata, Michx. Insane Asylum.

## DISPACEÆ.

DISPACUS.

317. *sylvestris*, Mill.

## COMPOSITÆ.

VERONIA.

318. Noveboracensis, Willd.
319. fasciculata, Michx.

## ELEPHANTOPUS.

320. Carolinianus, Willd.
321. tomentosus, L.

## COMPOSITÆ.

VERONIA.

322. Noveboracensis, Willd.
323. fasciculata, Mich.

ELEPHANTOPUS.

324. Carolinianus, Willd.
325. tomentosus, L.

LIATRIS.

326. graminifolia, Willd. var dubia.

KUHNIA.

327. eupatorioides, L.

EUPATORIUM.

328. purpureum, L.
329. hyssopifolium, L.
330. teucrifolium, Willd.
331. rotundifolium, L.
332. sessilifolium, Torr.
333. perfoliatum, L.
334. ageratoides, L.
335. aromaticum, L.

MIKANIA.

336. scandens, L.

CONOCLINIUM.

337. cœlestinum, D. C.

SERICOCARPUS.

338. solidagineus, Nees.
339. conyzoides, Nees.

ASTER.

340. corymbosus, Ait.
341. macrophyllus, L.
342. concolor, L.
343. patens, Ait.
344. lævis, L.
345. azureus, Lind.
346. undulatus, L.
347. cordifolius, L.
348. ericoides, L.
349. multiflorus, Ait.
350. Tradescanti, L.
351. miser, L., Ait.
352. simplex, Willd.
353. puniceus, L. var. vimineus, Torr & Gray.
354. Novæ-Angliæ, L.

ERIGERON.

355. Canadense, L.
356. bellidifolium, Muhl.
357. Philadelphicum, L.
358. annum, Pers.
359. strigosum, Muhl

DIPLOPAPPUS.

360. linariifolius, Hook.
361. umbellatus, Torr & Gray.
362. amygdalinus, Torr & Gray.

SOLIDAGO.

363. bicolor, L.
364. latifolia, L.
365. cæsia, L.
366. virgata, Michx.
367. puberula, Nutt.
368. arguta, Ait,
369. altissima, L.
370. ulmifolia, Muhl.
371. odora, Ait.
372. nemoralis, Ait.
373. Canadensis, L.
374. serotina, Ait.
375. gigantea, Ait.
376. lanceolata, L.

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## GLEANINGS IN FOREIGN FIELDS.

**Plant Fertilisation.**—Mr. M. S. Evans, writing from Natal, South Africa, gives, in a recent number of *Nature*, an account of plant fertilisation, through the agency of ants, that may prove interesting to entomologists as well as to botanists. He says: Some short time since I observed a rather curious case of plant fertilisation through the medium of insects, and I take the liberty of forwarding you the particulars in the hope that you can find a corner for them in your valuable journal.

Growing rather abundantly, just on the coast here, is a small shrub belonging, I believe, to the sub-order *Coffeæ*, having numerous small greenish flowers, the interior of the corolla tube filled with silky white hairs, and the style bent in a peculiar manner, so as to bring it to one

side of the tube. I observed the anthers dehisce before the flower buds open, covering the stigmatic surface (which is simply a thickened continuation of the style) with pollen. I noticed that all the individuals of this species of shrub were visited by a kind of ant in large numbers, and as soon as a flower opened they began pulling out the hairs, lining the corolla tube, and often biting off the stamens also, in order to clear a way down to the nectar contained at the bottom of the tube. In doing so they often support themselves by clinging to the pollen-covered style with their posterior legs. The bend in the style which brings it to the side of the corolla tube prevents it from being an obstruction while they are obtaining the nectar, although, so eager are they to get it even to the last drop, that in a few old flowers I noticed even the style removed. The pollen keeps dry for a considerable time, so that cross-fertilisation is effected by the removal of pollen from the *stigma* of one flower to that of another.

We have here, therefore, several adaptations of structure and habit to ensure that end. The dehiscence of the anthers while in the bud removes the pollen from a part of the flower where it would in all probability be wasted (when the ants bite off the anthers) to another part, where by a peculiarity in its structure, viz., the bend in the style, it is protected and transferred to other flowers. The hairs in the corolla-tube, by rendering the approach to the nectar difficult, and thus making the use of the style as a support needful, also increase the chances of cross-fertilisation.

**Dogs Eating Wasps.**—On several occasions this summer, I watched with much interest the excitement caused by wasps to a black and tan terrier. The moment one appeaaed on the window, he commenced barking furiously, trying with his paws to knock it down, which, if on the lower panes, he generally succeeded in doing; but the curious part was, that as soon as the insect was on the ground, the dog began turning it over and over with his tongue for about ten minutes, all the time making a peculiar hissing noise, dragging it sometimes half across the room, and eventually eating it with the greatest relish, but apparently unconscious of the danger of the sting if eaten immediately after death; but if he could pounce on one in the act of flying, he swallowed it at once with impunity, evidently regarding it as a *bonne-bouche*, from the frantic manner in which he pursued any that came in his way.—S. M. P. in *Science Gossip*.

## EDITORIAL PENCILINGS.

The American Postal Micro-Cabinet Club.—This club has now entered upon the second year of its existence. Its object is the circulation, study, and discussion of microscopic objects, and its members may be any reliable persons accustomed to work with the microscope, and able to contribute good objects for examination. It operates by dividing its members into circuits of six each, the first of whom receives a box that will hold six slides, in which he places a slide, preferably one illustrating some new method of preparation, or result of study. The box is sent to the person next named on the list, who examines the first and adds another slide, and so on, till the round of the circuit is complete, when the box is transferred to a new circuit, affording each member an opportunity to examine all slides contributed.

According to the published lists, the club now numbers twenty circuits, and the localities represented would seem to indicate that the interest felt in this department of scientific work was very local in character, no less than three circuits being located at Cleveland, Ohio, two at San Francisco, California, two at Boston and surburbs, one at New York City, and one mostly from its surburbs, making half the entire number. On the list we find the names of Rev. E. C. Bolles of Salem, Prof. C. E. Bessey of Iowa, Prof. Bicknell of Cambridge, Dr. Edwards of Newark, Prof. Biscoe of Ohio, and others.

An analysis of the subjects of 36 slides contributed consecutively, gives ten of diatoms, eight of human histology, nine of general zoology, six botanical, two chemical, and one micro-photograph. With the present number of members, more than a year must elapse before a contribution returns for replacement, while the expense in money is limited to one dollar per annum, and has not yet exceeded fifty cents. We think the above data are sufficient to exhibit clearly the operations of the club, with the success of which we feel gratified. Every one can determine for himself its relative advantages. No doubt the larger share accrues to beginners and amateurs, but it is from this class that our eminent workers are recruited, and there are a sufficient number of the latter included to insure a considerable amount of valuable matter.

In Europe such clubs have been in vogue for several years, and we

have always understood they were popular. The Officers at present are as follows, the Secretary having charge of all correspondence: President, Prof. John Pierce, Providence, R. I., Secretary, Rev. A. B. Hervey, Troy, N. Y.; Managers, R. H. Ward, M. D., also of Troy, and C. M. Vorce, Cleveland, Ohio.—W. H. S.

Correction.—The list of birds of the District, published in No. 11 of our last volume, and credited to Mr. Shufeldt, should have been credited to Mr. Jouy, who will furnish us for publication, at an early day, a complete list of all the birds of the District.

## OUR BOOK SHELF.

Report of the Commissioners of Maryland to His Excellency, the Governor. Jan. 1st, 1876. Annapolis, Md. Printed at Advertiser office. [8 vo, pp. 208. Illus. xv.]

A new class of public documents have come into existence within a few years, and are calculated to spread information of a very useful character, and result in benefiting the country and communities in an economical direction. We refer to the reports of commissioners of fisheries, both of the United States and the separate States. A recent one, which in its character is of considerable interest to Washington and surrounding regions, is the report of the Commissioners of Maryland, Mr T. B. Ferguson of Baltimore, and Mr. P. W. Downes, published by the State in 1876. This report, as compared with others from different States, is a very commendable one. Amongst other things the plan of a model hatching house is described, which is in actual operation at Druid Hill Park, Baltimore. In this building all the later improvements produced in fish culture are on exhibition and in actual operation. The eggs of several species of fish have their place in the different forms of apparatus and the young fish are cared for in nurseries and ponds.

This establishment, too, has somewhat of an educational character, as the attendants are directed to impart to visitors any instruction they may desire. The novelties of artificial propagation, the ingenuity of different apparatus, and the presence of numerous species of living fishes, both embryo and mature fish, combine to make this establishment a very interesting one, both to the visitor and the student.

Amongst other matters of original enterprise the subject of terrapin culture is discussed.

The question of fish ways is referred to in a practical manner with relation to the passage of migratory fish in the Potomac River above

the Falls of the Potomac. A very accurate map of the elevation and the topography of the falls has been made by Major Randolph, engineer of the Baltimore and Ohio Railroad.

The most interesting chapter in the book, for the naturalist, is the list of the fishes of Maryland, prepared by P. R. Uhler and Otto Lugger, of the Maryland Academy of Sciences.

The list of fishes contains the names of one hundred and fifty-eight species, with a short description of each. These are classified in their respective families, adopting the arrangement of Prof. Theodore Gill, of the Smithsonian Institution. The character of the list is expressed in the passage from the introductory remarks, where it is explained that the "list embraces every species of fish certainly known by one or other member of our section of Ichthyology to have been caught in Maryland waters, excepting a few only of which the names have not been ascertained."

The material of the list and descriptions is largely in the Maryland Academy of Sciences, while not a few species are refered to as in the possession of the Smithsonian Institution. This portion of the work will be of great value to our local collectors.

A compendium of the local fishery laws is also given.

QUARTERLY BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB, CAMBRIDGE, MASS.

The first number of this new periodical, (Vol. I, No. 1, April, 1876,) is at hand. It is a neat octavo pamphlet of 28 pages, embellished by a beautiful colored steel plate of a new warbler, *Helminthophaga leucobronchialis*, Brewster. The text comprises nine articles, all of which are of interest and importance.

The want of a magazine devoted exclusively to ornithology has long been felt in this country, and the "Nuttall Ornithological Club" will probably have the credit of being the first to supply this desideratum. We feel assured of the success of the undertaking since the editorship has been assigned to Mr. J. A. Allen, of the Museum of Comparative Zoology, of Cambridge, Mass.—a sufficient guarantee as to the nature of the contents, while Professor Baird, Mr. Lawrence, Dr. Coues, Mr. Ridgway and other leading ornithologists are to be among its regular contributors. We sincerly hope that ornithologists throughout the country may take a lively interest in this commendable undertaking, and render substantial aid by sending in their subscriptions to H. B. Bailey, No. 13 Exchange Place, Boston, Mass. The price is $1 per annum.

CONTRIBUTIONS TO THE FLORA OF IOWA. PREPARED BY J. C. ARTHUR, pp. 43. [Charles City, March, 1876.]

A very full catalogue of the flowering plants of Iowa embracing 979 species, These are presented in double columns; in the first is given

the botanical names and authorities, and in the second the common names. This plan adds to the interest for the general reader, although in many instances these common names are mere translations of the scientific ones. The catalogue is remarkably free from the typographical errors so frequently found in works of this kind. There is added an appendix giving botanical descriptions of such plants as are not found in Gray's Manual. So full and clear a catalogue must be an invaluable aid in the hands of investigators within the State, as well as a handsome and satisfactory exhibit of its vegetable productions to non-residents.

A Manual of the Vertebrates of the Northern United States. By David Starr Jordan, M. S., M. D. In one volume, 12mo. pp. 342. [Chicago, 1876. Jansen, McClurg & Co.]

As this is an age of labor-saving appliances it is not strange that study should be made easier by improved methods. In the work before us, by the admirable plan of artificial keys used in some of the branches of Natural Science, the labor of classifying and identifying is greatly reduced.

The work comprises descriptions of 817 species, representing 116 families of the mammals, birds, reptiles and fishes of that portion of the United States east of the Mississippi, and north of North Carolina and Tennessee. In addition to the descriptions of species there is a full Glossary of technical terms, and a "Nomenclator," or account of the derivations of the scientific names, an interesting feature of the work. Like Gray's Manual of Botany, it is a library in itself, and to beginners must prove an invaluable aid, while the cheapness of the work places it within reach of all.

Proceedings of the Poughkeepsie Society of Natural Science. 8vo. pp. 32. Plates iv. Numbers 1 & 2.

This society was organized in September 1874, and incorporated under the general act January 2d, 1875. The society meets on Monday evening of every other week in the room containing the library and museum. Discussions are held and papers read upon subjects embraced under the general title of Natural Science. Portions of the papers so read are presented, and are as follows: White Mildews or Blights, by W. R. Gerard; Insects as articles of Food; and the Theory of the Thermoscope, by Prof. Leroy C. Cooley.

Notes on the Yucca Borer. By Prof. C. V. Riley. pp. 20. Illustrated.—From the Transactions of the Academy of Science of St. Louis, Jan. 1876. A biological, bibliographical and descriptive history of the yucca borer, *Megathymus yucca*, with an appendix giving descriptions of allied species likely to be found where the yucca borer occurs.

## Publisher's Department.

Our First Number of the new Volume should have appeared on the *first* day of the month, but a mistake in the engraving of our title-page, requiring the work to be re-engraved, has caused the delay. We trust, in future, to be "on time."

Flora Columbiana.—This Catalogue of the plants growing wild in the District of Columbia, now appearing in *Field and Forest*, and of which an extended notice was given in our last number, when completed, will be published in pamphlet form.

Members of the Potomac-side Naturalists' Club, and others desiring copies, are invited to send in their subscriptions early, stating the number of copies wanted, as only a limited edition will be published.

Price, 15 cents per copy. Members of the Club ordering eight or more copies can have them furnished eight for $1. Address Columbia Press, or Editor *F. and F.*, P. O. Box 273.

Treasure Trove.—A Magazine of Entertaining and Select Literature published at 137 Eighth St., New York City, by R. B. Caverly. The initial number of Volume One is before us. Mrs. Wood, author of "East Lynne," gives the first chapters of a new serial story in this number, which also contains the "Secret of the Stair," "Roserl," "Entrapped," "Oldboy's Nearest Relative." and other entertaining stories and select reading matter. $3. per year, single cepies 30 cents.

Centennial Music.—F. W. Helmick, Music Publisher, 278 W. 6th Street, Cincinnati, sends us "That Banner a Hundred Years Old." Words by B. Devere, music by Eddie Fox; title-page embellished with a patriotic design in colors. Price 50 cents. A number of card photographs of the principal Centennial Buildings are presented to each purchaser of the song.

Mind, Matter, Money, Beauty.—Webster's Quarto Dictionary, as now published, has cost more intellectual labor, more money in its "getting up," and contains more matter, and a larger number of beautiful engravings, (3000 or more, with four pages of colored plates,) than any single volume ever before published for popular use in this or any other country. Bell & Daldy, the publishers of Bohn's libraries, are the London publishers of this magnificent volume.

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# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.— AUGUST 1876.—NO. 2.

## Collection of Economic Entomology in the Government Exhibit at the Centennial.

This collection, filling 24 cases or drawers, and numbering nearly 1,000 specimens, comprises the most common forms of the injurious and beneficial insects of the United States. The collection is by no means complete, but will serve to illustrate the plan of arrangement, which is especially adapted to Cabinets of Agricultural Colleges, State Museums and similar Institutions.

The cases measure 16 x 21 inches and 2½ inches deep, outside measurement. They are made of whitewood or poplar, ⅜ inches thick, dovetailed at the corners, with the bottom rabbetted in; the sides are made of two pieces, forming the box proper, about 1½ inches high, and a cover one inch, which is grooved on the inner surface near the top, (about ⅛ inch,) for the reception of a plate of glass, fastened in, when the box is made, with putty. The cover and box, where they fit together, are tongued and grooved, and are held together by brass hooks and eyes on either side.

The plan of arrangement is to show, in one group, the insect foes of a certain food plant, in the four stages of egg, larva, pupa and insect, accompanied by specimens exhibiting the mode of injury, and classified according to the portion of the plant injured, as root, stalk, foliage or fruit, to be followed by the beneficial insects known to destroy a particular species; in short, the idea of such a collection is to be able to show at a glance the entire history of any insect, or group of insects affecting any of our food crops.

It has long been a favorite idea of ours to arrange such a collection, as it has always seemed that it would prove doubly interesting to the masses of the people who know little, and care less of the study of entomology. That there is little interest felt in the subject by the masses is conceded by all, and it is only since the subject of economic entomology has been agitated and kept before the people by our enterprising State and Official entomologists that it has begun to gain ground. Dry descriptions of shape, form and color, and long scientific terms are not supposed to prove very attractive to persons that have no particular desire to learn about the insects of our country, but when we go into the field, and trace these same insects through their wonderful transformations, when we can *show* them in their varied changes, and at the same time exhibit their fairy-like habitations, or curious specimens of their architecture, from a dull, uninteresting theme, it at once becomes one of absorbing interest.

The question may be asked, cannot this be done as well in a scientifically arranged collection? We reply it *should* be done in every collection, but to the farmer or the fruit-grower, or even the student, before he has penetrated deeply into the mysteries of insect life, the subject comes home to him with more force, making more lasting impression if the destroyer and the destroyed are associated together.

In visiting such a collection we will suppose the farmer, or fruit-grower, or student, should desire to see the Colorado potato beetle. The case devoted to the potato is opened and he sees a dried specimen of potato leaf, fastened upon a card label, covered with little patches of the golden yellow eggs of this insect; next he observes the larvæ, of various sizes, either in alcohol, or prepared by "blowing;" then the pupa is shown to him; and to complete the story, the male and female of the perfect insect are displayed, some in a state of rest, some with wings expanded, and others in various positions to show marked portions of the body. Then, if it were possible, a denuded potato stalk should be shown to exhibit the peculiar "thoroughness" with which they do their work, and lastly the army of parasites that help to check their ravages, with samples of artificial contrivances in use by man to accomplish the same end, would "bring up the rear" and complete the history. Each card would be labelled with the scientific and common names of the specimen, or any information that is necessary to complete the history of the insects. After examining the Col-

orado species, he will be interested to know what other species are destructive to the potato, and in like manner, he will learn the history of *Lema trilineata*, *Baridius trinotatus*, *Coptocycla clavata*, and other species. When an insect is a general feeder it may be shown in the cases devoted to *two* or *three* only of the plants it is most destructive to, though on the card label, (which should be at least an inch by two inches in size,) the other plants it feeds upon should be named, or if found on vegetation generally, the word "omnivorous" explains the fact.

In the present collection the first stages of many insects could not be shown, and in some cases the insects themselves were wanting, and so were supplied by water color drawings executed by Mr. F. G. Sanborn, to whom was given the work of arrangement.

The design of arrangement has not been as fully carried out as could be desired, chiefly for want of specimens, particularly those illustrating the early stages of the insects. The present collection though, is a *commencement*, forming the nucleus of what may, some day, be the full realization of a complete cabinet of Economic Entomology. We think the plan of arrangement is new, and may become useful in an educational point of view, though it should be accompanied, in colleges and institutions, by a working collection, arranged according to families, tribes, genera and species, in order that the student may familiarize himself with classification while studying the habits of insects in relation to our farm products. The groups exhibited are as follows:

*Case A.* Thirty-nine species of the insects destroying, either directly or indirectly, the root, stalk, foliage or fruit, (in the field and in the granary,) of Indian corn or maize.

*Case B.* Insects destroying, or proving injurious to wheat, rye, oats, and other cereal crops. Twenty-two species.

*Case C.* Insects destroying or injuring cotton. Thirty-three species.

*Case D.* Insects destroying or injuring the potato. *(Solanum tuberosum.)* Sixteen species.

*Case E.* Insects proving destructive to *Cucurbitaceous* plants, as cucumber, squash, melons, &c. Seven species. Insects destroying milkweed, &c. Twenty-five species.

*Case F.* Insects destroying cabbage, turnip, &c., or the plants of the kitchen garden. Twenty-eight species.

*Case G.* Insects injuring the grape vine, or its fruit. Thirty-one species.

*Case H.* Insects injurious to fruit, fruit-trees, &c. Twenty-six species.

*Case I.* Insects destroying, or proving injurious to the apple. Twenty-nine species.

*Case J.* Insects that annoy the housewife, commonly called "household pests." Forty-one species.

*Case K.* Insects aiding in the destruction of forest-trees. Thirty-seven species.

*Case L.* Insects destroying the pine. Thirty-nine species.

*Case M.* Insects destroying shade-trees. Twenty species.

*Case N.* Insects injurious to man, by injuring or destroying the wood of various plants. Twenty-eight species.

*Case O.* Gall-insects on the oak. Twenty-seven species.

*Case P.* Gall-insects of other plants. Forty-four species.

*Case Q.* Insects destroying the eggs or young of fishes. Fourteen species. Insects injurious or annoying to bees, to cattle, and to mankind. Thirty species.

*Case R.* Objects of insect architecture, with the species employed in producing them. Forty-eight specimens.

*Cases S* and *T.* In these two cases are shown seventy species of the most common forms of our beneficial insects. [These should have been placed after the insects they destroy, in the general collection, but it was decided to group them together for the present.]

*Case U.* Thirty-one species of insects beneficial as scavengers, by removing filth and carrion.

*Case V* and *W.* These two cases are devoted to silk-producing insects, and contain about thirty specimens illustrating this industry.

*Case X.* In this case are gathered together a few "insecticides," so-called, and traps or devices for destroying insects.

I have thus endeavored, briefly, to give an outline of the plan of arrangement of this collection, mentioning merely the groups illustrated as a catalogue of the insects themselves would take more space than could be spared for the purpose.

CHAS. R. DODGE.

## Shell Heaps in Maryland.

It was many years ago and long before the first half of the present century had expired that I first saw one of these Indian accumulations of their housekeeping refuse. At that time the attention of scientists had not been especially directed to them as ethnological studies. They had been regarded by the farmer as convenient piles of material to be used as fertilizers, and in one of the Geological reports of Maryland, published about that time, Dr. Ducatel gave the arguments, *pro* and *con*, with a view of settling the question as to whether the heaps were old oyster shell banks, left high and dry on the land by a subsidence of the waters of Chesapeake Bay, or refuse shells thrown into a common heap by an encampment of Indians who frequented a particular place during the oyster season. The invariable separation of the two valves, the occurrence of broken pottery of cooking vessels, the bones of fish and quadrupeds used for food, with implements of stone of recognized aboriginal manufacture, taken in connection with the location of these accumulations, in a quiet creek convenient to the camp of the savage, would seem to decide them to be of ethnological interest entirely.

As the shores of the Chesapeake and the Potomac once swarmed with a wild population, who derived their subsistence mostly from the free productions of nature, it is easy to comprehend how these heaps are so numerous, as to be found on the bay, rivers and creeks wherever you may chance to go ashore.

During a summer vacation, being on a visit to an Eastern Shore County of Maryland, near one of the many small streams between Sassafras and Chester Rivers, and for the particular occasion, attending a reunion common among the neighbors after harvest, known as a fishing frolic, it was proposed, after suitable attention had been given to the business of the day, to pay a visit to one of these heaps, lying a little lower down the creek where the owner of the land was engaged in burning the shells into lime to be spread on his farm. Having arrived at the spot, a long low mound of shells and rubbish overgrown with bushes and weeds, came into view. A walnut tree of about fifteen inches in diameter, was growing out of the top of the ridge, as an evidence of the antiquity of the deposit. A cross section of it showed a base of twelve or fifteen feet with a vertical height of five or six. It

was arranged in layers, as if the tribe at times absented itself for a year or more, so that a stratum of leaves, weeds and rubbish gathered over the pile before they returned and added fresh layers of shells. It was a loose, easily worked mass and a negro help was employed in hauling the shells that had been raked clear of other materials to a conical mound, which was being built up of alternate layers of brush wood and shells and in due time to be fixed and converted into lime. A small mound of slacked lime, close by, showed where a burning had been completed and was ready for use. The owner of the works was a virtuoso in his way, and had laid aside such unusual objects as he had met with in digging down his oyster piles, as scraps of Indian pottery, some bones which had once been part of fish or wild fowl, some flinty arrow heads, which he irreverently called Indian stones, but, chief of all, he had a fine pair of buck's antlers in excellent preservation. These he had nailed fast to a large tree, out of reach of predatory hands, and regarded them as his sign of business, his token, his coat of arms, or his trade mark.. The lands in the vicinity were exceedingly impoverished and needed all the restoratives that could be obtained, and it was only when the as yet untried business of peach growing was started that they began to appreciate in value.

A short time afterwards a similar but smaller heap was found a few miles east of the City of Baltimore, on the Canton County grounds. The composition of it was the same, but with an unusual amount of broken pottery. The plough had gone through it long since, levelled it to an even surface and a dwelling is erected over the spot. It is thus that, in one way or another, these traces of Indian residence, on our shores, are fast disappearing.

The oyster, in many places on the Chesapeake Bay, can yet be obtained at low tide by wading out a few yards from the shore, and it is supposed that the Indians obtained their supplies in this manner, or possibly by diving when the water was deeper, dredging or tonging being devices for taking the bivalves unknown to them. The oyster was opened in a peculiar manner, a deep nick or notch being made *near the hinge* and some wedge shaped stone implement inserted to cut the adductor muscle. This mark is left on all the shells opened by Indians, and constitutes another argument, if any were wanting, to prove these heaps to be the kitchen refuse of the savage.

E. Foreman.

## Notes on the Catalpa.

*Catalpa bignonioides.*

It is only within the last decade that the natural occurrence of this tree anywhere but in the extreme Southern States has been established beyond dispute. Many years ago, Nuttall wrote: "Rarely to be met with—appears to have been introduced by the Aborigines. In most of the habitats of this tree, given by Michaux, which I have visited, if existing at all, it had evidently been introduced. *I am informed, however, by Governor Harrison of the indubitable existence of this tree, in very considerable quantities, in the forests of the Wabash, Illinois Territory, where its wood is even split for rails. Still, even here, it is extremely local, and I have never once met with it, either on the banks of the Ohio, the Mississippi or Missouri rivers, which I have ascended and descended for thousands of miles.*" * Commenting on the above, Mr. Fred. Brendel, in his account of the trees and shrubs of Illinois, † asks: "Can anybody living in southeast Illinois render account concerning the above considerable quantity of Catalpas split for rails?" Even the latest edition of Gray's Botany (1871,) questions its Southern Illinois habitat. Never having suspected until noticing the remarks above quoted, that the species had possibly become naturalized after artificial introduction, have carefully investigated the case, and find most convincing testimony that it is as truly indigenous to the forest of the lower Wabash and White River bottoms as any tree with which it is associated. The principal evidence is as follows:

(1.) It is not more local in its distribution than many other native trees, the Coffee Nut and Buckeye being both scarcer and more local. As is the case with nearly every species, however, it is abundant in some places, scattered in other districts and wanting elsewhere.

(2.) Its abundance, perfection of its flowering and fruiting, and the size to which it attains, attest that it here reaches full perfection, which would not be the case were the district so far removed from its natural habitat.

* Italics our own.

† The Trees and Shrubs of Illinois. By Fred. Brendel. Transactions of the Illinois State Agricultural Society, 1858–9, pp. 599, 600.

(3.) The theory of artificial introduction is greatly weakened by the fact that the earliest settlers found it abundant in the midst of the forest; and should the circumstance that it is most *often seen* growing in open places which are apparently old settlements or clearings, then there is as good reason for assigning the wild cherry and persimmon to the catagory of introduced trees. The Aborigines would scarcely have cultivated it for ornament, and no other quality is likely to have recommended it to their attention. Even the enlightened and cultured people, who have supplanted the rude red man, prize it far less for ornament than for economical purposes, for, though its great beauty is well appreciated, this tree becomes infested with a repulsive caterpillar which completely strips the foliage, and, falling to the ground crawls over the grass, as well as the neighboring fences and buildings. The timber, however, is greatly esteemed for its durability, when exposed to constant moisture, and on this account is constantly cut to supply the demand for fence posts and railroad ties. In consequence of this popularity, the larger trees are growing every year less plentiful, while in some localities the only evidence of its former existence are the growing sprouts from old stumps, bearing the huge, heart-shaped, light green leaves, so characteristic in their size and peculiar shade of color. The most common name of this tree is *Catalpha* or *Patalpha*, (an evident corruption of the proper term,) but it is occasionally, though not often, called "Indian Bean" or "Cigar Tree." Trees of the original growth are now quite rare, but may yet be found scattered sparingly through the forest, while at intervals, like other species, it is to be found greatly multiplied locally, so as to predominate over all other species of restricted areas. I remember such an instance near the town of Mt. Carmel, on the Illinois side of the Wabash, where Catalpas of considerable size formed an extensive grove, with only scattering trees of other species, the most common associates being Sweet Gums, Honey Locust and Water Oak, *(Quercus palustris,)* with a few Sour Gums, *(Nyssa.)* These trees, we believe, have now been all destroyed. The size of this tree has been like that of very many of our native trees, greatly underrated. No authority gives its maximum height at more than sixty feet; but, however true this may be of other localities, this is scarcely more than the average elevation of the larger growth in the district under consideration, where fifty to seventy feet is the ordinary variation. Trees

greatly exceeding this height, occur here and there, one having been cut in Posey County, Indiana, measuring one hundred and thirty feet, while the trunk alone produced eight seven foot post "cuts,"—being thus about sixty feet "in the clear,"—while the diameter was about four feet. In Professor Cox's Geological Report of Indiana, for the year 1873, Catalpas are mentioned, in the enumeration of the timber trees characteristic of certain counties of that State, which have the following size: At Owensville, (Gibson County,) trees of nine to twelve feet in circumference were measured. In Knox County, near Hazelton, in the White River bottoms, Catalpas of two and a half to three feet in diameter were common, while one of four and a half feet was measured. At Oakland, in the same county, another tree was four feet in diameter.

The rate of growth of this species seems to be very fast, judging from a statement made by Mr. James E. Baker, Surveyor of Knox County, in the report above cited, to the effect that a Catalpa of twenty-five inches diameter exhibited but thirty-seven annual rings of growth, "indicating an increase of size, during a third of a century, of more than six-sevenths of an inch per annum."

The appearance of this tree when bare of foliage is crooked and scraggy, but when clad with its dense canopy of large heart-shaped leaves, it is unquestionably the most luxuriant and tropical looking tree of the forest. The size and peculiarly bright, light, yellowish green color of the leaves render this tree conspicuous among all its associates, and when bedecked in its pyramidal masses of beautiful blossoms, few trees of any land far surpass it in beauty. But it presents its most striking appearance when the flowers are replaced by the long, cylindrical seed-pods, which, hanging pendant from underneath the banks of imbricated leaves, have always reminded me of little rills trickling from mossy ledges.

ROBERT RIDGWAY.

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## Notes on Forster's Tern.

*Sterna forsteri, Nutt.*

Among the few terns which are occasionally seen in the District in the late Summer and early fall months may be mentioned *Sterna fosteri*, which is now, for the first time, added to the birds of the District

of Columbia. The specimen was obtained last Summer on the Potomac, in the vicinity of Georgetown. Farther down the river, where salt water is reached, this is the most abundant species.

In spending my summer vacation, two years ago, at Piney Point, Maryland, some ninety miles from Washington, I had abundant opportunity to watch and study the movements of this beautiful bird.

Their elegant appearance, whether flying gracefully over the water in search of their food, or floating jauntily on a drift log, or darting swiftly from place to place, make them very attractive.

I started out one fine morning, on a collecting tramp, and the sun, which had risen clear and bright, gave evidence of a warm, sultry day, but the wind, shifting, scattered the clouds over the sky, and a dull, rather cool day followed. I continued my walk to the river; the receding tide had left a sand bar high and dry some twenty feet from the shore, and on this I noticed a flock of Forster's Terns, which took flight as I approached. I fired, one dropping dead amid the shrill cries of his companions.

As the water was very shallow I commenced to take off my shoes and stockings in order to wade out and secure my specimen, but to my astonishment the whole flock renewed their cries vociferously and commenced to circle around me and from me to the dead bird as if they knew that I was responsible for their companion's misfortune.

As I commenced wading, the birds seemed to ascertain my object, and they with one accord, began to fly higher and enlarge their circle, and flying faster than the rest of the flock the first six or eight separated themselves in single file, and each one while flying, with a strenuous effort, gave the dead bird a push with its feet; each individual of the flock pushed in rapid succession, and soon would have had the specimen beyond my reach if a friendly boat had not come along and rescued it and dispersed the flock.

This curious trait in this tern stands, I think, without a parallel in the history of birds. One can easily account for the maternal instinct which prompts a mother, at whatever personal risk, to protect her young; and it is well known that some birds, titmice and parrots for instance, will hover around and appear entirely unconscious of danger while their companions are being destroyed, but, for a whole flock of birds to act in perfect unison and with one impulse, which can hardly be credited to instinct, (as it is scarcely to be supposed the

affection for members of the flock would be as strong as for a mate, or for their young,) their combined efforts being exerted to remove a bird in the quickest and most effective manner, is certainly a wonderful characteristic.

Forster's Tern can be readily distinguished in all plumages, from similar species, by having the black of the tail on the inner web of the outer tail feather; all the others having the color on the outer web.

PIERRE LOUIS JOUY.

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## FLORA COLUMBIANA.

*Continued from page 15, Vol. II.*

A CATALOGUE of the plants growing without cultivation in the District of Columbia:

CHRYSOPSIS.
377. Mariana, Nutt.
POLYMNIA.
378. Canadensis, L.
379. Uvedalia, L.
CHRYSOGNUM.
380. Virginianum, L.
SILPHIUM.
381. trifoliatum, L.
AMBROSIA.
382. trifida, L.
383. artemisiæfolia, L.
XANTHIUM.
384. strumarium, L.
385. *spinosum*, L.
ECLIPTA.
386. procumbens, Michx.
HELIOPSIS.
387. lævis, Pers.
RUDBECKIA.
388. laciniata, L.
389. triloba, W.
390. fulgida, Ait.
391 hirta, L.
HELIANTHUS.
392. angustifolius, L.
393. occidentalis, Riddell.
394. giganteus, L.
95. strumosus, L.
396. divaricatus, L.
397. decapetalus, L.
ACTINOMERIS.
398. squarrosa, Nutt.
COREOPSIS.
399. verticillata, L.
BIDENS.
400. frondosa, L.
401. connata, Muhl.
402. cernua, L.
403. chrysanthemoides, Michx.
404. bipinnata, L.
VERBESINA.
405. Siegesbeckia, Michx.
HELENIUM.
406. autumnale, L.
GALINSOGA.
407. *parviflora*, Cav.
MARUTA.
408. *Cotula*, D. C.
ANTHEMIS.
409. arvensis, L.
NOBILIS, L.
ACHILLEA.
410. Millefolium, L.
LEUCANTHEMUM.
411. *vulgare*, L.

ARTEMISIA.

412. *Absinthium*, L.

GNAPHALIUM.

413. polycephalum, Michx.
414. purpureum, L.

ANTENNARIA.

415. plantaginifolia, Hook.

FILAGO.

416. *Germanica*, L.

ERECHTHITES.

417. hieracifolia, Raf.

CACALIA.

418. suaveolens, L. High Island.
419. reniformis, Muhl.
420. atriplicifolia, L.

SENECIO.

421. *vulgaris*, L.
422. aureus, L.

ARNICA.

423. nudicaulis, L.

CENTAUREA.

424. *Calcitrapa*, L.

CIRSIUM.

425. *lanceolatum*, Scop.
426. discolor, Spreng.
427. Virginianum. Michx.
428. *arvense*, Scop.

ONOPORDON.

429. *acanthium*, L.

LAPPA.

429 *Officinalis*, *All.*

CICHORIUM.

430. *Intybus*, L.

KRIGIA.

431. Virginica, Willd.

CYNTHIA.

432. Virginica, Don.
433. Dandelion, D. C.

HIERACIUM.

434. scabrum, Michx.
435. Gronovii, L.
436. venosum, L.
437. paniculatum, L.

NABALUS.

438. albus, Hook.
439. Fraseri, D. C.

CHONDRILLA.

440. juncea, L.

TARAXACUM.

441. Dens-leonis, Desf.

LACTUCA.

442. Canadensis, L.

MULGEDIUM.

443. acuminatum, D. C.
444. Floridanum, D. C.

SONCHUS.

445. *oleraceus*, L.
446. *arvensis*, L.

## LOBELICEÆ.

LOBELIA.

447. cardinalis, L.
448. syphilitica, L.
449. puberula, Michx.
450. inflata, L.
451. spicata, Lam.

## CAMPANULACEÆ.

CAMPANULA.

452. aparinoides. Pursh.
453. Americana, L.

SPECULARIA.

454. perfoliata, D. C.

## ERICACEÆ.

GAYLUSSACIA.

455. dumosa, Torr & Gray.
456. frondosa, Torr & Gray.
457. resionosa, Torr & Gray.

VACCINIUM.

458. stamineum, L.
459. Pennsylvanicum, L.
460. vacillans, Solander.
461. corymbosum, L.

EPIGÆA.

462. repens, L.

GAULTHERIA.

463. procumbens, L.

LEUCOTHOE.

464. racemosa, Gray.

ANDROMEDA.

465. Mariana, L.
466. ligustrina, Muhl.

KALMIA.

467. latifolia, L.

AZALEA.

468. viscosa, L.
469. nudiflora, L.

PYROLA.

470. rotundifolia, L.
471. chlorantha, Swartz.
472. secunda, L.

CHIMAPHILA.

473. umbellata, Nutt.
474. maculata, Pursh.

MONOTROPA.

475. uniflora.
476. Hypopitys, L.

## AQUIFOLIACEÆ.

ILEX.

477. opaca, Ait.
478. decidua. Walt. Great Falls.
479. verticillata, Gray.
480. lævigata, Gray.

## EBENACEÆ.

DIOSPYROS.

481. Virginiana, L.

## PLANTAGINACEÆ.

PLANTAGO.

482. *major*, L.
483. *lanceolata*, L.
484. Virginica, L.

## PRIMULACEÆ.

DODECATHEON.

485 Media, L.

LYSIMACHIA.

486. stricta, Ait.
487. quadrifolia, Ait.
488. ciliata, L.

ANAGALLIS.

489. arvenis.

## LENTIBULACEÆ.

UTRICULARIA.

490. vulgaris, L.

## BIGNONICACEÆ.

TECOMA.

491. radicans, Juss.

CATALPA. Cultivated only.

MARTYNIA. Cultivated only.

## OROBANCHACEÆ.

EPIPHEGUS.

492. Virginiana, Bart.

CONOPHOLIS.

493. Americana, Wallr.

APHYLLON.

494. uniflorum, Torr & Gray.

ORABANCHE.

495. *minor*, L. Piney Branch.

## SCROPHULARIACEÆ.

VERBASCUM.

496. *Thapsus*, L.
497. *Blattaria*, L.

LINARIA.

498. Canadensis.
499. *vulgaris*, Mill.
500. *Elatine*, Mill.

SCOPHULARIA.

501. nodosa, L.

CHELONE.

502. glabra, L.

PENTSTEMON.

503. pubescens, Solander.
504. Digitalis, Nutt.

MIMULUS.

505. ringens, L.
506. alatus, Aiton.

GRATIOLA.

507. Virginiana, L.
508. aurea, Muhl.
509. pilosa, Michx.

ILYSANTHES.

550. gratioloides, Benth.

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CENTENNIAL CAPTURES.—A specimen of *Pieris rapæ* was taken in Machinery Hall, where others were seen flying. A fine *Papilio troilus* was caught in the Government Building, with several species of large Diptera not named. *Cimex lectularius*, (two very large specimens) taken on the seat in one of the steam cars approaching the city.

## GLEANINGS IN FOREIGN FIELDS.

**A Curious Coincidence.**—Sir John Lubbock, in his work on "Pre-historic Times," and other writers, have lately shown us how well the habits of primeval man may be illustrated by the manners and customs of modern savages, and I have met with an interesting fact of a similar nature. In chapter viii., p. 279, of "Pre-historic Times," there is an interesting quotation from a paper in the Transactions of the Academy of Science of St. Louis, 1857, p. 61, by Dr. A. C. Koch, who describes the remains of a mastodon found in Gasconade County, which had apparently been stoned to death by the Indians, and then partially consumed by fire. The fire, he says, was evidently "not an accidental one; but, on the contrary, *it had been kindled by human agency*, and, according to all appearance, with the design of killing the huge creature which had been found mired in the mud in an entirely helpless condition." The bones were found standing up in the clay, and only those above the surface were charred. There were also broken pieces of rock, from the river near, and pebbles, none of which were *in situ* in the clay, but apparently fetched from the river banks, where there was a layer of them. Mingled with the ashes, bones, and rocks, were arrow-heads, stone spear-heads and axes; and a stone spear-head was found under the thigh-bone of the skeleton, actually in contact with it. Curiously enough, in G. W. Earl's work on "The Papuans" (Balliere, London,) p. 154, we read the following, respecting the Lemangs, a degraded Negritto race, supposed to be the aborigines of the Malayan peninsula, extracted from the fourth volume of the "Journal of the Indian Archipelago." "The rhinoceros they obtain with even less difficulty. This animal, which is of solitary habits, is found frequently in marshy places, with its whole body immersed in the mud, and part of the head only visible. The Malays call the animal 'Badak Tapa,' or the recluse rhinoceros. Towards the close of the rainy season, they are said to bury themselves in this manner in different places; and upon the dry weather setting in, and from the powerful effects of a vertical sun, the mud becomes hard and crusted, and the rhinoceros cannot effect its escape without considerable difficulty and exertion. The Lemangs prepare themselves with large quantities of combustible materials, with which they quietly approach the animal, who is aroused from his reverie by an immense

fire over him, *which being kept well supplied* by the Lemangs with fresh fuel, soon completes his destruction and renders him in a fit state to make a meal of." It is curious to find that a method employed by existing savage tribes, to master the rhinoceros, should have been applied in pre-historic times to the vast Mastodon.—F. A. A. in *Science Gossip.*

**On Collecting Hymenoptera, &c.**—Some of your correspondents encumber themselves with more bottles, tins and boxes than there is any necessity for; the simplest, most efficient and least expensive plan is the following:—Laurel leaves, as Mr. Blackett states, are the best, gathered in spring, but not too young, if pounded in a mortar instead of cut up merely. A good-sized bottle of the bruised leaves will be good for killing Coleoptera, Hymenoptera, in fact, all insect life during the year. I use mine now in December which were gathered last June. The most convenient collecting-bottle is an ordinary two ounce or four ounce wide mouth, with turned back rim, and tight fitting cork. In the centre of the cork pierce with a borer a hole, in which a glass tube will fit, open at both ends. I use a one drachm tube bottle, the bottom of which I cut off by notching with a file, applying a red hot ring of wire, and drop a little water over it; this cracks it round tolerably straight. Hold the edge in a gas flame for a few seconds to melt off the sharp edge, tie a piece of muslin round the bottom, and cork the mouth; fit this tube tightly into the cork of the larger bottle, which fill half or three parts full of bruised leaves. This forms a cheap and convenient double bottle. The larger insects are easily put into the large bottle, while the tube is kept for the smaller or any rare species. They are killed in a few seconds, and will keep in capital condition for setting for some weeks, or even months if needed. It is well, however, not to keep them too long. With this single bottle, I think, all a collector's requirements are met. Chloroform, cyanide of potassium, sulphur, and ammonia are all nuisances, and can be very advantageously dispensed with.—E. W. in *Science Gossip.*

**How Typhoid Fever is Spread.**—E. Frankland communicates to *Nature* (April) the following remarks on the outbreak of typhoid fever, which occurred at Lausen, near Basle, Switzerland: The source of the poison was traced to an isolated farmhouse on the opposite side of a mountain ridge, where an imported case of typhoid, followed by

two others, occurred shortly before the outbreak. A brook which ran past this house received the dejections of the patients and their linen was washed in it. This brook was employed for the irrigation of some meadows near the farm house, and the effluent water filtered through the intervening mountain to a spring used in all the houses of Lausen, except six which were supplied with water from private wells. In these six houses no case of fever occurred, but scarcely one of the others escaped. No less than 130 people, or seventeen per cent. of the whole population, were attacked, besides fourteen children, who received the infection whilst at home for their holidays, and afterwards sickened on their return to school.

The passage of water from the irrigated meadows to the spring at Lausen was proved by dissolving in it, at the meadows, 18 cwt. of common salt, and then observing the rapid increase of chlorine in the spring water; but the most important and interesting experiment consisted in mixing uniformly with the water 50 cwt. of flour, not a trace of which made its way to the spring, thus showing that the water was *filtered* through the intervening earth and did not pass by an underground channel.

These are the main features of the case, but there are other interesting details showing how carefully the investigation was conducted; for these, however, I must refer Mr. Mitchell Wilson to the works above cited. It affords a clear warning of the risk which attends the use, for dietetic purposes, of water to which even so called *purified* sewage gains access; notwithstanding that, as at Lausen, such water may have been used with impunity for years, until the moment when the sewage became infected with typhoid poison.

## Entomological Club of the A. A. A. S.

We desire to call the attention of entomologists of the United States and Canada, to the fact that the Entomological Club of the American Association for the Advancement of Science will meet at Buffalo, N. Y., on the 22nd of August, in some place that will be provided by the local committee of the Association.

All interested in the subject of entomology are invited to attend, and to repair at first to Tifft House for instructions.

C. V. Riley, *Secretary*, John L. LeConte, *President*.

# Field and Forest

A MONTHLY JOURNAL

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## "Sexual, Individual and Geographical Variation" in the Genus Leucosticte.

In the Bulletin of the Geological and Geographical Survey of the Territories, No. 2, (May 11, 1875,) I published a "Monograph of the Genus Leucosticte, or Gray-crowned Purple Finches," based on more than four hundred specimens, which had been brought together for that especial purpose, a larger number by at least three hundred than any author had previousiy been able to examine at one time, these birds having been among the very rarest in the North American *Avifauna*. This series embodied the material requisite for a comprehensive study of the subject, which was found to be fully illustrated in the special points of "sexual, individual and geographical variation," rendering of easy definition the forms represented. Many of the deductions, under these several heads, however, are questioned by Mr. J. A. Allen, in a paper entitled "Sexual, Individual and Geographical Variation in Leucosticte tephrocotis."[1] [Bulletin of the Geological and Geographical Survey of the Territories, Vol. II, No. 4, pp. 345–350. Washington: Government Printing Office, July 1, 1876.]

"Some very positive remarks" regarding sexual differences in par-

1 Under this name Mr. Allen would include, as expressions of climatic or individual variation, all the forms which are usually recognized as distinct species, or, at least, "geographical races,"—five in number—certain assumed "laws" of climatic variation being cited to explain the differentiation of the forms in question to supposed varietal rank. It has been clearly demonstrated, however, [see pages 58 and 59 of my monograph] that instead of in any way confirming this theory, the facts prove the case of this genus to be a notable exception to the "laws" which it is endeavored thus to bring into requisition. Taking as the only available, and, withal very reason-

ticular species, are the main ground of the objections referred to, Mr. Allen's attention having been called to the matter, as he states, by communications from Captain Charles Bendire and Lieutenant George R. Bacon, U. S. A., who, being stationed at a favorable locality had excellent opportunity to study the two forms of *L. tephrocotis*—the typical form and "var." *littoralis*—in the field, during their winter *hegira* southward. The "very positive remarks" in question, were, however, strictly the expression of the facts which suggested them, verified by the field-work of naturalists to whose experience and veracity as great respect is due as to Mr. Allen's correspondents—a consideration I am sorry to see ignored in Mr. Allen's statement with reference to the measurements appended to his article, to the effect that as they "were made by the collector from fresh specimens, and as the sex of each specimen was determined by actual dissection, they are of special interest in the present connection."

The point at issue is, whether the sexes of "*tephrocotis*" and "*littoralis*" do, or do not, differ in plumage—which, in a diagnostic sense, means whether there are, or are not, *absolutely constant* sexual differences. On page 60 of my monograph, under the head of "Sexual differences," I state: "The American species of this genus fall into two distinct groups, according as the sexes do or do not differ in appearance. In *L. tephrocotis*, in all its forms, there is not the slightest sexual difference; but in *L. atrata* and *L. australis*, the distinction is very marked. As a rule, the female is very slightly smaller than the male, but that she is not constantly so is clearly shown by the following averages of large series of each form."[2] Speaking of typical *tephrocotis*, on page 72, I again remark: "The spring plumage of this race is represented in the series before me by thirty-five individuals, which show that there i

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able, test of whether differentiations noted in a form require "varietal" or "specific" recognition, the question of whether "connecting links" do or do not occur, it is found that such intergradation exists *at present* between only two of the five forms of this genus, so far as known. This circumstance, then, entitles each of these forms to specific rank, for, whatever may have been the period of their gradual differentiation they have now passed the "varietal stage," through the final obliteration of all specimens of intermediate characters. The two forms, whose "connecting links" have not thus been destroyed, afford, however, the required evidence of a probably more recent common origin, and may thus very properly be reduced to the rank of representative, or geographical races. Preference is in this case given the term *geographical*, from the reason that whatever may have been the cause of the differentiation of the two representative forms, it is evident that no explanation is afforded by "laws" based only on present *climatic* conditions.

*no constant*[3] sexual difference in coloration, many females being as brightly colored as some males, and *vice versa*."

And, again, regarding "var. *littoralis*," (page 75:) "In regard to the two sexes, as compared with one another, there is the same absolute similarity in appearance and size that exists in *griseinucha* and *tephrocotis*, many females being more brightly colored, and some larger, than some males."[4] As to the comparative extent of the series examined separately by Mr. Allen and myself, they are somewhat unequal, so far as numbers are concerned; the number in each being respectively 94 and 71. But my series embraced both forms in the very dissimilar winter and summer dresses, as well as all transition stages from the livery of the one season to that of the other, and they were likewise obtained in various localities by numerous collectors; Mr. Allen's series, on the other hand, embraced only winter specimens, collected at a single locality, by two persons. The due importance of this distinction must therefore be allowed full weight.

As to "geographical variation," the case of the genus *Leucosticte* is a notable exception to certain supposed "laws" under this head. As I fully demonstrated this fact in my monograph (pages 58, 59,) Mr. Allen's remarks on my "strictures" give his theories no additional support,[5] notwithstanding from much contained in my arraignment of his views on the question, Mr. Allen "begs leave to dissent,

2 In my table of comparative measurements is an important error, respecting "*L. tephrocotis* var. *tephrocotis*," which Mr. Allen has kindly pointed out, and which was unfortunately copied in the diagnosis of that race; the average of the wing and tail in the female being given as 4:16 and 3:12 inches, instead of 4:05 and "2:97." Mr. Allen, however, has made an equally "unfortunate inadvertance" in correcting the last figures, since the true average of the several measurements given of that sex amounts to only 2:94!

3 Not italicized in the original.

4 Upon inspecting the measurements given by either Mr. Allen or myself of different "sexed" individuals of these two forms, it will be seen that while there is a very inconsiderable *average* difference in size between the sexes, this difference is *by no means constant*. Exactly the same kind of difference obtains in the plumage, the *general aspect* of a series of females being appreciably paler and less brightly tinted than a series of males, when the two groups are placed side by side for close comparison, but so perfectly similar specimens of opposite sex can be selected from the two series that if interchanged in position they could not possibly be distinguished. In *L. australis*, on the other hand, a series of 36 females does not contain a single specimen which even approaches in brightness the dullest male in a series of 69; while in 3 pecimens of *L. atrata*, the difference is equally positive!

as matters of fact." The very first of the exceptions taken, however, is at fault, in important "matters of fact," for it is stated that *L. australis* is "the most *Southern*, the *smallest* and by far the *brightest colored*." As to its being the most *Southern* of the species of this genus, the very paragraph which Mr. Allen quotes to prove that he "is sustained by Mr. C. E. Aiken," says that "*atrata*, if anywhere common, must occupy a still more Southern locality!" As to its being the *smallest*, the measurements of 106 specimens, compared with Mr. Allen's own exhibit of measurements of almost as many (94) *fresh* specimens of *tephrocotis* and *littoralis* prove that *australis* averages .02 of an inch *more* in length of the wing, and .32 more in length of the tail, than the average of the two more Northern, (and, as Mr. Allen's theory would have it, consequently *larger* forms! [6] Neither is it the most brightly colored, for any one of the four other forms is equally bright when specimens of corresponding season are compared. In this connection, Mr. Allen should remember that he compares *australis* in its greatly intensified midsummer dress with *tephrocotis* and *littoralis* in their dull winter livery. [See remarks under head of "Seasonal variations," pages 59, 60 of my monograph.] As to *L. tephrocotis*, it is stated: "Climatologically

5 I have elsewhere alluded [See *American Naturalist*, Vol. vii, Sept., 1873, p. —,] to the tendency of our author to form hasty conclusions regarding the relationship of certain congeneric forms, by which was meant the toofrequent unfortunate selection of examples supposed to illustrate "laws" of variation, the present genus being a case in point. Such slips, even in the absence of any real objection to the theories under discussion, are calculated to make one extremely careful not to accept without due confirmation by investigation, the "laws" which Mr. Allen endeavors to establish—however plausible they may seem when viewed from the author's standpoint. The pages of Mr. Allen's works abound with errors of this kind, which, unless corrected, can only involve the subject in confusion by rendering it extremely difficult for the student to sift from the heterogeneous mass of argument the positive *truths*, which to the exclusion of mere *theory*, are needed as the basis of true laws of variation. A few examples of these hasty conclusions may be quoted as exceedingly pertinent to the subject in hand:

On page 320 of the "Mammals and Winter Birds of East Florida," the Western Rough-legged Hawk, (*Archibuteo ferrugineus*,) is mentioned as the "*Archibuteo ferrugineus* type of the *A. lagopus*." This statement would doutless not have been made had the two species been compared; this seems not to have been done, however, hence the less excuse for the "the great positiveness" of the statement. On page 329 of the same work, "*Buteo oxypterus*," Cassin, is referred to *B. pennsylvanicus*, with as much confidence as if the type had been actually examined. On page 306 we are informed that Floridan specimens of *Centurus carolinus* "seem to accord in every particular with the so-called *Centurus subelegaus* of Lower California and Mexico"—a distinct species, which, by the way is not known to occur in any part of Lower Cali-

considered, *L. tephrocotis* is the *next most Southern*, is the *next in size*, (at least is not *larger* than var. *littoralis*,) *and has the least ash* on the head." The first point is reasoned from the fact that Mr. Aiken found *littoralis* far less numerous in Colorado than typical *tephrocotis*, and therefore supposed that it must be a more Northern bird, not migrating so far South in winter. [See Mr. Aiken's remarks, copied by Mr. Allen in foot note, on page 248.] The comparative rarity of this form in Colorado is not to be thus accounted for, however, but is due to the fact of its being a more *Western* bird, only stragglers to the eastward of its main range, mixing and associating with the main body of *tephrocotis*. In the same manner *tephrocotis*, itself, becomes rare westward, where, through the Great Basin and Sierra Nevada, the main body of *littoralis* migrates southward. The differences, then, between these two races, if depending solely on climatic considerations, are governed by the *longitude* and not the *latitude*, of their breeding habitat. [7] As to *tephrocotis* being "*next in size* (at least is not *larger* than var. *littoralis*,)" Mr. Allen's own computations show that *is* the larger of the two, except as regards the length of the tail. [8]

Admitting that *tephrocotis* "has the least ash on the head," how can this fact be attributed to climatological influences when *littoralis*, as stated, is *not* more Northern in its distribution, and when *griseinucha, the most Northern of all the forms, has less gray on the head than*

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fornia. On the same page we are astounded by the inforformation that *C. santa cruzi* and *C. elegans* are "the Southern forms of *C. flavi ventris*!"

In the "Ornithological Reconnoissance" [Bull. Muss. Comp. Zoology, Cambridge, III, No. 6, July 1872,] it is stated, on page 115, that "passing to the plains, proper, the faded aspect of all the birds is strikingly noticable, especially in species that range across the Continent." As an illustration, several very proper examples are mentioned; but with them are included the "'*Cassini*' type of *Peucæa æstivalis*," the fact ofthe case being that *Peucæa cassini* is a very distinct species, possessing well defin ed characters which should distinguish it at a glance from *P. æstivalis*, which has, in the same region, a Western race. The theory of certain climatic variations in the genus *Pipilo*, is expressed (page 117,) in the following terms: "In Mexico, *P. megalonyx* is well known to grade through *P. marcronyx* into *P. maculatus*." We are not aware that this fact was "well known" to any onebut Mr. Allen, and he will probably now acknowledge himself mistaken so far as *P. marcronyx* is concerned.

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6 My own measurements of these two forms being from 203 *dried* specimens, should, as a matter of fairness, be taken for comparison; they indicate a still greater difference in average length of wing in favor of *australis*, the wing of the latter averaging .08 more; the difference in the length of the tail, however, is somewhat reduced, the discrepancy amounting to only .12.

*littoralis?*" Neither can I admit that the darker colors of *griseinucha* "simply correlate with those of the generality of the varietal forms of birds and mammals inhabiting the same region, remarkable for its immense annual rain-fall and great humidity of climate," for the simple reason that the amount of rain-fall in the Sitkan district is probably as great, if not greater, than that of the Pribylov Islands and coast of the neighboring mainland. Hence it will appear that I did not "for the moment forget" any fact in this connection, while at the same time it is also evident that the darker colors of *griseinucha* are *not* so "easily explainable on climatic grounds."

In conclusion I beg leave to state that of the five well-marked forms of this genus now known in North America, only two, *tephrocotis* and *littoralis*, have been proven to integrade, while the immense series examined, independent of extensive additional material since received, was sufficient to indicate such a tendency if it existed. On the contrary, each one is defined by perfectly trenchant and stable characters, such as would constitute a "species," in a properly restricted sense. I accordingly have no hesitation in asserting that the distinct North American species of the genus Leucosticte, Swainson, so far as known, stand as follows:

1. *L. griseinucha*, (Brandt.)—Aleutian Islands and coast of Alaska, from Norton Sound to Kadiak.
2. *L. tephrocotis* Swains.—Western Mountain regions of North America, north of 38° (breeding north of 49°.) with the following "geographical races:" Typical *tephrocotis:*

7 In the paragraph, above quoted, it is stated that "this form [*littoralis*] *has not yet been taken* on the 'southern part of the North Pacific *coast*,' unless Alaska can be so considered." The words in quotation marks thus leave the reader to infer that a statement of mine is referred to, but upon turning to my monograph I find nowhere such words, or similar expression. In the paragraph above the one to which I refer I am also misquoted, as follows: "The fact that *littoralis* has more gray on the head than *tephrocotis* cannot be explained by stating that the former is more Northern in its distribution, for such is not the case, since the breeding grounds [*ground*] of var. *tephrocotis* are [*is*] quite as far northward in the interior as those [*that*] of var. *littoralis* is on the coast." The words supplied in brackets being those used by me instead of those which substitute them in the quotation.

8 A careful computation of the average of the measurements, given by Mr. Allen, (77 specimens of *littoralis* and 17 of *tephrocotis*,) indicates an average difference in the length of the wing of .03 of an inch in favor of *tephrocotis*, and in the length of the tail of .06 in favor of *littoralis*. My own measurements, however, of 154 specimens of *tephrocotis* and 47 of *littoralis* decide *both* these measurements in favor of *tephrocotis*, the excess being .08 for the wing and .07 for the tail!

The central mountain ranges and plateaus; straggling sparingly westward in winter. Subspecies *littoralis*, Baird: The coast ranges, straggling sparingly eastward in winter.

3. *L. atrata*, Ridgway.—Rocky mountains of Colorado, in May, (not yet known from anywhere else.) [Possibly, *but not probably*, a melanism of *L. tephrocotis*.]
4. *L. australis*, (Allen.)—Rocky Mountains of Colorado, (Spring, Summer and Autumn,) and southward, (Southern limit unknown.)

I am aware that this view is not in accordance with that of Mr. Allen, who has even gone so far as to state his suspicion that "some of the differences whereon certain species of Leucosticte have been founded may be only individual variations,"—the remark "having reference to a series of mounted specimens in the Museum of the Boston Society of Natural History, collected at Central City, Colorado, by Mr. F. E. Everett." These were evidently, judging from Mr. Allen's descriptions, (Bull. Mus. Comp. Zoology, III, July, 1872, p. 163,) specimens of *L. australis* and *L. tephrocotis littoralis*, and so I stated in a foot-note to the quotation of his remarks, (Bull. Geol. Survey Ter. No, 2, p. 55.) It seems to have surprised Mr. Allen, however, that I should have thus "without having seen them, assign[s] them, with great positiveness, to his [my] different species and varieties of Leucosticte." This rashness, however, was prompted merely by the unmistakable characters given by Mr. Allen, which enabled me to thus identify, "with great positiveness," two very distinct species, in the specimens which he considered to represent individual phases in a single form.

ROBERT RIDGWAY.

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## Field Notes in New England.

The intense heat of July made its mark very plainly in the diminished quantity and increased temperature of the water in the mountain springs.

Ascending Mt. Lafayette by the old path, July, 13th we found many springs dry, and in the two or three remaining, the water with

a temperature of 60° to 65°. Going down by the new path more on the northern slope, we noticed two springs with a temperature of 50° to 55°, but the mountains seemed to have been thoroughly heated, at least superficially, so that all the superfical waters were warm. One spring was noticed coming out of sandy soil by the woodside, at the lower end of Franconia notch, the temperature of which was 45°, but this was evidently deep-seated.

Walking along the sandy sea-beach near Kennebunkport, Me. I noticed a plant of unfamiliar aspect, striped of its foliage, but with peculiar fruit. A closer examination showed the destructive agent to be the Colorado potato-bug, which was found in all stages. This of course located the plant among the Solanaceae, and on reference to Gray's manual, determined it to be Hyoscyamus niger, L. And here this waif on the ocean shore, half a mile from any cultivated field had been detected and appropriated by decemlineata.

In this vicinity the flora is characteristic but not abundant in species. Juniperus communis, L., forms large spreading clumps in pastures rapidly encroaching upon the grass land.

On the borders of swamps are thickets of Myrica cerifera and M. gale, Comptonia asplenifolia, Vaccinium corymbosum, V. Canadense, V. vaccillans and Gaylussacia resinosa, these latter furnishing abundant supplies of "blueberries" and "huckleberries" as they are called in the vernacular. Sphagnous swamps abound with Habenaria psycodes, H. fimbriata, Calopogon pulchellus, Arethusa bulbosa, and other orchids scattered through them.

Another group of plants is found in the pure dry sand such as Salsola kali, Euphorbia polygonifolia, Calamagrostis arenaria, Cakile americana, Prunus maritma, Artemisia caudata, Atriplex patula L., var. hastata.

Around the salt marshes occur Spergularia salina, Tresl., Suaeda maritima, Dum., Salicornia herbacea, L., Ruppia maritima, Glyceria Canadensis, G. distans, G. maritima, Hordeum jubatum, Spartina polystachya, S. juncea, S. stricta Glaux maritima, Carex Œderi, C. folliculata, C. norvegica, C. maritima, Archangelica Gmelini, Statice Limonium, L., var. Caroliniana. Quite a number of other maritime species occur here, but these may suffice to give an idea of the chacteristic flora of the region.

J. W. Chickering. Jr.

## FLORA COLUMBIANA.

*Continued from page 33, Vol. II.*

A CATALOGUE of the plants growing without cultivation in the District of Columbia:

MICRANTHEMUM.

511. Nuttallii, Gray.

VERONICA.

512. Virginica, L.
513. officinalis, L.
514. serpyllifolia, L.
515. peregrina, L.
516. *arvensis*, L.
517. *Buxbaumii*, Tenore.
518. *hederæfolia*, L.

BUCHNERA.

519. Americana, L.

GERARDIA.

520. purpurea, L.
521. tenuifolia, Vahl.
522. flava, L.
523. quercifolia, Pursh.
524. pedicularia, L.

PEDICULARIS

525. Canadensis, L.
526. lanceolata, Mich.

MELAMPYRUM.

527, Americanum, Mich.

### ACANTHACEÆ.

DIANTHERA.

528. Americana, L.

DIPTERACANTHUS.

529. ciliosus, Nees.
530. strepens, Nees.

### VERBENACEÆ.

VERBENA.

531. augustifolia, Mich.
532. hastata, L.
533. urticifolia, L.
534. *officinalis*, L.

LIPPIA.

535. lanceolata, Mich.

### LABIATÆ.

TEUCRIUM.

536. Canadense, L.

TRICHOSTEMA.

537. dichotomum, L.
538. lineare, Nutt.

ISANTHUS.

539. cæruleus, Mich.

MENTHA.

540. *viridis*. L.
541. *piperita*, L.
542. *arvensis*, L.
543. *rotundifolia*. L.
544. *sativa*, L.
545. Canadensis, L.

LYCOPUS.

546. Virginicus, L.
547. Europæus, L.
var. sinuatus, Gray.
var. integrifolius, Gray.

CUNILA.

549. Mariana, L.

PYCNANTHEMUM.

550. incanum, Michx.
551. muticum, Pers.
552. linifolium, Pursn.

CALAMINTHA.

553. *Nepeta*, Link.
554. *Clinopodium*, Benth.

HEDEOMA.

555. pulegoides, Pers.

COLLINSONIA.

556. Canadensis, L.

SALVIA.

557. lyrata, L.
558. urticifolia, L.

MONARDA.

559. fistulosa, L.
560. puuctata, L.

BLEPHILIA.

561. ciliata, Raf.

LOPHANTHUS.

562. nepetoides, Benth.

NEPETA.

563. Cataria, L.
564. Glechoma, Benth.

PHYSOSTEGIA.

565. Virginiana, Benth.

BRUNELLA.

566. vulgaris, L.

SCUTELLARIA.

567. serrata, Andrews.
568. pilosa, Michx.
569. integrifolia, L.
570. nervosa, Pursh.
571. parvula, Michx.
572. galericulata, L.
573. lateriflora, L.

MARRUBIUM.

574. *vulgare*, L.

STACHYS.

575 palustris, L.
var. aspera, Gray.
var. glabra, Gray.

LEONURUS.

576. *Cardiaca*, L.

LAMIUM.

577. *amplexicaule*, L.
578. *purpureum*, L.

## BORRGINACEÆ.

ECHIUM.

579. *vulgare*, L.

LYCOPSIS.

580. arvensis, L.

LITHOSPERMUM

581. *arvense*; L.
582. latifolium, Mich.
583. canescens, Lehm.

MERTENSIA.

584. Virginica, D. C.

MYOSOTIS.

585. palustris, With,, var. laxa, Gray.
586. arvensis, L.
587. verna, Nutt.

CYNOGLOSSUM.

588. *Officinale*, L.
589. Virginicum, L.
590. Morisoni. D. C.

HELIOTROPIUM.

591. *Europœum*, L.

## HYDROPHYLLACEÆ.

HYDROPHYLLUM.

592. Virginicum, L.

ELLISIA.

593. Nyctelea, L.

PHACELIA.

594. parviflora, Pursh.

## POLEMONIACEÆ.

POLEMONIUM.

595. reptans, L.

PHLOX.

596. paniculata, L.
597. maculata, L.
598. pilosa, L.
599. procumbens, Lehm.
600. divaricata, L.
601. subulata, L.

## CONVOYULACEÆ.

QUAMOCLIT.

602. *coccinea*, Mœnch.

IPOMÆA.

603. *purpurea*, Lam.
604. *Nil*, Roth.
605. lacunosa, L.
606. pandurata, Meyer.

CONVOLVULUS.

607. *arvensis*, L.

CALYSTEGIA.

608. sepium, R. Br.
609. spithamea, Pursh.

CUSCUTA.

610. arvensis, Beyrich.
611. Gronovii, Willd.
612. glomerata, Choisy.

## SOLANACEÆ.

SOLANUM.

613. nigrum, L.
614. Carolinense, L.

PHYSALIS.

615. pubescens, L.
616. viscosa, L,

NICANDRA.

617. *physaloides*, Gærtu.

LYCIUM.

618. *vulgare*, Dunal.

DATURA.

619. *Stramonium*, L.
620. *Tatula*, L.

## Meeting of the American Association.

The American Association for the Advancement of Science held its quarter centennial anniversary at Buffalo, N. Y., from Sept. 23d to the 30th inclusive. The meeting may fairly be called one of the most important in the history of the association in regard to the number and standing of members and others attending, the value of the papers presented, and the cordial and even enthusiastic welcome given by the citizens of Buffalo.

One hundred and twenty-two members registered on the day of opening, and the maximum attendance probably exceeded 200. Of course the most notable feature was the presence of many distinguished scientists, and visitors or delegates to the Centennial Exposition. Among them we saw Prof. Von Baumhauer, Netherlands, several members of the Swedish, Egyptian, and Austrian Centennial Commissions, Dr. Rudolph Koenig of Paris, perhaps the leading physicist of our day on the suject of sound, and Prof. Huxley of London. The address of President Wm. B. Rogers introducing Dr. Huxley to the general meeting on Friday morning, might have been a fitting welcome to a demigod of science. The extempore reply was very pleasant, though an apparent diffidence of manner somewhat marred the force of delivery of the accomplished savan. He was reminded of a Scotch lake by the Hudson river, and thought the English race had suffered less modification by coming to America than was usually supposed. If there was any sign of degeneracy it was in an excess of the savage virtue of hospitality, which was not satisfied with merely giving a good dinner, but required the guests to carry off the spoons and plates. And while the average Englishman who acquired wealth devoted it to the purchase of real estate and the founding of a family; the nobler ambition of wealthy Americans seemed to be to establish public institutions like Yale College, in whose walls were assembled antiquities far exceeding in quantity and scientific value any collections in Europe, and compared with which historical remains were mere trumpery.

A peculiar feature of the meeting was the delivery of papers by Prof. Baumhauer and Koenig in German, and the attendance seemed to indicate a knowledge of German is very general among physicists. The subject of Prof. Baumhauer's paper was a method for the rapid analysis of milk, arranged by him while acting as chemist to the Amster-

dam board of health. Some very curious facts were elicited on this subject. The dealers found that the blue color produced by adulteration by pure water was obviated by the use of dirty water, and therefore actually used water from pools and cellars filled with typhus germs. The municipal government did not prohibit the sale o impure milk, but established a sliding scale of prices according to amount of adulteration. Prof. Chandler stated that as a practical question it had been found that in New York no adulteration but water was used to any extent and consequently the lactometer was reliable for general purposes.

Prof. Koenig's paper was on phenomena produced by the interference of sounds of unequal pitch, and was illustrated by apparatus and diagrams without which it wouid be unintelligible. His style of speaking was extremely rapid and nervous, showing complete familiarity with his subject.

Prof. T. A. P. Barnard of N. Y., submitted a report from the committee in relation to weights, measures, and coinage, advocating the establishment of an international bureau of weights and measures, without committing itself to any particular system, and also recomending that gold alone should be retained as the standard of value.

On Wednesday evening at St. James Hall, the chairmen of sections A and B delivered their addresses. Prof. Chas. A. Young of Dartmouth College, spoke on the history of astronomy in this country, while Prof. Ed. S. Morse chose the history of mammals in connection with the doctrine of evolution.

And as if to set off these efforts a brilliant reception at the gallery of Fine Arts closed the labors of the day. Thursday Prof. J. E. Hilgard as retiring president, delivered an interesting address on the progress of science in this country, especially of the branch with which the speaker was most intimately connected, viz., Geodesy and the construction of maps. After the address, the association proceeded to the rooms of the Bufialo Club, where society met science, and a brilliant evolution of light and beauty were the results of contact.

The increasing interest in the subject of microscopy, bore its legitimate fruit in the formation of a subsection, and the election of Dr. Ward of Troy as its chairman. The microscopic society of Buffalo gave a reception at the rooms of the Grosvenor Library, at which 17

instruments, most of them first-class, were provided, with far more objects than time permitted the large assembly to examine. Several of the instruments were new forms, of stands recently brought out to compete with the more popular stands of European make. Among the slides of special interest on exhibition, were portions of the shower of flesh which recently fell in Kentucky, that appears to have been ejected from buzzards. Gold crystalized in beautiful fern like tiny plates, and several remarkable fragments of coal, prepared by members of the Buffalo club, which seemed to show pieces of bone and teeth, and insect injuries, as worm holes, are still plainly perceivable in the structure of the coal itself. These thin slices were prepared by simply rubbing on hones without the aid of wheels or any machinery whatever. Prof. H. L. Smith of Geneva exhibited specimens of diatoms prepared for study, and we were much gratified at meeting Mr. C. Spencer, formerly of Canastota, N, Y., well known as the father of American microscopy. In addition to his successful labors in the construction of object glasses and the investigation of optical glass, Mr. Spencer has found by trial that some of the American double refracting spar is superior to that brought from Iceland, being harder and therefore taking a better polish.

Besides several invitations for excursions and parties, which interested only portions of the Association, two of a general character were given and carried through with great success. The first on Saturday to Niagara Falls, included beside the railroad ride admission to most of the places of interest, by the courtesy of their owners, and a sumptuous entertainment at the residence of J. L. Bush, proprietor of the Clifton House. It was mentioned as a happy incident that at the meeting of the Association ten years ago at Buffalo, a similar excursion and entertainment took place.

The second party was of a still more formidable character, in numbers and distance, being composed of over 300 members and their friends who went to Chatauqua Lake 70 miles distant, steaming all around the lake giving an opportunity of seeing the Sunday School grounds and of enjoying a capital lunch at the Lake View Hotel. During this trip a prolonged session of Section Q was held on the boat, presided over by Dr. Morris of Baltimore, at which several papers were read that will probably *not* appear in the proceedings.

Finally on the closing day of the convention the city fathers provi-

ded a numbers of carriages in which the association were taken to view the new park with which it is proposed to encircle Buffalo, the improvement of which has just commenced.

As an evidence of the general interest felt in the proceedings it may be mentioned that at least seven sermons were preached in the city on Sunday on topics more or less directly suggested by the convention. In justice to them it must be said that they mostly evinced a generous and catholic spirit on those points in which theology and science are supposed to differ.

We cannot close this brief sketch of a meeting which must be remembered with pleasure by all who attended, without alluding to the presence of Prof. Henry whose venerable form duriug latter years has often been absent. It was especially fitting he should be present on this occasion occupying as he does a central place in the progress of American science.—W. H. S.

## FIELD RECORD.

**Shell Heaps of Delaware.**—Reading the interesting paper on the "Shell Heaps of Maryland," in the August number of *Field and Forest*, recalls some Shell Heaps of Sussex county Delaware, which I in company with others, explored about two years ago. During a fishing and collecting excursion to "Delaware Breakwater" in July 1874, a small party of visited Rehoboth, near a small bay of that name, on the shore of the Atlantic, about seven miles from Lewistown, popularly called "Lewes." There are two Hotels at Rehoboth, one of which is kept by Captain Lewis Tradenic, formerly a citizen of Lancaster County. Somewhat differing from the character of the land usually found along the coast, it is here arable and is cultivated to within a hundred yards of the beach. The soil is a sandy clay, and the beach is bounded by an abrupt bank, somewhat higher than the land a hundred yards inland. In sloping a lawn from the Hotel to the beach, a number of Shell Heaps were discovered, barely visible on the surface but midening towards the base as the soil was was removed, and in exploring these we found several species of shells, mainly *Ostrea, Venus, Mactra &c.*

Those shells near the surface were bleached and abraded, but below, they retained the natural epidermis. The interstices were filled up with a blackish loamy earth resembling ashes and pulverized charcoal. In the mass were imbeded peices of plain and ornamented pottery, Jasper, chert and quartz arrow heads, some of them entire, but the larger number fragmentary. We also found the bones of mammals, and pieces of charcoal, or chared wood. Some of the pottery was blackened on the outside as though it had been set on or had hung over a fire. I did not notice particularly a notch in the edges of the shells indicating that they had been opened with an instrument, especially not in the clams and therefore I conjectured they had been opened by heat, No bones of fishes were discovered.—S. S. RATHVON.
*Lancaster, Pa. Aug. 1876.*

**Catalpa, or Cigar Tree.**—The latter is the name by which a stately tree was known in my boyhood, about fifty years ago. It stood in front of a drug store on Main Street in the borough of Marietta, Pa., and continued there for forty years or more, but where it came from, or who planted it, I never learned. The town was founded in 1802, and this was probably the first ornamental tree planted in it. "It was a thing of beauty and a joy" as long as it continued in foliage and bloom.

It was perfectly unique in that neighborhood, and many were the speculations in reference to its native locality. Since then, however, I have seen numbers of them growing wild in Pennsylvania, or at least growing in places where they could not have been planted by civilized human hands. As you approach the Schuylkill River, on the Pennsylvania Rail-Road, the Catalpa is seen in abundance on either side of the road for several miles. During the summer season I have noticed them for twenty years at least, but I have noticed none as tall as those alluded to in the August number of *Field and Forest.* I verily believe that some of the boys in my youth took their first lessons, in smoking, by using the "beans," or "cigars" of the Catalpa I refer to above. They are not a very sightly tree when denuded of their foliage, and I believe I never noticed what I would consider a well formed one, but when in foliage, and especially when in flower, nothing can excel them their majesty and profusion, and under those circumstances, all their deformities are completely covered.—S. S. R.

## CORRESPONDENCE.

The occurrence of aphids on newly formed and tender shoots of plants is the experience and despair of every gardener. Having found them injuring my chrysanthemums I resorted to the not very cleanly method of destroying them by compressing the affected shoot between the thumb and forefinger, crushing them at once. But, Mr. Editor, you and the rest of mankind have no doubt read the pleasing lesson in Kirby and Spence relative to these pests being herded as milch cattle by ants, who sedulously attended upon them for the purpose of imbibing the saccharine liquid which exudes from certain parts of their bodies. As nothing is said of other insects indulging in this practice the negative inference was drawn by most persons that the ant is the only one sagacious enough to have invented it. But as most insects delight in absorbing sweet liquids it would not be astonishing to detect others engaged in it, as the sequel will show. Having noticed a considerable entomological concourse on a tall thistle, *(Cdicus lanceolatus,)* which had grown up in a neglected part of my garden, I found the cause of it to be in vast colonies of aphids on the upper part of the branches. With several species of insects, strangers to me, there were at least three different kinds of house-fly, the most conspicuous for activity and greediness being the blue bottle, with these were several rose bugs, wasps and lady bugs—but one ant was discernible. A sort of hum proceeding from the whole crowd as if considerable business was being done. To enable me to study the whole exhibition I invented the ridiculous manouvre of Paddy, who to convince his master that he reported the time of day correctly, dug up the sun dial in the garden and brought it to him that he might see for himself. I plunged a wide mouth glass bottle over the whole assembly, cut off the branch quickly and put in the stopper. The wasps were too smart to be caught, but you will observe the curious association, the other antagonistic to individuals, which a common object of interest had brought together. I therefore submit the case for your observation, and such remarks as may be suggested.—E. FOREMAN.

The "honey dew" given off by these aphids, always attracts various insects, particularly ants, flies and wasps, the ants alone forcing them to discharge it. A few species, however, often seen with the others, are present for the aphids themselves.—Ed.]

## Publisher's Department.

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Contributions upon subjects pertaining to Natural History, are solicited from all.

Address all communications Editor Field and Forest,

P. O. Box 273, Washington, D. C.

## PERIODICALS RECEIVED.

*The American Naturalist*, September, in addition to other papers, contains interesting Natural History articles on "The mode in which Cockroaches and Earwigs fold their wings" "Mimicry in Butterflies explained by Natural Selection," and on the "Progress of Ornithology in the United States during the last Century."

*The Canadian Entomologist*, August. As usual, full of interesting matter for Entomolgists. "Inquries concerning the genera of Mr. Scudder's Systematic Revision," "Notes on Geometridae," Synonomy of the Coleoptera of the 'Fauna Boreali Americana,' Kirby." Also descriptions of several new species of Lepidoptera.

*The Gardener's Monthly*, September. The department of Natural History and Science contains a number of articles interesting to Naturalists, while the other pages are replete with good things.

*The Scientific Monthly*, August. "Habits of the Rough Winged Swallow," "Something about Bats," "Ozone" and other articles on Natural and Physical science.

*The Scientific Farmer*, September. Its Entomological department contains fresh and well selected articles, and the matter in other departments, show that it is living up to its name.

*Psyche*, July & August, "Bibliographical Record," "On the mandibles of the Larva of Eros." White Mountain Notes.

*Bulletin of the Torrey Botanical Club*, July and August. A good number.

Erratum. Page 33. August number, for "550" in last line, second column, of the list of plants, read 510 (gratioloides.)


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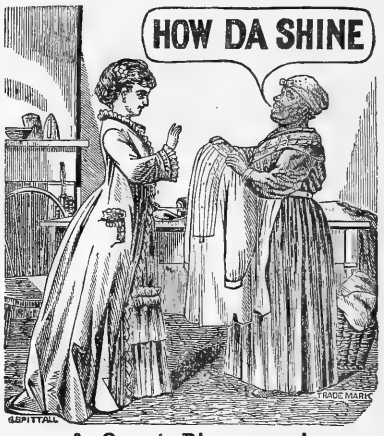


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# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.— OCTOBER, 1876.—NO. 4.

## Jumping Seeds.

We have recently had the pleasure of examining a small phial of these so-called jumping seeds received from California, and said by the gentleman collecting them to be found under oak trees, and to be quite easily obtained. They are somewhat the size and color of a mustard seed, perhaps a little more irregular in shape, and a lighter yellow. Their peculiarity seems to be the manner in which they move and roll around, or jerk themselves about, as though possessed of independent life and motion. In reality, these little objects are not seeds, but are cases each containing the larva of an insect, and upon gently jarring them so as to move their positions, numbers will be observed to spring with a quick jerking motion, sometimes to the distance of half an inch.


A hasty examination, with the microscope, revealed in the interior of the case a white fleshy little organism, curled up in the exact posi- shown in our figure, having what appeared to be a pair of faintly brownish jaws upon one end of the body, and so closely resembling the little grubs or larvæ frequently found in minute galls that we had little hesitancy in calling it a *Cynips*, and the receptacle a small species of oak-gall. Becoming interested in the matter, and desirous of knowing what had been written upon the subject, our libraries were consulted with the following result, which may prove interesting to our

readers, particularly as it was found that but little had been published on the subject, and in volumes not generally accessible.

The first reference that we can give on the subject of jumping seeds, of which there appear to be several kinds, is to the Proceedings of the Entomological Society of London, October 5, 1857. Seeds sent from Mexico by the British Charge d' Affaires, apparently of a species of *Euphorbia*, and containing larvæ presumed to be lepidopterous, were exhibited by the Secretary at that time. Other specimens of the seeds had however been sent to England by different persons. At the March meeting 1858, Mr. Westwood exhibited the perfect insect, a *Carpocapsa*, bred from some of the seed, sand June 7th, 1858, a paper with the description of the insect, named *Carpocapsa saltitans*, was read and afterward published in the Proceedings of that date. Specimens of the seeds were also forwarded in the spring of the same year to Paris, where they were exhibited at the Academy of Science, and in an interesting paper appearing subsequently in the *Revue Zoologique*, M. Lucas re-described the insect, being in ignorance of the fact that it had already been named. In the *Gardeners' Chronicle* of November 12th, 1859, there is a long article on the subject, over the familiar initials "J. O. W." (Westwood) in which these jumping seeds from Mexico are figured and described, together with the insect reared from them.

These seeds, which often jumped to the distance of one and a half inches, when laid upon something flat and level, were about four-tenths of an inch long, with a smooth surface, each resembling one of the parts of an orange cut into thirds, three seeds evidently growing together, and forming a globular mass. The interior was occupied by a fat grub or larva, which had consumed the whole inside of the seed, leaving no excrement. The larva measured about eleven-twentieths of an inch in length, had a small head, but strong jaws and the other parts of the head of a *lepidopterous* larva. The legs were short, consisting of three pairs attached to the first three segments of the body behind the head, the fourth and fifth segments were footless, but each of the four following had a pair of very short membranous feet, surrounded with a circle of very minute spines, and there was another pair at the extremity of the body. Larva yellowish white, with the head chestnut brown. The chrysalis was furnished with transverse rows of small reflexed spines on the segments of the abdomen, by the help of

which it pushed itself forward. Pupa measured four-tenths inches.

The following is a description of the moth, which measured ¾ inch in the expanse of the fore wings:—"Fore wings grayish white, faintly marked with pale ashy undulating lines, the fore-margin with about 16 small oblique dashes, the tip of the wings black with a small square black spot and with a large conical ashy spot near the outer angle, having its edges and middle marked with black lines, the apical margin varied with grey, leaden, and white colors, and a double row of minute black dots; the hinder wings brown, the head and collar reddish brown, and the palpi, outwardly and inwardly whitish."

The eggs of this insect are doubtless deposited upon the seed envelope, when young, and the larvæ hatching, eat their way in, in the same manner as *Bruchus pisi* or the "pea-bug."

Mr. Riley, in the Transactions of the St. Louis Academy of Science, mentions having received these Mexican jumping seeds, which are derived from a plant called arrow weed, or *yerba de flecha*, and *Colliguaja* by the Mexicans,* from San Diego, California. He gives an interesting account of them, substantially the same as that given above, except that the seed is lined inside with a delicate carpet of silk, and when cut partially open the worm immediately sets to work to mend the break with the same substance. He also states that the worm, before changing, eats a hole through the hard shell, plugging it up with silk; a slight cocoon is then spun, with a passage leading to the hole. The worm occupies but one sixth the space of the shell, consequently the slightest motion causes the shell to move about. "The jerking motion is conveyed by the worm holding fast to the silk lining with anal, and four hind abdominal pro-legs, which have very strong hooks, and then drawing back the head and forebody and tapping the walls with the head, often at the rate of twice in a second."

In *Science Gossip*, November 1867, we find a communication from Ventnor, Isle of Wight, in which the writer describes the "jumping seed" as a "small excrescence," which had been taken from a hawthorn; it was about the sixth of an inch in length, pear-shaped, and in size resembled a grape or raisin stone. The specimen had been

* Mr. Westwood, infers from subsequent information received that the seeds are in fact Peruvian, having been carried to Mexico, where the plant producing them is called *Colliguaja*. Those experimented with were received from the neighborhood of Tepic.

seen to jerk or leap nearly an inch from a given point, though while in his possession it had not shown such activity, leaping only a third or a quarter of that distance. On opening the case, which from the description must have been a gall, it was found to contain "a whitish maggot with a small yellowish scaly head, the body bent into a semi-circle, and the tail end slightly flattened. It had no legs, but the shining skin was deeply corrugated, or thrown into folds, which appeared to serve in some degree as limbs." After removing the insect from the case, though still vigorous, its motions had nothing of the leaping character.

Seeds of Tamariscus are said to be moved by a coleopterous larva known as *Nanodes tamarisci*, and Reaumur records an instance which appears somewhat analogous to the jumping seeds, being the movement produced in small oval cocoons of a species of *Ichneumon* by the enclosed larva.

We now return to the minute form figured at the beginning of this article. These seeds—which in reality are minute galls—are found very common not only in California, but are mentioned by Mr. Riley as occurring in Michigan, Indiana, Illinois and Missouri, where the ground under the trees infested by them—generally oaks of the White-oak group—is sometimes fairly alive with them, the noise they make resembling the patter of rain. Indeed, we should not be surprised to find them in the vicinity of Washington, as we have examined an oak leaf collected here last fall by Mr. Seaman—who has taken considerable interest in the matter, and to whom we are indebted for our drawings—which was literally covered with minute galls almost precisely identical with those recently received from California. The leaf had been picked green, however, before the insects within the galls had arrived at sufficient maturity to complete their changes, and so were found inside in a dried and shrivelled state.

The specimens figured gave the perfect insect in a few days, which proved to be a little black fly or Cynips, named *Cynips saltitans* by Henry Edwards, of San Francisco, who described it in the Transactions of the California Academy of Science. We append the following description of the gall:—"Formed in summer on the underside of *Quercus obtusiloba*, *Q. macrocarpa* and *Q. alba*, often to the number of one thousand on a single leaf, each gall inserted in a deep cavity, which causes, on the upper surface, a bulging of a straw yellow color,

irregularly sub-conical, with the top flattened or concave, and with a minute central nipple, sometimes obsolete; the galls becoming detached and falling to the ground in autumn, leaving a pale fulvous disc at the bottom of thc cavity. The gall has an average diameter of one millemetre, and the color and general appearance of a minute acorn, the base being paler than the sides, and conically produced to the central point of attachment. The apical portion is slightly constricted into a deep purple brown rim, and the top within the rim is flat with a small central nipple."

And now the question arises, how is such a tiny insect as the one we have just been considering, enabled while confined within its envelope, to throw itself, case and all, with such force at so great a height in comparison to its size? That the walls of the gall are very thin and elastic is readily seen, but even then, that the little soft fleshy atom within should exert a sufficient muscular force to act upon the walls of the case and throw it half an inch upward from its resting place, or to a distance equal to twenty times its own diameter, seems perfectly marvelous. A rolling motion is readily explained, as the mere changing of the centre of gravity in a round body like this, would naturally cause a change in its position. We cannot say how the movement is accomplished, but the specimen figured, while under the microscope, was observed to jerk the flattened portion of the body, shown beneath in the figure, in a violent manner, and it is supposed that it is by similar movements, when tightly enveloped in its light, elastic case, that the jumping is accomplished.

CHAS. R. DODGE.

---

## The Drumming of the Ruffed Grouse.

*(Bonasa umbellus.)*

How does the Pheasant drum? Singularly numerous have been the answers to this question, yet, after a study of what has been written in explanation of the manner in which the peculiar sound is produced, we do not feel that a satisfactory solution has been reached; but, on the contrary, the conviction is forced upon us that these answers are almost wholly chimerical. We cannot but think that the subject is a more involved one than authors have supposed. However this may be,

ornithology is evidently burdened with an enigma in the shape of this question which apparantly the practical observation and theorizing of half a century have been unable to unriddle.

Of the various theories, the earliest supposes the noise to proceed from the throat of the bird.

The next in importance, that of Audubon and Nuttall, is to the effect that the bird "draws the whole of its feathers close to the body, and stretching itself out, beats its sides with its wings in the manner of the domestic cock, but more loudly aud with such rapidity of motion, after a few of the first strokes, as to cause a tremor in the air, not unlike the rumbling of distant thunder."

Wilson describes the act in similar words, but does not commit himself beyond the fact that the sound is made in some way with the wings. We do not recollect who asserts that the sound is produced by the birds beating a log, stump, or similar object, with its wings.

Mr. Robert Ridgway printed in the *American Sportsman* the following explanation, furnished him by Mr. H. W. Henshaw:

"The bird sits crosswise upon the log, resting upon the back of the tarsi (not standing erect, as described by some writers,) its tail projecting nearly horizontally behind (not erect) and spread; the head is drawn back, the feathers pressed close to the body. The wings are then raised and stiffened, and drumming commences by a slow, hard stroke with both wings, downward and forward; but they are stopped before they reach the body. The rapidity of this motion is increased after the first few beats, when the wings move so fast that only a semi-circular haze over the bird is visible, this rapid vibration causing the rolling noise with which the sound terminates. The movements of the wing, and the rumbling thereby produced, are entirely analogous to those produced by the Humming-bird when hovering over a flower."

The above called forth, from Mr. J. H. Batty, this:

"The peculiar sound made by the Ruffed Grouse is caused by the backs or exterior sides of the wings striking each other as they are forcibly raised over the back of the bird. I have seen the Grouse drum, within a few yards of me, a number of times. * * * * * When going the round of my mink and muskrat traps, I found a male Ruffed Grouse caught in one of them by the leg. I carried the Grouse home and put it in a large feed-box, which was standing in the open air under the shade of an apple-tree. When returning from a hunting

excursion one day, one of my neighbors said 'Your partridge has been drumming.' I put an old stump in the box of my captive and it had the desired results, for the next morning it was drumming loudly. I observed its motions when drumming, through a hole in the box, and am confident that the noise was caused by the wings coming forcibly in contact with each other."

The above explantions, exclusive of that which ascribed the sound to a vocal effort, may be divided into two classes. First, those which regard the sound as resulting from the bird's striking its wings together or against a tangible object; and secondly, that supposing the sound to proceed from the vibration of the wings merely.

It seems almost needless to suggest the impossibilty of hearing the slow, regular first strokes at "the distance of from a quarter to a half mile," as Audubon and Nuttall assert that one may, when the bird beats its sides with its wings; and the assumption of Mr. Batty's that objects like birds, wings should possess resonance enough to transmit, to a similar distance, a noise resembling thunder is so manifestly erroneous as not to require further comment.

Mr. Henshaw's idea of the analogy of the "drumming" of the Ruffed Grouse and the "humming" of the Humming-bird requires qualification. Let us look for a moment at the two birds; the muscles which set in motion the mechanism of the Humming-bird's flight are among the notable instances of high development. Their power is surprising. Moving with almost inconceivable rapidity the ample wings, they enable the little aerial gem to toil hour after hour in its search for insects—darting at times from one flower to another with such lighting-like quickness as not to be followed with the eye. And when the autumn air warns it to seek a more congenial clime, this wee bit of animated nature, by the help of these same muscles, compasses many degrees of latitude, performing journeys which appear incredible. Yet the "humming" can not be heard at a greater distance than a few yards. Are we to believe that a slow, regular beat of its wings could be heard at all? The wings of the Ruffed Grouse are, comparativly speaking, short and rounded; and, while they are firm and compact, are not suited for extended flight or long continued, violent motion. Nor do we see any remarkable development of the pectoral muscles. They are in the Ruffed Grouse entirely normal, as comparison with

the same parts in other—non-drumming—members of the Grouse family testifies. Much more, then, we think would the Ruffed Grouse be unable to produce, with a comparatively slow motion of its wings *through* the air, (i. e. in the same way in which it is claimed the bird makes the first sounds of its drumming,) any relatively louder sound than the Humming-bird.

We think that, while Mr. Henshaw has approached nearest to a solution of the question under discussion, he has misconceived the underlying principle, and followed predecessors who have treated the subject in such a superficial manner as leads one to believe that they never doubted their ability to substantiate their statements. One asserts that a bird's wing brought in forcible contact with its body, may produce a sound to be heard at the distance of a quarter of a mile or more. He thinks not of the physical impossibility of such a result. The truth is, the subject has not been grasped in its full extent. Observers relate their experience and draw their conclusions without considering whether or not they militate against anterior natural laws. They tell us the manner of producing the sound, but do not attempt to expain the cause of it.

Evidently there is some connection between the air and the sound. Of course the primary cause is the vibration of the wings and the immediate result of this vibration, as we understand it, is the compressing of air between the wings and body—first by a slow movement that causes the regularly interrupted "beats" with which the sound begins, and then with such accelerating motion as to cause the sounds to run into each other, and to terminate in a rolling noise resembling distant thunder. The compressed air, escaping from under the wings, causes the "drumming," just as, when applanding a well-acted scene in a play, the more demonstrative of us, bringing our concaved hands forcibly together, cause the inclosed air to escape wtih a report.

We do not hesitate to confess our inability to follow up the course which the subject has taken under present treatment, but hope that our suggestions may interest a more competant hand in it; and that we shall, ere long, know—how the Pheasant drums, why he drums, and the physical cause of the sound he makes in drumming.

DAVID SCOTT.

*Washington, D. C., August, 1876.*

# FLORA COLUMBIANA.

*Continued from page 46, Vol. II.*

A CATALOGUE of the plants growing without cultivation in the District of Columbia:

## GENTIANACEÆ.

SABBATIA.

621. angularis, Pursh.

GENTIANA.

622. ochroleuca, Frœl.
623. Andrewsii, Grieb.
624. Saponaria, L.

OBOLARIA.

625. Virginica, L. Rock Creek.

## APOCYNACEÆ.

APOCYNUM.

626. androsæmifolium, L.
627. cannabinum, L.

VINCA.

628. minor.

## ASCLEPIADACEÆ.

ASCLEPIAS.

629. Cornuti, Decaisne.
630. purpurascens, L.
631. variegata, L.
632. quadrifolia, Jacq.
633. obtusifolia, Michx.
634. rubra, L.
635. incarnata, L.
636. tuberosa, L.
637. verticillata, L.

ACERATES.

638. viridiflora, Ell.

GONOLOBUS.

639. lævis, Mx. Mount Vernon.
640. obliquus, R. Br.
641. hirsutus, Mx.

## OLEACEÆ.

CHIONANTHUS.

642. virginica, L.

FRAXINUS.

643. Americana, L.
644. pubescens, Lam.
645. viridis, Michx. f.

## ARISTOLOCHIACEÆ.

ASARUM.

646. Canadense, L.

## PHYTOLACCACEÆ.

PHYTOLACCA.

647. decandra, L.

## CHENOPODIACEÆ.

CHENOPODIUM.

648. *urbicum*, L.
649. *murale*, L.
650. *album*, L.
651. *ambrosiodes*, L.
var, *anthelminticum*, Gray.

BLITUM.

652. capitatum, L.

ATRIPLEX.

653. patula, L.

## AMARANTACEÆ.

AMARANTHUS.

654. *paniculatus*, L.
655. *retroflexus*, L.
656. *spinosus*, L.
657. *albus*, L.

## POLYGONACEÆ.

POLYGONUM.

658. *orientale*, L.
659. amphibium, L.
660. incarnatum, Eu.
661. Pennsylvanicum, L.
662. *Persicaria*, L.
663. *Hydropiper*, L.
664. acre, H. B. K.
665. hydropiperoides, Michx.
666. aviculare, L. Var. erectum, Roth.
667. Virginianum, L.
668. arifolium, L.
669. sagittatum, L.
670. *Convolvulus*, L.
671. dumetorum, L.

FAGOPYRUM.

672. *esculentum*, Mœnch.

RUMEX.
673. Brittanica, L.
674. *obtusifolius*, L.
675. *crispus*, L.
676. *Acetosella*, L.

## LAURACEÆ.

SASSAFRAS.
677. officinale, Nees.
LINDERA.
678. Benzoin, Meis.

## THYMELEACEÆ.

DIRCA.
679. palustris, L.

## SANTALACEÆ.

COMANDRA.
680. umbellata, Nutt.

## LORANTHACEÆ.

PHORADENDRON.
681. flavescens, Nutt.

## SAURURACEÆ.

SAURURUS.
682. cernuus, L.

## CERATOPHYLLACEÆ.

CERATOPHYLLUM.
683. demersum, L.

## CALLITRICHACEÆ.

CALLITRICHE.
684. verna, L. & var. platycarpa.

## EUPHORBIACEÆ.

EUPHORBIA
685. maculata, L.
686, hypericifolia, L.
687. dentata, Michx.
688. corollata. L.
689. *Cyparissias*, L.
690. commutata, Engelm.
ACALYPHA.
691. Virginica, L.
PHYLLANTHUS.
692. Carolinensis, Walt.

## URTICACEÆ.

ULMUS.
693. fulva, Michx.
694. Americana, L.
CELTIS.
695. occidentalis, L.
MORUS.
696. rubra, L.
URTICA.
697. gracilis, Ait.
698. *dioica*, L.
LAPORTEA.
699. Canadensis, Gaudich.
PILEA.
700. pumila, Gray.
BŒHMERIA.
701. cylindrica, Willd.
PARIETARIA.
702. Pennsylvanica, Muhl.
CANNABIS.
703. *sativa*, L.
HUMULUS.
704. Lupulus, L.

## PLATANACEÆ.

PLATANUS.
705. occidentalis, L,

## JUGLANDACEÆ.

JUGLANS.
706. cinerea, L.
707. nigra, L.
CARYA.
708. alba, Nutt.
709. tomentosa, Nutt.
710. porcina, Nutt.
711. microcarpa, Nutt.

## CUPULIFERÆ.

QUERCUS.
712. stellata, Willd.
713. alba, L.
714. Prinus, L.
var. monticola, Michx.
715. bicolor, Willd.
716. Phellos, L.
717. imbricaria, Michx.
718. nigra, L.
719. falcata, Michx.
720. tinctoria, Bartram.
721. coccinea, Wang.
722. rubra, L.
723. palustris, Du Roi.

CASTANEA.

724. vesca, L,
725. pumila, Michx.

FAGUS.

726. ferruginea, Ait.

CORYLUS.

727. Americana, Walt.

CARPINUS.

728. Americana, Michx.

OSTRYA.

729. Virginica, Willd.

## MYRICACEÆ.

MYRICA.

730. cerifera, L.

## BETULACEÆ.

BETULA.

731. nigra, L.

ALNUS.

732. serrulata, L.

## SALICACEÆ.

SALIX.

733. humilis, Marshall.
734. discolor, Muhl.
735. sericea, Marshall.
736. petiolaris, Smith.
737. cordata, Muhl.
738. rostrata, Richardson.
739. *alba*, L.
740. nigra, Marshall.
741. lucida, Muhl.

POPULUS.

742. grandidentata, Michx.
743. monilifera, Ait.

## CONIFERÆ.

PINUS.

744. inops, Ait.
745. mitis, Michx.
746. rigida, Miller.
747. Strobus, L.

JUNIPERUS.

748. Virginiana, L.

## ARACEÆ

ARISÆMA.

749. triphyllum, Torr.
750. Dracontium, Schott.

PELTANDRA.

751. Virginica, Raf.

SYMPLOCARPUS.

752. fœtidus, Salisb.

ORONTIUM.

753. aquaticum, L.

ACORUS.

754. Calamus, L.

## THYPHACEÆ

TYPHA.

755. latifolia, L.

SPARGANIUM.

756. eurycarpum, Engelm.
757. simplex, Hudson.

## LEMNACEÆ.

LEMNA.

758. polyrrhiza, L.

## NAIADACEÆ.

POTAMOGETON.

759. lucens, L.
var. fluitans, Gray.
760. natans, L.
761. crispus, L.
762. lonchites, Tuck.
763. pectinatus, L.

## ALISMACEÆ.

ALISMA.

764. Plantago, L. var. Amer.

ECHINODORUS.

765. radicans, Engelm.

SAGITTARIA.

766. variabilis, Engelm.
767. pusilla, Nutt.

## HYDROCHARIDACEÆ.

ANACHARIS.

768. Canadensis, Planchon.

VALLISNERIA.

769. spiralis, L.

## ORCHIDACEA.

ORCHIS.

770. spectabilis, L.

HABENARIA.

771. tridentata, Hook.
772. lacera, R. B.

GOODYERA.
773. pubescens, R. Brown.
SPIRANTHES.
774. gracilis, Bigelow.
775. cernua, Richard.
776. simplex, Gray.
777. graminea, Lindl.
POGONIA.
778. ophioglossoides, Nutt.
TIPULARIA.
779. discolor, Nutt.
MYCROSTYLIS.
780. ophioglossoides, Nutt.
LIPARIS.
781. liliifolia, Richard.
CORALLORHIZA.
782. innata, R. Brown.
783. odontorhiza, Nutt.
APLECTRUM.
784. hyemale, Nutt.
CYPRIPEDIUM.
785. pubescens, Willd.
786. acaule. Ait.

AMARYLLIDACEÆ.

HYPOXIS.
787. erecta, L.

HÆMODORACEÆ.

ALETRIS.
788. farinosa, L.

IRIDACEÆ

IRIS.
789. versicolor, L.
SISYRYNCHIUM.
790. Bermudiana, L.
PARDANTHUS.
791. chinensis, Ker.

DIOSCOREACEÆ.

DIOSCOREA.
792. villosa, L.

SMILACEÆ.

SMILAX.
793. rotundifolia, L.
794. glauca, Walt.
795. hispida, Muhl.
796. herbacea, L.

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## FIELD RECORD.

**Grasshoppers in the Northwest.**—The dreaded grasshopper *(Caloptenus spretus)* made another raid, during August, 1876, over a portion of the territory previously devastated by them. The abstract of returns to the Department of Agriculture support Riley's theory that these pests operate westward of the 17th meridian west from Washington. They were first observed about the middle of July in northwestern Minnesota, though authentic reports show their destructive presence as early as the 5th of that month, but their main sweep of devastation dates from about the middle of August. Nineteen counties in Minnesota, McLeod, Yellow Medicine, Faribault, Redwood, Meeker, Nicollet, Blue Earth, Nobles, Stevens, Stearns, Todd, Rock, Jackson, Pope, Renville, Chippewa, Swift and Kandiohi—report their presence. In Iowa they appeared in fourteen of the northwest-

ern counties—Crawford, Clay, Harrison, Calhoun, Humboldt, Cherokee, Sioux, Greene, Montgomery, Audubon, Guthrie, Pottawatomie, Pocahontas and Sac. Missouri reports them only in her northwestern corner county, Atchison. Kansas, had a destructive visitation, but not so general as in previous years, reporting them in only nine counties—Mitchell, Pawnee, Washington, Ellis, Reno, Norton, Graham, Rice and Republic. Nebraska suffered more severely, in eighteen counties—Furnas, Knox, Osage, Cuming, Dodge, Webster, Franklin, Saunders, Seward, Thayer, Boone, Lancaster, Platte, Hall, Wayne, Merrick, Antelope and Richardson. In all, sixty-one counties report officially the presence of these pests. Their ravages were in many cases very severe; in others they did but little damage. In some counties, all the late grain, grass, fruit and vegetable crops were swept; in others the destruction was limited to a few growing crops.

One correspondent examined the soil of an oat-stubble field, upon which they had settled for oviposition. He estimates that 15 deposits of eggs, on an average, were made on each square inch of ground, and that each deposit averaged 30 eggs. This gives an aggregate of 2,826,688,000 per acre. This doubtless is largely in excess of the average, but it illustrates something of the stupendous multiplication of insect life.

The English sparrows lately imported, did good service in some counties in destroying the pests, and a wail of regret over the wholesale slaughter of insectivorous birds now comes from all parts of this afflicted region. It is a question affecting our civilization, how we may be able to abate this terrible nuisance; no adequate remedy has yet been suggested.—E. C. Merrick.

**Crows Seeking Water.**—I send you an Ornithological note, which may be of interest to the readers of *Field and Forest.*

During the protracted drought of June and July in some of the eastern counties of Virginia, it was observed that nearly all the water-melons were pecked in deep holes by the crows in their search for water. How did they select the water-melon from pumpkins, squashes &c, as a water supply?

It was said by Pliny, I think, that ravens have been known to drop pebbles into urns or crevices containing water beyond their reach, so as to raise it by displacement to an accessible level.—N. B. Webster.

**The Colorado Beetle.**—Apropos of the fact that the potato beetle has appeared upon Block Island without perceptible means of ferriage from the mainland, the New London *Telegram* says that the captain of a New London vessel reports being boarded while at sea by the genuine Colorado beetle, and they came in such numbers as to necessitate the closing of the hatches. Those who regard this as a rather improbable story are informed that at Millstone and other places, for some time past, the pest of the country has come in on the waves by the million. Only a few miles out of town they can be found on the shore, washed in, but still living, in such immense numbers that the stench coming from them fairly poisons the air.—*Norwich Bulletin.*

We cannot say how *accurate* the above report may be, but in regard to the first two lines we can say that having spent some little time upon the island mentioned, in August, we have very serious doubts. Diligent inquiries were made at each end of the island, of tillers of the soil, in regard to the presence of the pest, and as to whether any damage had been done to the potato crop, but the good people were not only in blessed ignorance of the existence of such a creature, but had noticed nothing eating the vines. In one of the fields we passed through, the tops were all dead, but they certainly had died "a natural death."

Block Island is thirty miles from the Rhode Island coast, and only has regular steamer communication with the mainland about two or three months in the year. A catalogue of its Insect fauna would make quite a respectable pamphlet, but we doubt at present if the *Doryphora 10-lineata* could be inserted.—C. R. D.

**Second Blossoming.**—An Arbre Courbe pear tree in the grounds of the Department of Agriculture has just blossomed (September, 8th) for the second time this season. The first set of leaves and fruit were destroyed by a small fungus, in July, and mostly dropped off, and the present show of young leaves and blossoms would seem like a premature development of buds, properly belonging to the next season.—W. H. S.

**Tipularia discolor.**—Mr. L. F. Ward of the Naturalists' Club has succeeded this season in discovering a locality where an abundance of this rare and interesting Orchis can be obtained in the flowering state. As is well known to the members of the club, this plant is common enough during the season of the year when the con-

spicuous root-leaf is on ; the difficulty has been to find it in its flowering condition, which does not occur until long after every trace of the leaf has disappeard, and careful observation has proved that it is only under peculiar circumstances that it blooms at all, so shy and coy does it appear to be. And when it does send up its brown scape so near the color of the leaves through which it peers, and open its brown-purple flowers with scarcely a different hue, it is a rare chance if any botanist happens to detect it during the brief period of its evanescent existence in this state.

For several years Mr. Ward, Prof. Doolittle and Mr. J. M. Comstock of this city, have carefully watched the phases of this plant and marked with the greatest care all the principal localities where it is found in this vicinity, but have heretofore only succeeded in securing enough flowering specimens to supply the local demand. The new locality and from which they hope to supply exchanges, is on the Virginia shore of the Potomac not far above the Three Sisters. The exact time for collecting it in flower seems to be the last week in July.

**Sinea Multispinosa.**—This insect, belonging to the true bugs, hitherto supposed to be only beneficial, by destroying plant lice, and other insects injurious to vegetation, is reported as doing considerable damage to apple orchards, reports coming from as remote points from each other as Morris County Texas, and Mifflin County Pa., one orchardist in the first named locality losing his entire apple crop through their ravages. In Texas this is the first year they have ever been seen, but in Pennsylvania they appeared last year in small numbers, and the present season many orchards are ruined by them.

They make their first appearance in June (earlier at the South) and continue troublesome for six or eight weeks. The blossoms are first attacked, and killed out, after which they "sap" the limbs often to the trunk.

The small twigs of new growth suffer most, though the insects sting or puncture the older wood to a certain extent; wherever they operate, the bark turns a light brown, and the twig dies in a few days. When the insects are not at work on the twigs they lie concealed in the dried up leaves. It was noticed in Texas that young trees two or three years old, that did not bloom, escaped injury, and appear perfectly healthy.

**"Watermelon Blight."**—For a number of years an unknown insect—probably an Ægerian—has been destructive to melon vines in the vicinity of Augusta, Ga., to a greater or less extent every year, but the present season their ravages have extended over every part of the melon producing section contiguous to Augusta. Many hundred acres are devoted to the culture of this fruit, and this year many fields have been totally destroyed.

According to Mr. A. H. M. Laws, who has observed their mode of warfare, the insects attack the plant at various stages of its growth, sometimes when young, and often when the fruit is nearly ripe. Sometimes one of the branches alone is killed, but most frequently the crown, from which the branches shoot, appears to be the point of attack, and all die; the long tap-root does not appear to be injured. Four years ago the insect was only to be found in occasional hills, now it spreads over every field.

**Hydrodictyon utriculatum,** Roth.—Three years ago we discovered this very interesting *alga* in large masses, in some pools near the Baltimore and Potomac depot, now filled up. We have not succeeded in finding it since, until a few days ago, (September 13th) strolling along the river bank at the foot of Seventeenth street, it was seen in the bottom of a stranded canal-boat. The old fronds are breaking up and there is a good supply of young nets about an inch long. To any of our microscopic readers we cannot recommend a more interesting object than some of these placed in a large jar of fresh water, when their growth and reproduction will offer entertainment for a considerable time.—W. H. S.

**What was their Motive?**—A few weeks ago, in the country, I was amused greatly at the proceedings a flock of young turkies in a field. Two of the bipeds had evidently fallen out about the possession of some grasshopper, and were having a little war in Turkey all to themselves; after several minutes of manœuvring, the smaller of the two, doubtless feeling himself no match for his antagonist, beat a retreat. The larger one followed, however, and after considerable skirmishing, came up to his victim, and was proceeding to administer a sound drubbing, when half a dozen of the flock simultaneously rushed upon him, standing between the two till peace was again restored.

**Euschistes Punctipes.**—This insect has been winning a name in Virginia, by preying upon the Colorado potato beetle. We do not remember of seeing its name in the list of the foes of "the spearman" before, and so hasten to enroll it.

## EDITORIAL PENCILLINGS.

The grasshoppers have again come down upon portions of the States lying west of the Mississippi, and besides doing a great deal of damage, have deposited their eggs, literally by the million, for the next season's broods. It is only last year that they laid waste the farms and homesteads of the rich Missouri Valley, bringing untold suffering and loss, and the prospect now seems good for another terrible scourge in 1877.

Our entomologists have studied the insect's habits as far as limited opportunity would allow; the farmers have certainly done all they could do in the matter, and even the legislatures of some of our western States have voted money for bounties for the destruction of the insects, when upon their borders; but from some unknown cause our national government seems to close its eyes to the fact that there is anything left for it to do in the matter. When an appropriation of $30.000 was asked last year, with which to buy seeds for the sufferers, it was given, as it should have been, but when scientific men, looking not to the immediate present, but to the future of our country, ask that a commission be authorized to try to find the *source* of this torrent of destruction that, it seems, is to sweep down upon our farming lands year after year, and *there* seek the remedy, the matter is bandied about in committees, this and that amendment is proposed, it is wound up in red tape, and finally like the coin in the hands of the prestidigitator, it disappears altogether, and nothing is done. Well, it is not strange; there are few farmers among our legislators, and comparatively speaking no men of science, and consequently no one to take a genuine interest in the matter. Congress, notwithstanding, has a duty to perform, and the sooner it is accomplished, the better it will be for the farming interest of the west, and for the country at large. Let a commission be authorized, for one year, or several, and let two or three practical, economic entomologists, that are not afraid of rough field work, be appointed on it, appropriate money sufficient for the work, and results

*will* be obtained that will pay a *big principal* on the *little interest* invested.

But until somthing is done, we cannot urge too strongly the value of fighting the pests by State legislation, that is, by the prompt appropriation of money by States invaded, for payment of bounties for their capture and destruction. Place a price per bushel upon grasshoppers, as soon as they appear in numbers, and pay for all that can be gathered, and it immediately becomes a matter of interest to the *whole* community.

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## OUR BOOK SHELF.

MANUSCRIPT NOTES FROM MY JOURNAL, OR ILLUSTRATIONS OF INSECTS, NATIVE AND FOREIGN. ORDER HEMIPTERA, SUB-ORDER HETEROPTERA. BY TOWNEND GLOVER. [quarto. pp. 134. plates X.] Washington, 1876.

This is the third volume issued by Prof. Glover for private distribution, and like the previous one, on the Diptera, shows great labor and industry in its preparation. The entire work is printed on plate paper, and the "letter-press" is in the author's well known chirography, the pages having been transferred to lithographic stone from the copy furnished. The plates also, are engraved on copper by Mr. Glover, in hours of leisure from official duty.

The work opens with an introduction followed by nearly three hundred figures of our principal plant-bugs, with latest names and references; then comes the Arrangement of Families, and the Classifications adopted by various authors, List of Families and Genera, with Synonyms, Habits, Food, &c., Predaceous or Parasitic Heteroptera, Vegetable and Animal substances they destroy, and insects in turn destroyed by them, Authors and Authorities referred to, Abbreviations of Remedies used, of Sections, Families, Genera and Species, with derivation of names, Classification, Notes and Extracts from Prof. Uhler's list, etc., etc., the whole forming quite a comprehensive work on the subject, "boiled down" to the smallest space. But fifty copies have been printed, and these are distributed to Authorities and Institutions, both in this and foreign countries, so the edition is exhausted almost as soon as published.

While this plan seems to carry out the immediate views of the author—and it is a matter wholly for himself to decide—we think it is not altogether the most suitable way to publish a work, the several parts of which have taken the best years of a lifetime for completion. If we understand the author right, the work is intended, when finished,

for students, for young entomologists, and for that great class of not wholly scientific observers, the agriculturists, who need just such plain figures, and brief descriptions of habits &c., as are here given, to aid them in their pursuits; and yet none of these have access to its pages. If we may be pardoned a suggestion, let the work be given to some enterprising publisher, who will publish it in parts at a fair price, and we have no fears but that the volumes would find ready sale.

The author should give it to the world himself, for we fear if the work is left for those that come after him, others will take the credit and reap the benefit, even if the work is published at all. To the suggestion that Congress may take the matter in hand, we have only to point to the reckless way in which such public works are often distributed, and ask if there is not a better and a more indepenent plan.

Report upon Geographical and Geological Explorations and Surveys, in charge of First Lieut. Geo. M. Wheeler. Chap. iii Vol. V. [4to. col'd plates xv.] Washington, 1876.

This is an elaborate work of over 400 pages, upon the Ornithological collections made in portions of Nevada, Utah, California, Colorado, New Mexico and Arizona, during the years 1871, 1872, 1873 and 1874, by Mr. H. W. Henshaw, and is a work which must prove of the greatest value and assistance to students of ornithology. The collection comprises over 3,000 specimens, 298 species being enumerated. The classification and nomenclature adopted, for the land birds, is that used by Baird, Brewer and Ridgway in their work on N A. Birds, while for the aquatic species, Dr. Coues' system is followed. In addition to full descriptions, and synonyms sufficient for purposes of study, the author has given much valuable information on the natural history of the species, as to habits, nesting, breeding, &c., which attaches a popular interest to the work. Two new species are described.

As an introduction to the volume, Dr. H. C. Yarrow, Surgeon and Zoologist of the Expedition, gives a brief *resume* of the operations of the Natural History branch of the Survey, following a letter from Lt. Wheeler. The whole work speaks for itself, and we congratulate those in immediate charge of the Survey, on having secured the services of so thorough students and courteous gentlemen, as are found in the members of the Natural History Branch.

Eighth Annual Report on the Noxious, Beneficial, and other Insects of the State of Missouri. By Chas. V. Riley. [8vo. pp. 185. Illus. lv.] Jefferson City, 1876.

Like all of Mr. Riley's valuable reports, full of interesting matter for entomologists as well as agriculturists. The subjects treated are: The Colorado Potato Beetle, Canker Worms, The Army Worm, The Grape Phylloxera, The Yucca Borer, and Supplementary Notes on

the Army Worm. Several ingenious plans are given for destroying the potato beetle or preventing its ravages, and two new machines, for the same purpose, are described; the results of numerous experiments with Paris-green, to ascertain if poisonous to the tubers, are also given. *Paleacrita vernata* and *Anisopteryx pometaria* are compared from egg to imago, to show why they should be placed in separate genera, the first named genus having been erected by Mr. R., for the old and commonly accepted species of canker worm. *Leucania unipuncta*, the army worm, is next treated in a paper well illustrated, and replete with interesting statements as to natural history, habits, parasites, etc. The greater portion of the remaining pages are devoted to the Rocky Mountain locust, in which is given a history of the terrible visitation of 1875, together with much valuable information, statistics, &c., from actual investigation, and various other sources.

While upon the subject of legislation, both national and local, the author indulges in a little plain talk, which is much to the point, though he should relinquish the idea that the Commissioner of Agriculture has any duty in the matter under consideration, as he has had neither the power, or the funds, to authorize such an extended investigation as this vexed grasshopper question demands; however, before seeing Mr. Riley's report, we had given our views on the subject, and they will be found upon another page.

ANNUAL REPORT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, FOR THE YEAR 1875. BY WM. SAUNDERS, REV. C. J. S. BETHUNE, AND R. V. RODGERS. [Large octavo. pp. 54. Illust. xxx.] Toronto, printed by Hunter, Rose & Co.

The Annual Report of this flourishing Association of Entomologists "across the line" is again before us, and contains the usual amount of interesting matter. In addition to papers by the gentlemen named above, upon the subjects of noxious insects, it contains reports of meetings of the several branches of the Society, annual addresses of the retiring and incoming presidents, with other matter, and the paper by Dr. LeConte on methods of Subduing Injurious Insects to Agriculture, read before the American Association for the Advancement of Science, at the Detroit meeting.

In the report upon insects, the first paper, by Mr. Saunders, is upon the subject of Canker-worms. The habits of both species are fully described, with wood illustrations and a page is devoted to remedies. Mr. S. also presents notes of the year, and a paper on some of our common Insects. Mr. Rodgers in a paper bearing the last named title gives the history of the Luna moth *(Actias luna)* and Mr. Bethune treats in an interesting manner the subject of the Western Locust, *(Caloptenus spretus)* devoting several pages to the means of reducing their ravages.

## Publisher's Department.

Field and Forest is a monthly publication devoted to the Natural Sciences, and is also the Bulletin of the Potomac-side Naturalists' Club of the District of Columbia.

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Contributions upon subjects pertaining to Natural History, are solicited from all.

Address all communications Editor Field and Forest,

P. O. Box 273, Washington, D. C

### ACKNOWLEDGEMENT.

We are under obligations to the Interior Department for a copy of Major Powell's beautifully illustrated report of Explorations of the Colorado River of the West, and its tributaries, during the years, 1869 to 1872 inclusive.

Also for a copy of Dr. Coue's Birds of the Northwest, a hand-book of the ornithology of the region drained by the Missouri River and its Tributaries. This valuable work is published with the reports of the Hayden's Geological Survey of which it forms a part.

Flora Columbiana.—This Catalogue of the plants of the District of Columbia, which has appeared in several numbers of *Field and Forest*, is now published in pamphlet form, and is ready for distribution. It has been prepared by a committee of botanists appointed by the Naturalists' Club, and is the record of the botanical explorations of the club for the last five years.

Brereton's catalogue, "*Flora Columbianæ Prodromus*," published in 1830, and now out of print, is the only previous attempt that has been made to give a complete list of the plants of this locality.

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3 & 4. Amylaceous discs produced by acid on the cellulose.

5. Discs expanded into globules resembling starch.

# Field and Forest

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## The Edible Crab of Maryland, &c.

*Callinectes hastatus*, Ordway.

During several Summer excursions to various parts of the ocean coast and bays of Maryland and Virginia my attention has been directed to the female crabs of the genus *Callinectes* carrying sponge (as the fishermen and sailors call it) in a large bunch, or mass, beneath the hinder part of the body. This spongy mass consists of hundreds of thousands of minute eggs, resembling the roe of fish, densely packed together, filling the whole space between the extended tip of the abdomen and the second sternite. This mass is very conspicuous, even in the rapidly swimming crab, and causes the abdominal flap (called apron by the fisherman) to be opened almost to its fullest extent.

In a crab which measured 6 inches in width by 2½ inches in length, the bunch was 2¼ inches across, 1¾ inches wide, and 1¼ inches thick. The smallest female observed with eggs was 4½ inches across by 2 inches in length, and the egg-mass measured 1¾ inches across by 1½ inches in width and 1 inch in thickness. Some gigantic females measured as much as 9 inches between the tips of the shell.

At first the eggs are of an amber-yellow color, translucent and adhere with great tenacity to the long slender fibres of the abdominal legs. They are spherical and about one fifth of a millemetre in diameter; and after the young embryo has advanced in maturity, the mass becomes more opaque and of a dull rust-brown color. At this time, also, two minute black specks make their appearence at one end of each egg, which indicate the place of the future eyes.

The abdominal legs, four on each side of the crab, serve to hold the mass of eggs in place, and to give them the motion which bathes and saturates them with the salt water in which they hatch. These legs consist of two branches spreading widely apart, and resembling flattened quills; the innermost is the broader and longer, consists of two joints hinged together below the middle, and beset on both edges with bundles of long stiff bristles which serve to keep the inner layers of eggs in place. The outer branch tapers to a slender point, is curved like a scimetar, and is bearded each side like the vanes of a feather. This feathery expansion spreads off in all directions when bathed in the water, and fixes the outer layers in such a manner as to give to the mass a rounded contour.

When ready to hatch the eggs, the female seeks some sheltered bay, out of the reach of surf, where the water is salt and shallow, and after settling a little way into the muddy, or even pure sand, she rests stationary and incubates until the young are hatched. The precise number of hours requisite for this purpose has not yet been ascertained.

The season of incubating varies somewhat with the temperature of the locality. In places where the water becomes warmed by the sun in late June, they begin to incubate at that time; but the great bulk of the season properly lies between the middle of July and the latter part of August. We observed them in great numbers resting upon the slightly muddy sand of the estuaries and inlets of the coast of Accomac county, Virginia, in the early part of August. As the season advances they become gradually less numerous, until about the first of September, at which they time they have generally disappeared.

After incubation the female usually, if not always dies, aud the dead body is washed upon the beach by the tide to serve for food to the many kinds of insects and other creatures which abound there. Every storm throws huge piles of them upon the shore, and the fishermen's seines drag multitudes to destruction.

The males, however, are not so subejct to a short career; they are more active and vicious, swim and travel over long distances, and venture to ascend in the rivers and creeks almost to the point where the fresh-water unites with the brackish or salt-water.

My specimens of the first stage, or *Zoea*, having by accident been lost or mislaid, I am unable at present to give a description of them.

The *Megalops*, or next stage of the young, propably one day old, is

an active little creature, having more resemblance to a cray-fish or lobster than to its parent crab. It crawls with considerable rapidity over the muddy and sandy sea-bed in shallow water; or swims in shoals or streams, of two feet or more in width, with great regularity and precision of movement. Each beside the other swims with steady stroke, near the surface, and leading in one direction, usually towards the deeper water.

Its body is whitish translucent, glistening, and the shell so thin as to be almost transparent. Its eyes are very bright blue, and being quite large heighten the pleasing effect of its appearence as it moves through the water. The head is almost quadrangular, raised like a tablet, with the front margin triangular and provided with a long slender stylet, projecting forward from the centre. The carapace is strikingly different from that of the older crab; it is long-quadrangular, raised above the level of the abdomen, and the sides are rounded off and slightly sloping towards the under side. Its four pairs of hind legs resemble those of the adult, except in the last joint of the posterior pair, which is not widened into a broad paddle, but, while being of the shape of a sword-blade as the others, is a little more expanded, and adapted both for swimming and creeping. Besides this the tip of each foot is provided with a slender spine, which enables the creature to hold firmly to any object upon which it may alight.

The abdomen stretches back long and narrow, a little tapering towards the tip, not having the tail expanded as in the lobster, but with the end piece long-quadrangular, a little rounded behind, and terminated by a few slender threads.

Vast numbers of this *Megalops* were observed by me on the fourth day of this month in places where the female *Callinectes* was incubating. A few *Zoeas* were in the swarms, and I was enabled to secure a large supply of specimens. The muddy sand was crowded with them around the female crabs, so that stirring of the bottom set them streaming in every direction. They were observed in many places, both at an earlier and later date, but never in such remarable swarms as on that occasion. The weather had then been calm for several days, and the remarkably hot season no doubt favored their developement. They generally measured 3 millemetres in length, by 1 millemetre in width, while the abdomen was scarcely more than a half millemetre in width.

This crab not only contributes to the sustenance of man; it forms the most abundant food of a great proportion of the other tenants of the seas. Perhaps no creature of the water multiplies in such countless swarms. Were it not for the great number of enemies which are ever on the alert to devour it, the sea might be crowded so full of crustacean forms as to leave no room for other animals.

However, it is probable that not the one-hundredth part of the ripe females are able to remain undisturbed long enough to hatch their eggs. Skates, Rays and other monsters of the deep are continually searching for them, and nearly all the varieties of our larger food-fishes pursue them to destruction. The patient females hide in the sea-weed or bury themselves in the mud to escape their persecutors, but rarely do they succeed in evading them. When aroused they may protect themselves and eggs with savage energy, but in general they remain so quiet as to be touched by the foot without causing them to show signs of irritation.

PHILIP R. UHLER.

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## Sexual Variation in the Genus Leucosticte.

In Mr. Ridgway's recent reply * to my critique † upon his "Monograph of the Genus *Leucosticte*," he states, very truly, that "the point at issue is, whether the sexes of '*tephrocotis*' and '*littoralis*' do, or do not, differ in plumage," and, he should have added, in size. Having shown, in my above-cited paper, that there exists in these forms the usual amount of sexual variation in size found in this genus, and that there is also a well-marked sexual difference in color, Mr. Ridgway attempts to avoid a full admission of the correction by saying that this, "in a diagnostic sense, means whether there are, or are not, *absolutely constant* sexual differences!" Under the heading "Sexual Differences," Mr. Ridgway, in his Monograph, ‡ says: "The American species of this genus fall into two distinct groups according as the sexes do or do not differ in appearance. In *L. tephrocotis*—in all its forms—there is *not the slightest sexual difference* § ; but in *L. atrata* and *L.*

* This Journal, September, 1876.
† Bull. U. S. Geol. and Geog. Survey of the Terr., Vol. II., No. 4, pp. 345-350.
‡ Bull. U. S. Geol. and Geog. Survey of the Territories, 2d Ser., No. 2, p. 60.
§ Not italicised in the original.

*australis*, the distinction is very marked." Without attempting to squarely meet this issue, he calls attention to supposed differences in the character of the specimens constituting our respective series, remarking that while his series "embraced both forms in very dissimilar Winter and Summer dresses," mine "embraced only Winter specimens." As a "matter of fact," however, mine were collected (as shown by the collector's labels,) at different times from November to March 11, while his latest published dates are March 20 to 25 for *tephrocotis*, and March 10 and April 18, (single specimens each) for *littoralis*.

The main point at issue being substantially conceded by Mr. Ridgway, I will say but a word or two on minor points. In respect to my still regarding all the forms of *Leucosticte* as "intergrading forms," Mr. R. labors under a grave misapprehension. The main subject of my paper being sexual variation in two varieties of *L. tephrocotis*, I very naturally entitled my article "Sexual, Individual and Geographical Variation in *Leucosticte tephrocotis*;" but I see nothing in the article that need to lead to the supposition that I accorded any of them, except *L.* "*atrata*," a different rank from that which Mr. Ridgway claims for them in his Monograph. On the contrary, I intended to imply, by adopting, without reservation, (by the use of quotation-marks or otherwise, Mr. Ridgway's nomenclature, that I did admit all except *L.* "*atrata*," in the same sense as did Mr. R., himself, and trusted that I had made that fact evident. I regret that he has been so far misled as to feel called upon to re-argue and re-affirm the specific and varietal rank of the other forms, or that he should feel warranted in assuming that the views I expressed four years since have been unmodified by the subsequently greatly increased knowledge of the different forms of this, at that time, little known group. Perhaps I may be allowed, in this connection, to remind Mr. Ridgway that he would not, at that time * admit even the varietal distinctness of *L. australis* from *L. tephrocotis* proper, while at the same time *L. campestris* was so recognized by him, and so retained two years later when *L. australis* was formerly introduced as a "*variety*." † I may add that it was partly in deference to the opinion of Mr. R. and other well-known

* See Baird, Brewer and Ridgway's Birds of North America, Vol. I, p. 504, footnote, 2.

† Ibid., Vol. III, p. 509.

Washington ornithologists that led me to regard *L. australis* as representing only the breeding dress of the Southern form of *L. tephrocotis*, after I had gone so far as to formally describe it as a variety, making the suppression in my last revise of the proof-sheets of that part of the "Ornithological Reconnoisance." With my specimens before them, the authors of "North American Birds" say that "it seems very reasonable to suppose that these specimens represent the breeding plumage of that [*L. tephrocotis*] species,"—the theory I at first entertained and finally adopted. It thus appears that even Mr. Ridgway's opinions have considerably changed in four years, respecting the character of the "different forms" of *Leucosticte*. ‡ He ignores, however, the fact that one of the forms (*L. "campestris"*) to which I referred in 1872, as possibly founded on individual variation, he himself, in 1875, regarded as "unstable as a race, from the fact that scarcely two specimens are alike." Mr. Ridgway's commendable acuteness in recently relegating certain specimens, from my description of them in 1872, to his several species and varieties, results from the examination of a large amount of material not accessible to any one at the time I wrote. *L. "atrata"* is now the only "form" of *Leucosticte*, respecting the character of which we now differ, and this, Mr. Ridgway admits is "possibly, but *but not probably a melanism of L. tephrocotis.*" The apparent difference between us on the subject of species and varieties in this group results simply from his choosing to quote my opinions of 1872 as being those of 1876.

In saying that the measurements, given in my late article, (l. c., pp. 349, 350,) "were made by the collector from fresh specimens, and as the sex of each specimen was determined by actual dissection, they are of special interest in the present connection," I intended no reflection whatever upon the "experience" and "veracity" of Mr. Ridgway's correspondents, the remark having the most evident allusion to the fact that in only a relatively small proportion of the specimens of which he gave measurements was the sex indicated.

The sweeping charge Mr. Ridgway brings of the almost total unreliability of my scientific work I do not feel called upon to further notice, the spirit animating his whole article being in itself a sufficient reply. Yet I may thank Mr. Ridgway for thus giving me a favorable

‡ In his last notice of the group, (this Journal, September, 1876,) he raises *L. griseinucha* from a "variety" of *L. tephrocotis* to the rank of a distinct species.

opportunity of referring to one or two other matters. In the "Mammals and Winter Birds of East Florida," I freely confess to having too hastily formed conclusions "regarding the relationship of certain congeneric forms" in several instances among the *Falconidæ*, and in one or two other groups, *(Bucephala* and perhaps in *Centurus,)* and that I made a mistake in respect to *Pipilo macronyx*, but the question of whether certain forms referred to are "species" or merely "geographical races" does not seriously affect the points then under discussion. Probably there is still a difference of opinion between Mr. R. and myself, respecting several of the components of the groups in question. The case of *Peucæa "Cassini,"* however, is somewhat different, as is shown by the following quotation from "North American Birds," (Vol. II, p. 43,) published two years after the occurrence of the alleged gross blunder. In the above-named work it is stated that "the *general acceptance* of the name *Cassini* has been that of a term designating a variety of the common species,"—which is just the sense in which I used it, the discovery of the impropriety of which had not, at that time, been made public.

Mr. Ridgway, perhaps I may be allowed to add, has had to correct his own "hasty conclusions," or has had them pointed out by others, quite too often for such criticism to come with very good grace from his pen.

J. A. Allen.

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## Vegetable and Animal Cellulose.

In each of the monthly reports of the Department of Agriculture for July, 1875, and May and June, 1876, appears an article on the subject of cellulose, both vegetable and animal. The first article relates mostly to the discoveries and observations of the scientists of Europe on animal cellulose, and the second to experiments based on them, together with others made by myself with their results, being really a continuation of the original observations of Virchow. Any person who has given this subject full consideration will comprehend the scope and tendency of these investigations. If it can be shown, to a demonstration, that vegetable cellulose is a constant constituent in the organs and blood of the higher animals, including man, we establish the fact

that the bases of a fermentable body is in them, since cellulose is convertible by animal ferments, and acids into starch, and the latter directly into grape sugar, a fermentable substance. It was supposed, at one time, that cellulose belonged exclusively to the vegetable kingdom, yet we have discovered in the inferior animals, as in the *Ascidiæ* a complete tissue of cellulose. (Lowig and Schafer, Ann. ch. Pham.) c. 312. From his analysis of the mantles of the *Pyrosomidæ*, *Salpidæ* and *Phallusia mammillaris* he finds that the tunicine derived from them is identical with vegetable cellulose. There are many other proofs that a substance resembling cellulose and so-called amylaceous matter has been found in the higher and lower animals by European scientists. The much discussed corpora amylacea are pronounced by Nageli to be really and truly starch. (Virchow, p. 230, Cellular Pathology.) But there are other bodies discovered and described by Virchow, resembling cellulose in a condition between cellulose and starch. In blood, Virchow states that he has never found any thing resembling amylaceous matter. In the presence of professional men and microscopists of this city I have made the following experiments: A drop of blood was drawn from one of their fingers and placed on a glass slide, followed by one drop of concentrated muriatic acid, than by one of amber-colored tincture of iodine, and again by one of concentrated sulphuric acid. A glass cover, say one inch in diameter, was placed over the mixture, and viewed with powers varying from 50 to 150 diameters. Sometimes discs were seen, not *blood discs*, but blue amylaceous matter. These often form into globules; all the viscera of higher animals have given similar results. The position to be taken in this matter is one of interest, view it as we may. Either the amylaceous matter is in the blood or in the alcholic solution of iodine, or in the muratic acid employed, or it falls from the atmosphere. It cannot come from the sulphuric acid, because such bodies would, if allowed to remain in that liquid, become grape-sugar or be carbonized, and their structure would be wholly destroyed. I have sometimes found in the alcoholic solutions of iodine the hairs of plants and other vegetable forms. For the performance of such investigations, therefore, unusual care is required. The chemicals must be pure, and every substance used in cleaning glasses should be composed of animal, rather than vegetable matter, and all vessels into which the chemicals are placed should be exposed within and without to the action of flame to destroy cel-

lulose or other vegetable matter present in them. Plate I represents a form of cellulose I have found while experimenting on brain. The discs and blue color are produced by the action of the acids and iodine. The editor of the London *Microscopic Journal*, in his last edition, wholly misconceives and misconstrues the objects of my microchemical investigations, and asked the question, "Will any one who has ever examined the blood under a high power read the subjacent lines with approval? * * * Why, he could barely see the blood-globules of man with such a power," (150 diameters.) I hope that those who may read the present article, as well as my former ones, will not fail to understand that I allude to amylaceous discs. When I propose to examine the blood corpuscles I shall use powers suitable for that purpose.

I believe the method I propose to detect cellulose in its various forms, the tubular, membraneous, and amorphous conditions, is new. The following will illustrate my views: Place in a beaker, say 50 grains of clean cotton or flax fiber, to which add about one ounce of muriatic acid, (concentrated,) and apply a gentle heat; when the cotton is half dissolved, stop the action; when cold, add a quantity of distilled water to the mixture, when a white precipitate will fall; remove the precipitate and dry it, and keep it in a bottle for use. Place a small portion of this mixture, composed of partially dissolved and precipitated cellulose, on a microscopic slide and apply the acids and iodine, as described in the blood-experiment, when a very interesting sight will be seen. The precipitated cellulose (amorphous) will appear blue, but without structure, while the undissolved, tubular fiber will be changed into discs, more or less depending on the chemical action used in the last experiment. *Some* vegetable-cell membranes may be converted into the blue amylaceous conditions, as that of the orange and lemon, while the starch-cells of the potato are never rendered blue by this process, although doubtless cellulose. I propose to investigate and demonstrate, by these tests, the presence of cellulose, or it may be its absence, in animal tissues and fluids.

The application of a solution of iodine, simply to corpora amylacea is not a favorable method of defining the true character of the substance. If corpora amylacea were originally cellulose the purple, or redish color, produced by the simple use of iodine would only indicate that a degeneracy of the cellulose had taken place by animal ferments,

or under other conditions; and in the presence of a weak acid, or even water, the starch would become purple or blue; but, on the other hand, were the corpora amylacea subjected to the process I propose, their true character would be seen. Were they, or any part of them composed of tubular structure they would be converted into discs, some of which would expand into globules resembling starch, while the membranous portion, if present, would not change in structure, unless the sulphuric acid were used too strong, when it would wholly disappear by solution forming new products.

Since writing the above, it occured to me that still greater care should be employed in making tests for amylaceous matter in blood, than I have heretofore made. I therefore renewed my experiments, commencing as follows: Four new slips of glass, 1 by 3 inches, were immersed in c. p. concentrated sulphuric acid, together with all the glass rods and phials used in my experiments. If amylacious matter were on any of the vessels or glass rods used, the acid would quickly destroy it. These respective instruments were washed in distilled water, and each submitted to the action of the flame of a Bunsen burner. A pen-knife was subjected to the same flame until it changed from a white to straw color. My hands were washed, and dried with leather, and my forefinger being punctured with the point of the knife, a drop of blood was removed from it and placed on one of the plates of glass, 1 by 3 inches. The acids and iodine were used as described for blood. A power of one hundred diameters was employed to examine the results of the chemical action, when several well-defined blue amylaceous forms were seen, and when examined by the higher powers exhibited no structure, but resembled spots of starch spread out. A second experiment was made, and similar blue amylaceous spots were seen moving about in the liquid. I next made experiments with chemicals, from the same phials, combining them without the blood, and placing them on other slides carfully prepared, but no blue amylaceous matter was seen. When tincture of iodine, muriatic and sulphuric acids are combined on a microscopic slide, and viewed with a power of about 100 diameters, purple liquid globules are seen; but these, in the absence of cellulose or cholesterine never assume the blue color.

To use high powers for the examination of boiled starch will avail nothing, because it is without structure. One of my experiments, alluded to by Dr. Lawson, editor of the *London Microscopical Journal*,

consisted of boiling the fibre of blood in caustic potash, with the evident intention, as any one skilled in the rudiments of chemistry would suppose, of destroying all animal matter, as we generally understand those terms; but if cellulose is present in the mass of the substance it will not be destroyed by treatment of this kind. The strength of potash solution used consists of about four ounces of water to about one of caustic potash. When the nitrogenous structure is supposed to be destroyed, including blood corpuscles, and the mass is rendered homogenous, I test for cellulose. I deem it reasonable to say that any one accustomed to the use of the high powers of the microscope would soon abandon his investigations in search of blood-globules in such homogeneous matter, but by the means I suggest every portion of cellulose present will spring into view, and will expand under the treatment twenty fold. I now believe this method is somewhat objectionable from the liability of foreign substances coming in contact with the matter under investigation, the potash might be even contaminated by the woody and cotton fibers. I now prefer operating on blood directly with muriatic and sulphuric acids, and tincture of iodine, as previously described.

When we desire to see the microscopic structure of a plant-leaf we render it transparent, and, by a system of staining, its mechanical divisions are more clearly defined; but if the object of the investigation is to discover the relative amount of amylaceous cellulose present, microchemistry takes a very different course. The leaf may be boiled in caustic potash to remove all soluble matters consisting of starch, &c. The potash should next be removed by distilled water and other means. If the remaining mass of cellulose is submitted to the acids and iodine test, the easily digestable cellulose will be converted into a blue mass, but the vascular bundles of the leaf will retain their perfect structures and would prove, if used as food by animals, very indigestable, as such cellulose structures resist fermentation for years. Many of the grasses are largely composed of this woody structure and are therefore better fitted for the manufacture of textile fabrics than for the feeding of cattle; but should the microscope reveal that the larger proportion of cellulose is converted into a blue mass, we conclude that the grass will excel as a fat-former. The illustrations represent some of the out-cropping of micro-chemical investigations in cellulose, as relates directly to agriculture.

The general reader should understand that there are only three substances known in nature, cholesterine, cellulose, and starch, which exhibit a blue color when sulphuric acid tincture, or solution of iodine are applied to them. Cholesterine is found in many animal and vegetable substances. Cellulose composes the cell-walls of plants. The pith of plants and the pure fibers of cotton and flax consist of it. Starch and cellulose are identical in composition and by well-known chemical methods cellulose may be converted into starch the latter into dextrine, and dextrine into grape-sugar; but by the use of sulphuric acid, cellulose or starch may be converted into grape-sugar directly without passing into dextrine, as an intermediate stage. Put a few grains of pure starch in a vessel containing distilled water, and place by the side of it a second vessel containing a weak solution of the chloride of ammonium; place both vessels under cover, and expose them to a temperature of about 70°, say for a period of about six months, when if examined it will be found that no chemical change of these substances has taken place; but, on the other hand, if these liquids are united in one vessel, and kept under a temperature of about 70°, vegetable growth will commence within a few days, provided there is an air space above the liquid; blue mould will appear, and a matting of mycelium and spores will be seen. In the early stages of their growth the mycelium takes the blue stain when iodine tincture and sulphuric acid are placed over them. A power of 500° may be used with profit when viewing these spores, although much lower powers may be used for the amylaceous mycelium. Experiments of this character will prepare the young investigator for detection of similar bodies in other substances.

On page 341, in the English *Popular Science Review*, Vol. vii, the following appears upon starch in the yolk of the egg: "*Our readers will remember that we sometime since called attention to M. C. Dareste's remarkable discovery of this fact.* M. Dareste has since given a more detailed account of his observations. and has described the means employed by him in isolating the starch-granules. First, he washes the yolk rapidly with ether to remove the fatty matter. This should be done quickly, so as to avoid coagulating the albuminous substances: Then he washes it with water to remove albumen, sugar, and such like matters. Finally, he treats the residue with acetic acid, an operation which extends over three months. During this time an extremely

delicate precipitate forms, which is in great part composed of starch-granules. The microscopic and polariscopic examination of this precipitate proves, beyond all question, that starch granules are present. This fact, says M. Dareste, adds to the analogy which is thought to exist between the egg of animals and the seed of plants."

Dr. Lawson, also editor of this journal, calls the discovery of starch in the yolk of the egg a remarkable fact, but the discovery of amylaceous matter in blood, the same gentleman, in 1876, considers a matter unworthy of consideration, * and questions not the methods of M. Dareste, covering a period of more than three months, who used a series of vessels and liquids, all of which were necessarily exposed to the atmosphere. If my experiments on blood, which were performed within a few seconds after it is taken from a living body, are supposed to be imperfect, what shall we say of the unbounded faith of Dr. Lawson in M. Dareste's discovery? It verily appears like straining at a gnat and swallowing a camel.

Chemists, contemporary with Cuvier, held that nitrogen was not an essential constituent of plant-life. It is now established that nitrogen is as essential a constituent of vegetable, as animal living matter.

"Starchy substances, cellulose and sugar, once supposed to be exclusively confined to plants, are now known to be regular and normal products of animals. Amylaceous and saccharine substances are largely manufactured, even by the highest animals; cellulose is wide spread as a constituent of the skeletons of the lower animals; and it is *probable that amyloid substances are universally present in the animal organism, though not in the precise form of starch.* † (Huxley, in the April number of *Popular Science Monthly*, 1876.) In all candor, is it not fair to presume that Mr. Huxley states the precise condition of the knowledge attained by European scientists in relation to all the discoveries made to date, relating to these questions.

In my first article ‡ on cellulose the following occurs: "But it has been demonstrated that parts of certain animals, as the mantle of Tunicata, consists of cellulose. It may therefore be reasonable to expect, as a necessary consequence, the presence of analogous substances

* Since writing the above I have tested a portion of the white and yolk of a boiled egg and have found what appears to be structural cellulose in both, and also a substance resembling starchy matter, the experiment occupying about five minutes.

† The words in this quotation have been italicised by myself.

‡ Monthly Report of the Department of Agriculture for July, 1875, page 316.

in them, such as animal starch, glycogen, and chitine, which are convertible into each other, * * * and, since it is found in the mollusk alluded to, it may be presumed to be present in the higher forms of life, as in the vertebrates, including man; and as nature does nothing in vain *the presence of cellulose in animals would imply that it has a function to perform for which it is peculiarly fitted in their vital economy.* *

THOMAS TAYLOR.

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## FLORA COLUMBIANA.

*Continued from page 64 Vol. II.*

A CATALOGUE of the plants growing without cultivation in the District of Columbia:

### LILIACEÆ.

TRILLIUM.

797. sessile, L.

MEDEOLA.

798. Virginica, L.

VERARTUM.

799. viride, L

CHAMÆLIRIUM.

800. luteum, Gray.

UVULARIA.

801. grandiflora, Smith.
802. perfoliata, L.
803. sessilifolia, L.

ASPARAGUS.

804. *officinalis*, L.

POLYGONATUM.

805. biflorum, Ell.
806. giganteum, Dietrich.

SMILACINA.

807. racemosa, Desf.
808. stellata, Desf.

HEMEROCALLIS.

809. *fulva*, L.

ORNITHOGALUM.

810. *umbellatum*, L.

ALLIUM

811. tricoccum, Ait.
812. cernuum, Roth.
813. *vineale*, L.
814. Canadense, Kalm.

LILIUM.

815. Philadelphicum, L.
816. Canadense, L.
817. superbum, L.

ERYTHRONIUM.

818. Americanum, Smith.
819. albidum, Nutt.

MUSCARI.

820. *botryoides*, Mill.

### JUNCACEÆ.

LUZULA.

821. campestris, D. C.

JUNCUS.

822. effusus, L.
823. setaceus, Rostk.
824. scirpoides, Lam.
825. acuminatus, Michx.
826. articulatus, L.
827. nodosus, L.
828. marginatus, Rostk.
829. tenuis, Willd.
830. bufonius, L.
831. Canadensis, J. Gay.
832. dichotomus, Ell.

* The words in italics were published fifteen months previous to the appearance of Mr. Huxley's letter in *Popular Science Monthly*.

## PONTEDERIACEÆ.

PONTEDERIA.

833. cordata, L.

HETERANTHERA.

834. reniformis, Ruiz & Pav.

SCHOLLERA.

835. graminea, Willd.

## COMMELYNACEÆ.

COMMELYNA.

836. erecta, L.
837. Virginica, L.

TRADESCANTIA.

838. Virginica, L.

## ERIOCAULONACEÆ.

ERIOCAULON.

839. gnaphalodes, Michx.

## CYPERACEÆ.

CYPERUS.

840. flavescens, L.
841. diandrus, Torr.
842. phymatodes, Muhl.
843. strigosus, L.
844. Michauxianus, Schultes.
845. filiculmis, Vahl.
846. Lancastriensis, Porter.
847. ovularis, Torr.
848. retrofractus, Torr.

DULICHIUM.

849. spathaceum, Pers.

ELEOCHARIS.

850. obtusa, Schultes.
851. palustris, R. Br.
852. rostellata, Torr.
853. tenuis, Schultes.
854. acicularis, R. Br.

SCIRPUS.

855. planifolius, Muhl.
856. pungens, Vahl.
857. validus, Vahl.
858. atrovirens, Muhl.
859. polyphyllus, Vahl.
860. lineatus, Michx.
861. Eriophorum, Michx.

FIMBRISTYLIS.

862. spadicea, Vahl.
863. autumnalis, R. & S.

RHYNCHOSPORA.

864. glomerata, Vahl.

SCLERIA.

865. triglomerata, Michx.
866. oligantha, Ell.

CAREX.

867. adusta, Boot,
868. aquatilis, Wahl.
869. bromoides, Schk.
870. canescens, L.
871. cephalophora, Muhl.
872. comosa, Booth.
873. crinita, Lam.
874. debilis, Michx.
875. digitalis, Willd.
876. Emmonsii, Dew.
877. fœnea, Willd.
878. folliculata, L.
879. glaucoidea, Port.
880. grisea, Wahl.
881. granularis, Muhl.
882. gynandra, Schw.
883. Hitchcockiana, Dew.
884. intumescens, Rudge.
885. lagopodioides, Schk.
886. laxiflora, Lam.
887. lupulina, Muhl.
888. miliacea, Muhl.
889. Muhlenbergii, Schk.
890. nigro-marginata, Schw
891. oligocarpa, Schk.
892. pallescens, L.
893. Pennsylvanica, Lam.
894. platyphylla, Carey.
895. polytrichoides, Muhl.
896. Pseudo-Cyperus, L.
897. pubescens, Muhl.
898. retrocurva, Dew.
899. retroflexa, Muhl.
900. riparia, Curtis,
901. rosea, Schk.
902. scoparia. Schk.
903. Shortiana, Dew.
904. sparganioides, Muhl.
905. squarrosa, L.
906. stellulata, L.
907. stenolepis, Torr.
908. Steudelii, Kunth.
909. stipata, Muhl.
910. straminea, Schk.
911. stricta, Lam.
912. styloflexa, Boot.
913. tentaculata, Muhl.
914. torta, Boot.
915. triceps, Michx.
916. umbellata, Schk.
917. varia, Muhl.

918. vestita, Willd.
919. virescens, Muhl.
920. vulpinoidea, Michx.
921. Willdenovii, Schk.

## GRAMINEÆ.

LEERSIA.

922. oryzoides, Swartz.
923. Virginica, Willd.

ZIZANIA.

924. aquatica, L.

ALOPECURUS.

925. *pratensis*, L.
926. aristulatus, Michx.

PHLEUM.

927. *pratense*, L.

VILFA.

928. aspera, Beauv.

AGROSTIS.

929. perennans, Tuckerm.
930. scabra, Willd,
931. vulgaris, Withering.

CINNA.

932. arundinacea, L.
var. pendula, Gray.

MUHLENBERGIA.

933. sobolifera, Gray.
934. Mexicana, Trin.
935. sylvatica, Torr. & Gray.
936. Willdenovii, Trin.
937. diffusa, Schreber.
938. capillaris, Kunth.

BRACHYELYTRUM.

939. aristatum, Beauv.

CALAMAGROSTIS

940. Canadensis, Beauv.
941. Nuttalliana, Steud.

STIPA.

942. avenacea, L.

ARISTIDA.

943. dichotoma, Michx.
944. gracilis, Ell.
945. purpurascens, Poir.
946. oligantha, Michx.

GYMNOPOGON.

947. racemosus, Beauv.

CYNODON.

948. *dactylon*, Pers.

ELEUSINE.

949. *Indica*, Gærtn.

950. TRICUSPIS.

951. seslerioides, Torr.

DACTYLIS.

952. *glomerata*, L.

EATONIA.

953. obtusata, Cray.
954. Pennsylvanica, Gray.

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## GLEANINGS IN FOREIGN FIELDS.

**Sardine Fisheries.**—The *Bulletin of France*, states that the sardine fisheries commenced work on the French coast in July. The business is carried on most largely in the Bay of Dowarnenez, where the fish are yielding very well this year, and the price varies from 8 to 10 francs per thousand. A boat, with a crew of three to four men, will return at night with from 15,000 to 20,000 fish. When landed, the fish are taken in baskets to the packing house where the heads and entrails are removed and the fish thrown into salt water to lie for several hours. They are then washed in clean water and spread on wire drying-frames till dry. The frames and fish are then dipped in boiling oil for a few minutes, after which the fish are packed in the

well-known tin boxes, which are filled with fresh olive oil, tightly solden, thrown into hot water, and finally packed in boxes holding 100 each. In the arrondissement of Quimper 10,000 women and children are employed in this business, Concarneau boasting of the most extensive establishments.

**New Remedies for the Phylloxera.**—M. Gachez, in a recent number of *Comtes Rendus*, states that after long and patient research he has become convinced that by planting rows of red maize between rows of grape-vine, the latter are shielded from the ravages of the Phylloxera, the insects abandoning the vine roots for the roots of the maize. M. Gachez tried this method upon vines, the roots of which, last Spring, were covered with these insects; in September, the most careful examination failed to detect a single one on the vines. The roots of maize planted in a field alongside the vine-yard did not present any trace of the phylloxera.

M. Pignede found an effectual remedy in digging, during March and April, a trench four inches deep around his infested vines, and throwing in 500 grammes (1.1025 pounds) of slacked lime. He then whitewashed the vine after having removed its bark. The operation, he declares, destroys the greater part of the insects and their eggs, and arrested the hatching of the eggs already deposited upon the vines. The first year afterwards the vines gave out vigorous shoots, and the second year fine grapes in large quantities.

**Fungi.**—As it is sometimes desirable to preserve specimens of fungi for future and more convenient examination Mr. C. W. Quin, in a late number of *The Garden*, recommends the following mixture as suitable for the purpose: Sulphuric acid, 2 pints; water, 8 pints; mix and add creosote, 1 pint. Bottle the fungi in this and cork tightly. It is said to preserve them perfectly without change of color. Fungi may also be preserved by drying, by bedding them in silver sand, gills upward, in tin boxes, and placing them in a slow oven for two or three hours.

**Curious Fact Concerning a Frog.**—A short time since a lad here wished to eject a large frog from an outhouse, and to do so he took up a large steel file that was lying near, and just touched the frog with its blunt point, but not to hurt it. The frog, however, emitted a singular scream, as though in pain, and continued to do so each time that it was touched by the file. My attention having been drawn to this,

I took a piece of deal lath, and touched it in the same way, but it seemed to take no notice of the application, except leaping on as before. A few more touches of the lath provoking no sound, I took the file, and again applied it lightly, when the scream was again emitted.—*A. D. in Gardner's Chronicle.*

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**The American Postal Micro-Cabinet Club.**—In the July number, W. H. S. gives an analysis of 36 slides. Of the 90 slides which have so far passed through my hands in this Club, the subjects upon the same analysis show as follows: Botanical, 21 slides; geological, 4; chemical, 5; zoological, 14; entomological, 17; diatoms. 16; histological, 12; micro-photographs, 1. Total 90. The notes and remarks accompanping the slides convey a great deal of useful information.—C. M. Vorce.

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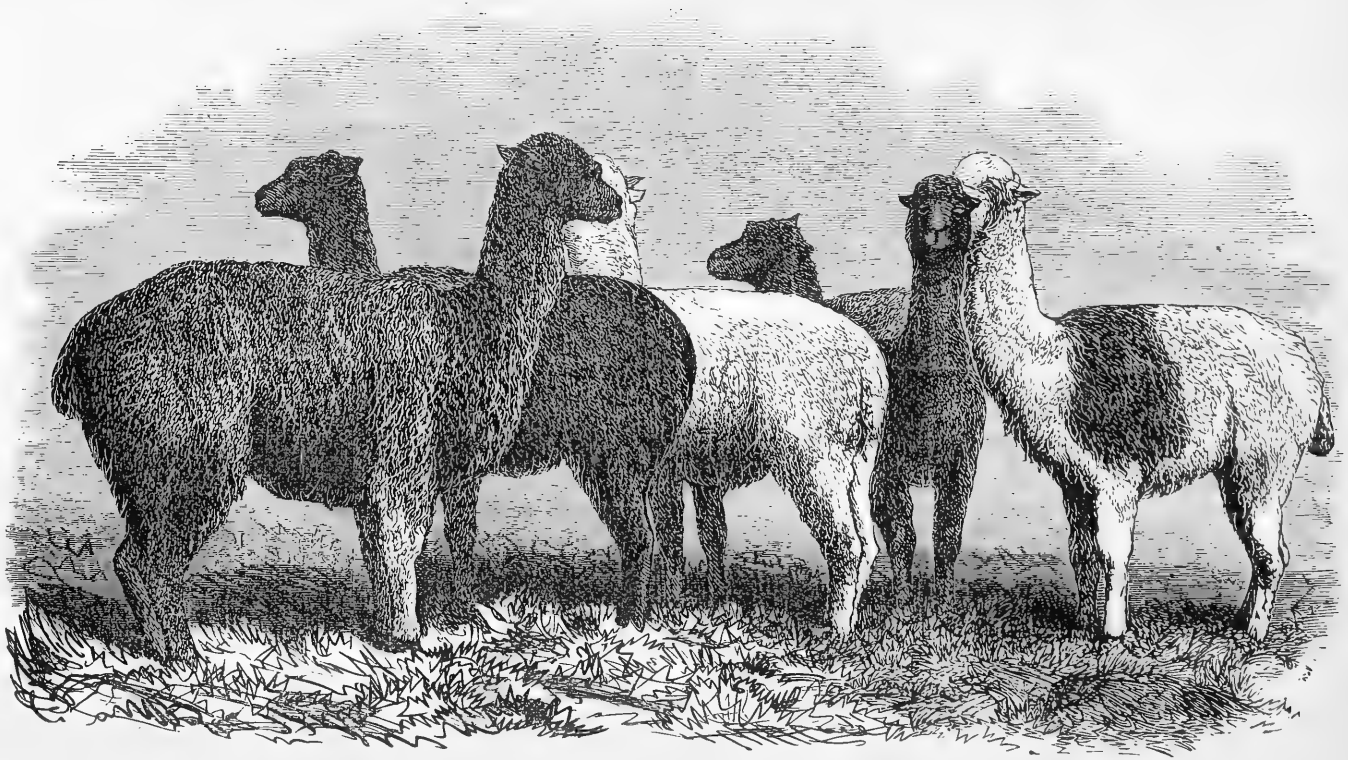
## OUR BOOK SHELF.

Proceedings of the Davenport Academy of Natural Sciences, Vol. I, 1867–1876. [8vo., pp. 283., plates, xxxvii.] Davenport, Iowa. Puplished by the Womans' Centennial Association, 1876. Price, $2.50.

We congratulate the academy on the appearance of this their first volume of Proceedings, which gives the result of a number of years of valuable investigation in various branches of science. In Archæology the discoveries of mound builders' relics, in 1875, almost within the city limits, have resulted in awakening considerable interst in this branch of science, and in the volume before us, there are no less than eleven papers on this subject. Our entomological friend, J. D. Putnam, contributes four papers of interest on insects, principally the result of explorations in the western territories, and from Mr. Cresson, and Prof. Thomas, we find lists of Hymenoptera and Orthoptera, also collected by Mr. Putnam. There are two papers on Botany, one from Dr. Parry; two upon Conchology, one upon Geology, and four or five upon various topics in physical science. A Record of Proceedings is also given, with addresses, lists of donations to Museum and Library, Constitution, lists of members, &c.

The ladies of the Centennial Association took upon themselves the difficult part of supplying the funds neccessary to publish the work, which is almost wholly a home production, and a very creditable volume.



GROUP OF ALPACAS.

# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.—DECEMBER, 1876.—No. 6.

## The Alpaca in North America.

The Alpaca, *Llama pacos* of Cuvier, *Auchenia alpaca* of Illiger, is a species of a South American genus inhabiting the Andes, at elevations of 8,000 to 12,000 feet, from Peru southward. It is held by naturalists to be allied to the Camel, having many points of resemblance to that animal; and the larger species, the Llama, is actually used in carrying burdens of about 100 pounds weight, over rough and declivitous routes, at the rate of 10 to 15 miles per day. The head is camel-like, there is an accretion of fat instead of an actual hump on the back, and the feet are adapted to mountain travel rather than traversing desert sands, and they have callosities on the knees of the fore legs from their camel-like habit of kneeling for burdens. The wild Guanaco *(A. huanaco)* is generally deemed identical with the domesticated Llama, though some authorities have made it a distinct species. The Alpaca is smaller, and the Vicuna the smallest of this genus, about 30 inches to the shoulder, the larger species being about 3 feet at the shoulder, the head being carried about two feet higher.

The Alpaca is a domesticated species useful for its fleece especially, which is very fine and long, and for its flesh. Its period of gestation is 11 to 12 months, the young are weaned at six months, and are sufficiently mature for reproduction at two years.

Attempts have been made, during the past thirty years, to introduce them into this country, Europe and Australia. In 1844 the British Consul at Arica, Peru, sent sixteen to Queen Victoria. It aroused opposition to their exportation, and caused the enactment of more stringent

laws against their shipment from the Peruvian Coast. In the official reports on agriculture for 1857 it is stated that Hon. Daniel Webster, when Secretary of State, received several as a present from the Peruvian Government; and that in the early part of the winter of 1857 a cargo of Llamas and Alpacas were shipped to Baltimore for Guayaquil on speculation. Either these or others shipped about the same date were received in New York, (though the latter are reported as Llamas) kept till Spring and sold at less than $100 each, some of them subsequently going to Australia. In July 1868, a Mr. Ledger succeeded in evading the Peruvian restriction by taking a flock into the Argentine Provinces, then into Chili, and embarking them at Copiapo for Australia. Of 292 animals, (46 male and 38 female Alpacas, the remainder Llamas and few Vicunas) 276 were safely landed at Sidney, New South Wales. They were first sent to Liverpool, a point about 20 miles distant, and afterwards to Arthursleigh, a sheep-station. A winter of mismanagement had reduced their number to 200, but with better care they began to thrive, and at the end of 18 months they numbered 253.

The latest importation into this country was made by Hon. Francis Thomas, (since deceased) late minister to Peru, and formerly a member of Congress form Maryland. Mr. Thomas thus writes concerning them to the Commissioner of Agriculture, October 8, 1875: "The fiber of a fleece of twelve months' growth often exceeds fifteen inches in length, and the fleeces average from 7 pounds to 10 pounds each in weight. The animals live to the age of twenty, twenty-five and sometimes thirty years; are too large and bold to be worried by dogs, and are very docile and tractable. I think you will concur with me in the opinion that this experiment which I am conducting is well worth the expense which I have incurred, especially when we consider the public benefit which would accrue in case of my success." The illustration here given is from a photograph of several of the flock, in Frankville, Maryland.

The successful establishment of this race as a textile-producer in this country is by no means assured, but no effort should be spared to test its adaptation to some portion of the country. It is doutful if they can become acclimated east of the Missouri river, but the Rocky mountains afford a better promise of ultimate success.

J. R. Dodge.

## The Little Cypress Swamp of Indiana.

Among the most interesting of the trees of the eastern forest-region of North America, on account of curious pecularities of growth, as well as somewhat remarkable distribution, is the Bald Cypress *(Taxodium distichum,)* a species found only in the southern sections of the country, and there confined to the lowest swamps along the Atlantic coast and in the Mississippi Valley. Its northern limit to the eastward is said to be the state of Delaware, in latitude 38° 30′, while in the interior it extends farther northward, or beyond latitude 40°, in Indiana and Illinois. In many portions of the Southern States this tree attains an immense size, while some specimens growing in Mexico, described by Humboldt and other travellers, almost rival the mammoth *Sequoïas* of California. The celebrated Bartram mentions in his book of travels in the Carolinas and Florida, trunks of these trees "that would measure eight, ten and twelve feet in diameter, for forty and fifty feet straight shaft," (page 92) while we have seen many whose conical bases measured 40 feet and upwards in circuit.

In the south-western portion of Knox County, Indiana, is a swamp having a total area of about 20,000 acres, most of which is timbered more or less with this tree. These swamps consist of clusters of ponds, of various sizes, generally open towards the centre, and all drained by connecting "sloughs" or "bayous" which lead through a single deeper channel into White River, a short distance above the confluence of that stream with the Wabash. We have visited only the lower portion of this locality, where our explorations were entirely limited to what is down on the maps as the "Little Cypress Swamp," many times smaller than the "Big Swamp" farther northward.

The general character of the Little Cypress Swamp, is that of a group of elongated ponds in the midst of a heavy forest, their general direction being nearly North and South. The largest of these may be a mile in length by about a quarter in width, though actual survey would probably result in smaller measurements. These ponds are frequently dry in mid-summer, with the exception of little pools in the lowest depressions, which during the season of drought so swarm with fish and tortoises that the water is in constant motion from the restless movements of these animals confined within such narrow limits. The general appearance of these ponds at such a time, is that of a

beautiful green savanna entirely surrounded by a dense forest of lofty oaks and other trees, the entire area being overgrown with a great variety of sedges and grasses, with patches of *Sagittariæ*, *Pontederia*, *Nuphar* and other aquatics in the moister spots, while around the pools *Nymphæ odorata*, is abundant, mixed with the large circular peltate leaves of *Nelumbinm luteum*, supported on their erect stems, and tall blades of cat-tail (*Typha latifolia*) and *Scirpus validus*. Around the margin of these ponds grow clumps of the tall *Hibiscus militaris*, with its large pink and crimson flowers, and the *Polygonum amphibium* in such abundance that its pendant delicate carmine racemes almost give the prevailing color. The edges of the pond are generally overhung by willows (chiefly *Salix nigra* and *S. lucida*,) behind and above whose fronting screen of graceful, feathery foliage rise the lofty trunks of the cypresses.

The cypresses in this locality grow chiefly along the margin of these ponds, where they are necessarily restricted to the immediate shore on account of the high bank which rises behind them, and upon which they immediately give way to the usual hard-woods. It is only in the lower portions of the forest, between the ponds, and through which run the connecting sloughs, that the cypress trees prevail, or form groves by themselves; and even then there is an open, or at most brushy, pond along one side. In one such grove the conical bases of this tree were twenty-five to near fifty feet in circumference, but the largest remaining tree was only twenty-two feet around at the beginning of the cylindrical portion, some eight or ten feet from the ground. The finer trees here, as indeed throughout these swamps, had been cut and rafted off for shingles, so that the remnant was undoubtedly a poor sample from which to judge the character of the original growth. Certain it is, that several stumps *where cut off*, measured nine and ten feet feet across, while one was thirteen feet in diameter; and as this tree is usually, if not always, cut at the beginning of the cylindrical portion, we may judge that some of those felled far exceeded in dimensions any now standing. The largest cypress tree observed in this locality measured twenty-two feet around at about ten feet from the ground, where its circumference was forty-five feet; its top spread ninety-four feet, and was about a hundred and forty feet from the ground; but what was peculiarly striking in this example was the fact that it consisted of two main trunks, growing vertically beside each

other and at intervals welded together, or coalesced into a solid mass, while below the flat top the several smaller upright trunks were in places joined by a growth extending between them, exactly after the manner of the cartilage connecting the Siamese twins. Independent of their immense conical bases, however, none of these cypresses would be considered large trees in the heavy forest surrounding them, for the tall sweet gums and white ashes scattered among them towered above the highest, while the very finest cypress trunks could not compare in length or symmetry with those of the former tree, they being, though long, rapidly tapering, and disfigured by numerous knots. Some of them had no ramification of the trunk whatever, but merely horizontal lateral branches near the top; one such, a felled one, measuring a hundred feet to where the top was broken off, though its diameter near the base was scarcely over a foot. The tallest of these trees were about a hundred and forty feet high, the average of the larger growth being about one hundred and twenty.

In appearance the Bald Cypress is by all odds the most striking and peculiar-looking tree of our forests. The observer is surrounded by enormous conical masses (they do not look like tree-trunks) of a reddish colored wood, from the centre of which rise tall pillars of the same material, these growing so near together that the intervening spaces are often entirely taken up by the conical excrescences growing from the roots, the whole surface thus being an irregular wooden one, with soil or water only in the depressions. Viewed across a pond, these large cypresses are observed to stand in dense clumps, composed of half a dozen or more lofty columnar trunks, straggling branched for three-fourths their height, and surmounted by a flat-topped mass of feathery, light green foliage, while the trunks look bare and cinnamon-colored beneath.

The undergrowth of the swamp under consideration was not particularly dense, but the ground was rendered so rugged by the confusion of knees, fallen logs and the general debris that it proved exceedingly difficult to get through, even in the absence of brushwood. The latter consisted chiefly of water locust, (*Gleditschia monosperma*) large-leafed poplar, (*Populus heterophylla*) red birch, (*Betula nigra*)—(these of large size, the first sixty and the latter eighty-five feet high, and mostly along the edge, or overhanging the ponds,) *Forestiera acuminata, Cephalanthus occidentalis* (these two in clumps, the former from

twenty to thirty feet high) and *Amorpha fruticosa*. The latter was larger than we have ever seen it, or heard of it, anywhere else, one specimen cut down expressely for measuring, being thirty-five feet in length and eighteen inches in circumference, and showing seventeen annual rings of growth. The small cane *(Arundinaria tecta)* was also common in places. We were suprised to notice the frequency with which stocks of the cypress were welded to or united with, trunks of other trees, in cases where the two had originally sprouted close together. We have noticed a tall white ash and a cypress, each two feet through, so completely coalesced for several feet from the ground that their base seemed that of one tree. In another instance an immense decaying cypress stump, standing in the water, measuring forty-eight feet around at the surface and thirteen feet across the top, supported on all sides a growth of birch sprouts from twenty to more than forty feet high, and three to six inches in diameter, whose roots were imbedded in the soft decaying wood of the stump. In the same locality a still more remarkable union of five species of trees, viz., the black willow, bald cypress, white ash, red birch and silver maple all sprouted from one base, the bark of which appeared of the same character all around, while the trees themselves retained each its characteristic aspect.

ROBERT RIDGWAY.

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## Elm Leaf Beetle.

(*Galeruca xanthomalæna.*)

A most remarable appearance of this insect occurred in Lancaster City and Township, in the months of July and August last; suddenly, numerously, and without any warning. Except a few individuals occasionally in some of the rural districts, within the last two years, it had never before been noticed in Lancaster County; but, it is said to have been introduced into the United States from Europe, and first made its appearance in the vicinity of Baltimore, nearly forty years ago.

About the middle of July many of the Elm trees in and around Lancaster City were infested by a small larva that had perforated their foliage with millions of small holes, and towards the end of the month,

much of it was skeletonized, brown and crisp; and the cause became manifest by the descent of hundreds of thousands of coleopterous larvæ, down their trunks to the pavements or the ground beneath them. Owing to the hard pavements in the city intercepting their downward progress, these larvæ pupated in masses around the bases of the trees, or in moist and shaded corners about the door steps. Many hundreds, however, effected their pupal transformation in the crevices, or under the rough bark on the trunks, from the base to as far up as the vision could detect them; but the large number reached the ground or pavements, and could have been gathered up by pints and quarts.

The pupal period averaged about six days, but the imago continued to evolve from the first to the twentieth of August. Many of those that reached the pavements were swept up and destroyed, or were appropriated by the English sparrows, of which we have a goodly number in this city.

Reference has been made to this Elm-leaf beetle by Harris, Fitch, and others, as the *Galeruca calmariensis*; but that must surely be erroneus; for, according to Stephens and others, that species feeds, and is only found upon aquatic plants, and is not in accord with the Elm-leaf beetle as described in the manual of Stephens. This error, accorcording to competent authority, is attributable to a misconception of Gyllenhall.

"*G. xanthomelæna* Schon, S. 78.—*Ste. M.* IV, 291. Oblong-ovate; above griseous-yellow, thickly punctured, crown with a 3-angular black spot and another germinated one at the base of the antenna; thorax with 3 black spots; elytra with a long black dash within the margin, and a short streak near the middle; legs dull yellow, thighs with a dusky spot within, tibia with a black streak, hinder pair bent. (L. 3 l.) Elms: London district, 6."

If it were necessary to add anything more than the above description from *Stephens' Manual British Coleoptera*, it would be that the central thoracic spot is 3-angular, similar in form and size to the crown spot, in nearly all of the specimens which came under my observation. Their uniformity, therefore, seems to be exceptional.

The *larva*, when mature, is three-eighth of an inch in length; the head and feet black, color lemon-yellow, two dark lateral stripes, and a dorsal yellow stripe, the segments are divided transversely, above, by a distinct indented line, exhibiting twice as many segmental divisions

above as there are below; each segment above, and within the yellow stripe has, four tubercular dots, surmounted at the apex by a few short diverging hairs; on the lateral dark stripes are three similar dots, triangularly arranged on each segment; indeed the lateral stripes are formed by the color of the tubercles extending down a little beyond their bases, leaving narrow yellowish interstices between; on the abdominal segments are marginal rows of yellowish tubercles armed with hairs, similar to the others, on minute dark apical tips; on the under side—which is yellowish—there are five dark dots on each segment, and a dark central dash, transversely arranged.

The *pupa* is three-tenths of an inch in length; (when straightened one-fourth) lemon-yellow in color, and the *antennæ*, feet and elytra folded over the stermum, as is usual incoleopterous pupæ; along each margin of the abdomen a sort of frill, more or less, projects outward in sections, those of the greatest depth about the center. The pupa is entirely disengaged from any other object, naked and unprotected. They are entirely immaculate, delicate, and very liable to injury from incidental causes.

S. S. Rathvon.

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## Catalogue of the Alpine and Sub-Alpine Flora of the White Mountains of N. H.

1. Viola palustris, L.
2. Cardamine bellidifolia, L.
3. Silene acaulis, L.
4. Arenaria Groenlandica, Sprerg.
5. Stellaria uliginosa, Murr.
6. Paronychia argyrocoma, Nutt.
7. Dryas integrifolia, Vahl.
8. Geum radiatum, Michx.
   var. Peckii, Gray.
9. Sibbaldia procumbens, L.
10. Potentilla frigida, Vill.
11. Potentilla tridentata, Ait.
12. Amelanchier Canadensis, T. & G.
13. Rubus Chamaemorus, L.
14. Ribes lacustre, Poir.
15. Saxifraga rivularis, L.
16. Epilobium alpinum, L.
17. Viburnum pauciflorum, Pylaie.
18. Solidago virga-amea, L.
    var. alpina, Big. var. humilis, Gray.
19. Solidago thyrsoidea, Meyer.
20. Arnica mollis, Hook.
21. Nabalus Boottii, D. C.
22. Nabalus nanus, D. C.
23. Vaccinium caespitosum, Michx.
24. " uliginosum, L.
25. " vitis-Idaea, L.
26. Arctostaphylos alpina, Sprerg.
27. Cassiope hypnoides, Don.
28. Phyllodoce taxifolia, Salisb.
29. Kalmia glauca, Ait.
30. Rhododendron Lapponicum, Wahl.
31. Sedum latifolium, Ait.
32. Loiseluria procumbens, Desv.
33. Pyrola minor, L.
34. Euphrasia officinalis, L.
35. Veronica alpina, L.
36. Rhinanthus Crista-galli, L.
37. Castilleia pallida, Kunth.
38. Diapensia Lapponica, L.
39. Polygonum viviparum, L.
40. Oxyria digyna, Desv.
41. Alnus viridis, D. C.
42. Betula glandulosa, Michx.

43. Empetrum nigrum, L.
44. Salix Cutleri, Tuck.
45. " herbacea, L.
46. " argyrocarpa, Ands.
47. " chlorophylla, Ands.
48. Habenaria obtusata, Rich.
49. Veratrum viride, Ait.
50. Streptopus roseus, Michx.
51. Luzula spicata, Desv.
52. " parviflora, Desv. var. melano carpa, Gray.
53. " arcuata, Meyer.
54. Juncus trifidus, L.
55. Carex scirpoidea, Michx.
56. " capitata, L.
57. " canescens, L. var. vitilis.
58. " rigida, Good. var. Bigelovii.
59. " irrigua, Smith.
60. " atrata, L.
61. Eriophorum vaginatum, L.
62. Poa caesia, Smith.
63. " laxa, Haenke.
64. Phleum alpinum, L.
65. Hierochloa alpina, R. & S.
66. " borealis, R. & S.
67. Aira atropurpurea, Vahl.
68. Calamagrostis Pickeringii, Gray.
69. " Langsdorffii, Trin.
70. Phegopteris hexagonoptera, Fee.
71. Lycopodium Selago, L.

This list, it is believed, includes all the Alpine and Sub-Alpine species, thus far detected in this region, though there seems to be no reason why several other species, found on Mount Katahdin, Maine, and on some ot the Green Mountains, should not occur among the White Mountains.

*Dryas integrifolia* is inserted on the authority of Pursh, but its occurence is quite doubtful. *Sibbaldia procumbens* has not been seen recently, nor has *Saxifraga rivularis* been found since Oakes collected it some years ago. His exploration of the mountains was quite thorough, and his sets of the Alpine Flora were widely distributed.

Mr. Wm. F. Flint, of Hanover, N. H. has been collecting carefully during the past season, and now offers for sale sets of over 50 species for $5.00 per set.

Several of the species enumerated here, as *Streptopus roseus*, and *Veratum viride* occur plentifully in the woods of Maine and N. H., but are so abundant at elevations of 4000 feet or more, as to form a characteristic part of the mountain Flora.

It is to be hoped that the researches of the Appalachian Club, organized the past season, will add some new species to our present list.

J. W. Chickering.

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## Resurrection Plants.

Dr. Berrota of the city of Mexico, has presented to the National Museum a small collection of specimens intended to exhibit the rich and beautiful products of his country. Among them is a specimen of the resurrection plant, which obtained this name in consequence of

its relation to moisture and dryness. Being a native likewise of Texas, New Mexico, Arizona and California, it is often several months deprived of moisture, causing it to shrivel and curl up into a brown dry ball, but when moistened with water for a short time, it is apparently restored to life and expands itself, displaying layers of slender fronds of a fine green color, radiating from a common center. It is a cryptogamous plant belonging to the order Lycopodiaceæ, and may be found in botanical catalogues of the southwestern United States, under the name of *Selaginella lepidophylla*. Its organization places it low down in the vegetable scale somewhere between the Ferns and Mosses. There are numerous species of *Salaginella*, and they are often used for greenhouse and aquarium decoration; they serve to cover over the soil in large tubs or pots, the fronds being long hang over the edges with a pleasing effect enhanced by the usually lively green color. In tropical forests they form striking objects, covering decayed trunks and extending their leaves for a foot or more, in moist situations.

Another resurrection plant, having similar hygroscopic qualities, has long been reverenced in Syria, Egypt, Arabia and other arid countries beyond the Mediterranean. It is popularly known as the rose of Jericho. It is not a rose by any means, but its botanical alliances would place it with the wall flowers, candytuft, rockets, &c. It is known to botanists as *Anastatica hierochunta*, and when Linnæus described it he placed it in his class *Siliculosa*, and it therefore belongs to the order Cruciferæ of the natural system. It has been known in Western Europe for two hundred years. It recovers its natural form by immersion in water, after being dry for a long period. It is said to be only necessary to place the root in a glass of water, which is rapidly imbibed; it begins apparently a new life, expands in all its parts and unfolds unseen flowers to the beholder. Such a plant offers tempting opportunities to the charlatans of the East to impose on popular credulity. M. Fulgence Marion describing it says, "the buds swell with new life, the leaves of the calyx open, the petals unfold, the flower stalk grows upright, and the full blown flowers appear before us like magic."

With strong religious superstition the Orientals attribute a great sanctity and power of prophecy to this plant. It is believed to come into bloom every year on the day and hour of the birth of the Saviour;

and pious pilgrims report that they find it growing on every spot sanctified as the resting places of Joseph and Mary during their flight into Egypt. The Arabs call it *Kaf Marian* or Mary's hand. They declare that if a dry plant of it be immersed in water at the beginning of parturition, it will develop its flowers at the very moment when the new born child enters the world. It is on sale at some of the oriental bazaars of the Centennial Exposition, but an incredulous correspondent relates that he has watched a specimen in water for a long time and was not so fortunate as to behold it unfolding its flowers.

There is still another resurrection plant brought by the celebrated botanical explorer Commerson, from Africa, and called Medusa's head. It is a euphorbiaceous plant, and is known to botanists as *Euphorbia caput-medusa*, having been first introduced into the Jardin des Plantes in the time of the elder Jussien. It is not so widely known, but it is said to exhibit changes similar to those above described.

E. Foreman.

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## A Fly's Toilette.

It is so rarely that a fly (even if it is in the habit of performing what may be called its toilette operations in regular sequence) gives the opportunity of observation, that a note of the whole affair in its regular progress may not be without interest.

In this case the operation took about a quarter of an hour, and was carried on in the most systematic way, beginning at the head, and after being carried down the left side to the under surface of the wings, starting again with a careful cleaning of the upper surface of the wings and their front edges.

The insect—a common house fly—began by brushing the head with the two fore legs in the manner only too often noticeable in summer weather when the creatures are attracted by food. The front legs, tibiæ and tarsi, were most carefully rubbed and dressed, and (this complete) the second leg on the same (the left) side was what might be described as taken in hand, held well forward whilst it was thoroughly manipulated by the tarsi and tibiæ of the front legs, aided by very thorough applications of the proboscis.

The next stage was more difficult with regard to balance, for the middle left leg had to play its part in cleaning the two hind ones, and the support of the three disengaged ones was obviously not quite satisfactory. In this part great care appeared to be bestowed on the tarsi, and as soon as the hind legs were all right they in their turn were applied as cleaning brushes. Only the hind legs were used in brushing the under-surfaces of the wings, and when these and their fore edges had been carefully cleaned, the fly started again on the right side.

The head being all right required nothing more, but after a little recleaning of the front legs, the second on the right side was dressed as its companion had been, but more slightly, and then rubbed similarly with the two hind ones; and then everything being in order for the most important part of the operations, the dressing of the upper surface of the wings was proceeded with by drawing them longitudinally between the two hind legs. The greatest attention was given to the front edge of the wings, this part being gone over in both series of brushings.

The operation was interesting from the perfectly regular and systematic method in which it was conducted, the limbs acting as brushes, being each made scrupulously clean successively before carrying on their services, and the front legs (the primary cleaners) being dressed again before starting the work on the second side, whilst the wings (the most important part of all) were dressed and their edges carefully attended to in both series of operations. During the movement constantly going on during the day, the flies, though only too frequently present, are rarely stationary, but the perfect quiet of the early morning gave an unusal chance for observation.—*O. in Gardeners' Chronicle.*

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**Maggots in Strawberries.**—Last spring we noticed that late strawberries were infested with a small larva, working in the berry, which produces a species of *Drosophila.* We engaged a fruit grower to furnish us berries, for a friend, as long as any could be gathered, and several lots were brought after these berries had disappeared from the markets, but invariably were infested, on the inside, with the larvæ above named. The species of fly was not determined.

# FLORA COLUMBIANA.

*Continued from page 88, Vol. II.*

A CATALOGUE of the plants growing without cultivation in the District of Columbia:

## GRAMINEÆ.

MELICA.

955. mutica, Walt.

GLYCERIA.

956. nervata, Trin.

957. pallida, Trin.

POA.

958. annua, L.
959. brevifolia, Muhl.
960. sylvestris, Gray.
961. *trivialis*, L.
962. pratensis, L.
963. compressa, L.

ERAGROSTIS.

664. reptans, Nees.
965. *poæoides*, Beauv.
var. *megastachya*.
966. *pilosa*, Beauv.
967. Frankii, Meyer.
968. Purshii, Schrad.

969. capillaris, Nees.
970. pectinacea, Gray.

FESTUCA.

971. tenella, Willd.
972. ovina, L.
973. elatior, L.
974. nutans, Wiild.
975. *myurus*, L.

BROMUS.

976. *secalinus*, L.
977. ciliatus, L.

UNIOLA.

978. latifolia, Michx.
979. gracilis, Michx.

LOLIUM.

980. *perenne*, L.

TRITICUM.

981. repens, L.

ELYMUS.

982. Virginicus, L.
983. Canadensis. L.
984. striatus, Willd.

GYMNOSTICHUM.

985. Hystrix, Schreb.

AIRA.

986. flexuosa, L.
987. *caryophyllea*, L.

DANTHONIA.

988. spicata, Beauv.

TRISETUM.

989. palustre, Torr.

ARRHENATHERUM.

990. avenaceum, Beauv.

HOLCUS.

991. lanatus, L.

ANTHOXANTHUM.

992. *odoratum*, L.

PHALARIS.

993. arundinacea, L.
994. *Canariensis*.

PASPALUM.

995. setaceum, Michx.
996. læve, Michx.

PANICUM.

997. filiforme, L.
998. *glabrum*, Gaudin.
999. *sanguinale*, L.
1000. anceps, Michx.
1001. agrostoides, Spreng.
1002. proliferum, Lam.
1003. capillare, L.
1004. virgatum. L.
1005. latifolium, L.
1006. clandestinum, L.
1007. microcarpon, Muhl.
1008. viscidum, Ell.
1009. dichotomum, L.
1010. depauperatum, Muhl.
1011. verrucosum, Muhl.
1012. *Crus-galli*, L.

SETARIA.

1013. *verticillata*, Beauv.
1014. *glauca*, Beauv.
1015. *viridis*, Beauv.

TRIPSACUM.

1016. dactyloides, L.

CENCHRUS.

1017. tribuloides, L.

ANDROPOGON

1018. furcatus, Muhl.
1019. scoparius, Michx.
1020. argenteus, Ell.
1021. Virginicus, L.
1022. macrourus, Micnx.

SORGHUM.

1023. nutans, Gray.

## EQUISETACEÆ.

EQUISETUM.

1024. arvense, L.
1025. hyemale, L.

## FILICES.

POLYPODIUM.

1026. vulgare, L.

PELLAÆA.

1027. atropurpurea, Link. Great Falls. Analostan Island.

PTERIS.

1028. aquilina, L.

ADIANTUM.

1029. pedatum, L.

WOODWARDIA.

1030. angustifolia, Smith.

ASPLENIUM.

1031. Trichomanes, L.
1032. ebeneum, Ait.
1033. angustifolium, Michx.
1034. thelypteroides, Michx.
1035. Filix-fœmina, R. Brown.

PHEGOPTERIS.

1036. hexagonoptera, Fee.

ASPIDIUM.

1037. Thelypteris, Swartz.
1038. Noveboracense, Willd.
1039. spinulosum, Swa.tz.
1040. marginale, Swartz.
1041. acrostichoides, Swartz.

ONOCLEA.

1042. sensibilis, L.

CYSTOPTERIS.

1043. bulbifera, Bernh

WOODSIA.

1044. obtusa, Torr.

LYGODIUM.

1045. palmatum, Swartz.

OSMUNDA.

1046. regalis, L.
1047. Claytoniana, L.
1048. cinnamomea, L.

BOTRYCHIUM.

1049. ternatum, Swartz
var. obliquum, Gray.
var. dissectum, Gray.
1050. Virginicum, Swartz.

OPHIOGLOSSUM.

1051. vulgatum, L.

## LYCOPODIACEÆ.

LYCOPODIUM.

1052. inundatum, L.
1053. dendroideum, Michx.
1054. complanatum, L.

## ADDENDA.

ACONITUM.

1055. uncinatum, L. Rock Creek.

HESPERIS.

1056. matronalis. Waste places.

ALLIARIA.

1057. *officinalis*, Georgetown.

HYPERICUM.

1058. corymbosum, Muhl.

HIBISCUS.

1059. *trionum*, L.

ACER.

1060. saccharinum, Wang. Islands in Potomac.

DESMODIUM.

1061. viridiflorum, Beck.

LESPEDEZA.

1062. Stuvei, Nutt.

POTENTILLA.

1063. Norvegica, L.

ROSA.

1064. micrantha, Smith.

CRATAEGUS.

1065. *Oxyacantha*, L. Below Alexandria

AMELANCHIER.
1066. Canadensis, T & G.
var. oblongifolium.
OENOTHERA.
1067. riparia, Nutt.
PASSIFLORA.
1068. incarnata, L. Kendall Green.
GALIUM.
1069. asprellum, Michx. Hunting Creek.
1070. triflorum, Michx.
FEDIA.
1071. Fagopyrum, T. & G. High Island.
EUPATORIUM.
1072. album, L.
ASTER.
1073. carneus, Nees.
1074. tenuifolius, L.
1075. prenanthoides, Muhl.
SOLIDAGO.
1076. bicolor, L. var. concolor.
1077. Virga-aurea, L. var. humilis.
GNAPHALIUM.
1078. uliginosum, L.
MULGEDIUM.
1079. leucophaeum, D. C.
KALMIA.
1080. angustifolia, L.
PHRYMA.
1081. Leptostachya, L.
PERILLA.
1082. *ocimoides*,
var. *crispa*. Crystal Spring.
MELISSA.
1083. *officinalis*, L.

## ERRATA.

No. 76. For Ascyrum stans, read A. Crux-andreae, L.
" 100. Prefix *Spergularia*.
" 215. For Geum strictum, read G. Virginianum, L.
" 384. Prefix *Xanthium*.
" 395. Strike out *Xanthium*.
" 427. For Cirsium Virginianum, read C. altissimum, Sprerg.
" 561. For Blephilia ciliata, read B. hirsuta, Benth.

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## FIELD RECORD.

**Second Blooming.**—In August, last two "Horse Chestnut" trees *(Aesculus hippocastanum)* in this city, after the fruit had formed, dropped their leaves, and put forth a second crop of leaves and flowers, presenting the singular spectacle of fruit, leaves and flowers, at the same time. The trees seemed to be affected with "Fire blight" similar to that affecting the pear-trees of this county last Summer.

No *fungus* appeared to be present, and the cause was attributed to the intense heat, and the too rapid evaporating the fluids necessary to healthy foliation, in the forepart of July.

Many trees along the streets were in a similar condition, more or less, but I noticed no others that bloomed. Some of the apple trees in the country, bore a second crop of fruit.—S. S. R.

**Unusual Accidents to Birds.**—I shot a *Chordeiles popetue* a a few weeks ago the victim of rather an unusual accident. It had swallowed a large *Lachnosterna*, probably mistaking it for something more tender, when he caught it. Certain it is the weak aesophagus of the bird had to yield to the muscular legs of the beetle, and not the aesophagus alone, but the *skin* also; he did not succeed in wholly extricating himself however, and died sticking fast to the æsophagus at one end and having his head and first pair of legs outside the skin. The insect was firmly imbeded in the membranes, and must have been there some time.

I have seen pigeons with a considerable branch dangling beneath them. I have one specimen with a beach twig about nine inches long, that had entered the bird from beneath and pierced the femural muscles, projecting about four inches on the back: It had undoubtedly falling from the nest when a "squab" and been impaled on a twig. It was an old bird and the stick was much worn, it must have been very unpleasant in walking.—A. J. KUMLEIN.

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## OUR BOOK SHELF.

LIFE HISTORIES OF THE BIRDS OF EASTERN PENNSYLVANIA. By THOMAS G. GENTRY. VOL. I. [16 mo. pp. 400.] Philadelphia, 1876. Published by the Author. Price $2.00.

An exceedingly entertaining volume filled with substantial facts, regarding the habits of Birds, with full and concise descriptions of their nests, eggs and young, their "bill of fare," the songs they sing—as nearly as the alphabet can express them—and, in short, the many little details of bird-*biography*, so often slighted in works of this character, that make it a valuable reference book to the ornithologist, and to the general reader a source of pleasure and profit.

It shows the author to be a true lover of nature, as well as a minute observer, and the labor he has bestowed upon the work, though, doubtless, in one sense, a labor of *love*, should bring him a handsome remuneration. The second volume is soon to follow, and, we doubt not, will be as well received as the first.

# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.—JANUARY, 1877.—No. 7.

## The Tendency in Birds to Vary their Habits.

In its entirety, North American ornithology has reached an acme, beyond which, perhaps, is precluded a further general advance. This growth of the science—more rapid than in any other country—is due, partly to the support it has received from government; partly to the accumulation of material by private workers, in whom may be seen expressed the impulse given by Alexander Wilson near the beginning of this century; and mainly to the indefatigable labors of our ornithologists in collating and organizing a great mass of facts into a complete, rounded whole.

While we have thus a beautiful science,—reliable in its technical descriptions, interesting in its biographical portions, apparently natural in its classification,—it is limited mainly to recording observed facts, (the *ultimata* of some ornithologists) and displays little of what may be called philosophic ornithology; i. e. explaining the cause where the effect is so well known.

Unfortunately for the science, many writers frequently engage in hopeless wrangles about mere names of species; filling the magazines with an almost useless mass of literature; and creating a vast number of specific designations which will, if the practice continue, stifle our already over-burdened synonomy. Although it is desirable to have definitive appellations for the birds, it is also desirable that these shall be applied without detriment to the science; without hatching a superabundant synonomy, and wasting the valuable time of our scientists.

As already intimated, there are very many collateral sujects growing out of ornithological science which are yet to be investigated; and it is to these minor, but none the less interesting topics that some of our writers are devoting their energies.

The present subject has attracted attention. Considering it of no great importance, however, those who have written at all upon the subject have contented themselves with simply chronicling the facts; making few generalizations and prematurely abondoning the data which, doubtless, they regard only as

"Truths that wake to perish never."

Nevertheless we have here a highly interesting and fruitful field of study. Numerous are the changes that have been made and are still making in the manner in which various species perform operations peculiar to bird-life; moreover, the birds' susceptibility of being affected by the slightest alteration in external conditions, lends an additional zest to the elucidation of governing laws.

A consideration of more than one of the numerous sub-heads embraced in our caption would lead beyond the limits of this article; therefore our subject shall be variation incident to nidification.

For illustrations we need not look far, as nearly all our common species have adopted or are constantly acquiring new styles of living. It must not be supposed that these changes are always permanent, for, indeed, it is only in exceptional cases where benefit has resulted from the departure, or where circumstances are against reversion, that any permanence is exhibited in the new *regime*.

The chimney swallow *(Chaetura pelagica)* was accustomed to roost and breed in hollow trees before this country became as thickly settled as it now is. Although it has not entirely forsaken its old haunts in some localities, at the present day it generally incubates and roosts in chimneys of abandoned houses, and not unfrequently in those of inhabited structures. This change is ascribable to various causes, foremost among which is the gradual but sure depopulation of the forests and consequent loss to the birds of suitable trees; and secondly, the convenience of its adopted habitations, which are now more numerous and accesible than its old abodes. The proximity of man, also, insures protection from rapacious birds. This desire to take advantage of man's powerful presence is shown by many of our smaller species. One is struck with the almost total absence of small birds in the interi-

or of the great forests, while their comparative abundance in the vicinity of cities and towns is equally noticeable. How often is this confidence betrayed? Young America, with his shot-gun, plays sad havoc amongst these tiny songsters; and "children of larger growth" think too often that robins and other small birds will cook up well with their partridges. But to return. Before the swallows began roosting in chimneys, they were much more gregarious. Assembling in great companies to pass the night in mutual protection within the walls of some ancient oak, their actions were interesting to the looker on, when about to enter the tree.

According to old observers, the birds began to arrive in the vicinity of the particular tree long before dusk; and by the time king night roused himself and had shaken out the folds of his sable mantle preparatory to its being dropped, an immense number were collected, flying round and chattering incessantly. Then, as mother earth was being environed by nocturnal shades, they would form in a huge living stream and pour into the hollow.

The white-bellied swallow *(Tachycinata bicolor)* usually occupies an accidental cranny in a tree or a deserted woodpecker's nest during breeding time. Mr. Lord, however, in his work on the "Natural History of Columbia and Vancouver's Island," says: "I am quite sure these swallows dig in a hole in the solid tree, a feat which their soft beaks hardly seem fitted for, inasmuch as I saw one begun and finished."

Can we believe this statement? If Mr. Lord did not err in his observation, this is a remarkable freak; and would it not imply a corresponding increase in the length and strength of the bird's bill which is now, as any one may see by reference to specimens, very short and weak, scarcely strong enough to break through rotten wood? At all events it is a fact for Darwin. Doubtless he would urge that this incipient tendency would initiate the consequent ulterior hardening and lengthening of the bill, and natural selection doing its work, we should have, in a "few years," a swallow metamorphosed into a woodpecker,—a novel and interesting acquisition to our *avi-fauna!*

The cliff-swallow *(Petrochelidon lunifrons)* which usually builds its nest on the sides of cliffs and sometimes under the eaves of houses, was observed, in Kansas, keeping company with the bank-swallows

*(Cotyle reparia.)* "They had," says Mr. Allen, "the same appearance of breeding in the banks as *Cotyle reparia* themselves,"

It appears that the brown thrush *(Harporhynchus rufus)* is guided entirely by circumstances in the situation of its nest. When building "in dry, sandy localities, it is well known to commonly nest on the ground; and to place its nest in low bushes, where the soil is damp and clayey." Mr. Allen found it along Big Creek, near Fort Hayes, "nesting in low bushes, and also in trees sixteen to twenty feet from the ground." This creek "is subject in summer to sudden freshets, the stream flowing between abrubt banks, sometimes rising ten or twelve feet in a single night, half submerging the trees that grow along the narrow bed. It was under the latter circumstances that the nests of this species were found placed twenty feet above the ground, while but a few yards distant other nests were found in low bushes, the bushes, however, growing on the bluffs, several feet above high-water mark.

"Other species that generally nest near the ground were also found to place their nests at a similar elevation, when breeding in the trees that grew along the bed of Big Creek."

The Dove *(Zenaidura Carolinensis)* displays no preference in selecting a building site, as its nests have been discovered on the ground, on bushes, on low trees and in the very tops of tall ones. At the Garden of the Gods, in Colorado, we have two instances of departure from primitive nesting habits. The common sparrow-hawk *(Falco sparverius)* and the *Tachycinata thalassina* both usually depend upon trees for eligible places for nidification,—the former in large cavities rotted in the trees, the latter in smaller ones,—while here, no trees being within miles, though there "are remarkable pinnacles of rock rising vertically to a height of from one hundred to three hundred feet, abounding in holes admirably suited for nesting sites for these and other birds," they have taken to them and breed as readily as in their old places.

The golden-winged woodpecker, *(Colaptes auratus)* * in the absence of trees in the West, finds that it can content itself with the banks of

* The (so-called) *C. Mexicanus* is evidently no more than a geographical race of the eastern bird; and however dear to certain innovators the trinomial system may be, relegation of the several "varieties" by calling them—individually and collectively—"auratus" would be in the interest of the science.

water-courses. There it now drills its nesting holes in close proximity with the sand martins, while in the East it places its nest in a nicely chiselled hole in a tree as do the rest of the woodpeckers.

The night hawk *(Chordeiles popetue)* which commonly roosts on trees and scratches a shallow cavity in the ground in which to deposit its eggs, has been found to roost and breed on top of the flat roofed houses in many of our large cities.

The strangest place, however, ever chosen for a bird's nest is that selected by a pair of cedar birds. Whether in the spirit of gay mockery and fearlessness, or from mere stupidity, I leave the reader to judge; their nest, which was a very elaborate one, was placed in the gaping pocket of an old coat on a scare crow in a corn field near a cherry orchard.

Several years ago the *Revue des Deux Mondes* printed an article touching the question whether or not birds improve in nest building. After a few preliminary remarks, the writer waxes wroth, and wonders how we can believe that nature provides for everything; that "blind instinct" guides the bee in the construction of her cell and the bird in the building of its nest. He is sceptical and essays to prove that in its building operations the bird is not influenced by a certain power or disposition of its nature, by which, independent of all instruction or experience, it is unerringly directed to do spontaneously whatever is necessary for its comfort and preservation—or *instinct;* but that the stimulating agent is embodied in a faculty which enables the possessor to deduce inferences from facts—or *reason;* claiming also that this faculty is identical with that exhibited by man when he builds a house, and that it is simply imitativeness.

The first argument he produces in support of this theory is, that birds brought up in confinement do not construct the nests peculiar to their species; generally rejecting the materials offered for that purpose, or employing them without skill. He then asks, "does not this well known fact prove that, instead of being guided by instinct, the bird *learns* how to construct its nest, just as a man learns how to build a house?" The simple fact that birds reared in confinement do not prepare proper nests, is not antagonistic to commonly received notions in regard to instinct as an influencing cause in such operations. However, this raises quite a plausible objection to the power of instinct; for, as our author says, the isolation of the birds deprives

them of advantages offered by the association with many individuals of their kind; prevents them from learning how to provide the customary place for incubation; and accounts for their impotency in this respect. He is probably not conversant with the fact that animated nature of inferior order kept in confinement for any length of time becomes anomalous; some part of the organism is modified,—especially the essential organs,—and being in this abnormal condition, the bird necessarily does not have full possession of its faculties (be they what they are) and consequently cannot be expected to produce such a complicated affair, as a nest generally is, in as complete and perfect a manner as when in a normal and free state. And it is too notorious to require comment, that animals in a high state of cultivation, not only acquire new wants as well as new habits, but lose many of their natural qualities and instincts.

His principal illustrations in relation to improvement in nests, appear to be deduced from the observations of M. Pochet who published in 1870, some notices of progressive improvement in martins' nests. "He kept for forty years in the Rouen Museum some of these nests, which he had himself detached from the walls of old buildings in that city. Having one day got some new nests, he was amazed, on comparing them with the old, to perceive considerable differences." The new style nests were all built on the same plan and differed from the old style, "which is a quarter hemisphere, having a very small circular orifice," in having "a width greater than their depth, forming a segment of an oblate spheroid, the orifice being very wide." Here he says, "we see an evident progress, the new type being larger, more comfortable."

This is only analogous to another instance he mentions, which does not strike him as being very remarkable. The instance referred to is, that the common sparrow (and it is to be noticed in almost all other birds) when building its nest in open and exposed situations constructs it in a solid and covered manner; but when it can avail itself of a nook in a wall it is far less particular, putting it loosely together. The improved martins' nests were, as he says, built in perilous places; they therefore demanded more attention in construction and finish, this resulting in the "new style." Whether this progressive improvement shall continue under all conditions—safe as well as dangerous—is more than doubtful.

Admitting, however, that the domiciles of the birds do often exhibit surprising modifications in manner of preparation and in situation, we must yet regard these aberrations as governed entirely by external conditions.

> "There is a bird, who by his coat,
> And by the hoarseness of his note,
> Might be supposed a crow."

This is the jackdaw of Europe, and an interesting example he is for us. Dr. Wood says: "in some of his actions he is wonderfully clever, apparently showing great rational capabilities; but in his nesting operations he appears uncommonly stupid. He will search a long time for suitable sticks to be used in building his nest and when one is discovered, seize it by the middle, and fly gleefully toward the selected place, which is generally a hollow in an old tree, or aperture in a building. When arrived he flies directly for the hole, and does not stop until checked by the stick crosswise in his bill, not stopping to take the branch by the end and thus enter the hole, easily he flies around in great distress, finally dropping the stick, and going off for another. Heaps of sticks are frequently found under a jackdaw's nest, having been dropped in this way."

This example (and there are others of similar import which want of space forbids insertion here) is illustrative of the fact that, while many birds appear very intelligent in accomplishing certain ends, in other more important, but at the same time simple occasions for the display of intellectual qualities, they are woefully lacking—proving that their "scheme of thought" is far from symmetrical, and that it is many degrees removed from what we term reason.

Numerous other instances of various alterations in the birds' nesting habits might be adduced. Those cited, however, will sufficiently show the tendency to divergence; and adiquately prove that any modification, either great or small, in style of construction, in position or situation of birds' nests, is wholly subject to the influence of environing conditions,—regional, climatal, &c.

Two generalizations are suggested here.

I.—*The influencing agent which prompts the bird to build its domicile is instinct.* Instinct, and instinct alone, is the prime mover in causing the *primitive* nest of a bird to be built. This piece of bird-architecture, when it does not vary from the normal type, is the result of an

innate, spontaneous tendency to act, and not the result of an acquired faculty through association, nor of an educated taste.

II.—*Nearly all birds modify their habitations to accord with exteral influences.* This is the result of experience. The original tendency to act under the stimulus of sensations. Learning to make use of this power to subserve necessary requirements, the bird often shows marvelous facility. So rapid frequently are these acquisitions, that it is next to impossible to distinguish them on the one side, from undeniable iustincts; and, on the other, from certain forms of ratiocination.

It will be seen that nothing more than a mere outline has been here sketched. Experimental research into the more metaphysical portions of the subject would throw much light upon the question of animal instincts; and under more favorable circumstances of publication, it may be brought forward again.

DAVID SCOTT.

*Washington, D. C.*

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## Doryphora Decemlineata.

Noticing a paragraph in a cotemporary journal, to the effect that Sweden has prohibited the importation of potatoes into that country, from England, Germany, France and the United States, recalls the article on this subject in the October number of *Field and Forest*, p. 66, which describes an experience similar to my own in regard to the insect named above.

In July, 1875, I took a walk along the beach from Henlopen Lighthouse to the extreme point of the Cape, a distance of about six miles. I found many insects strewn along the water line of the beach, chiefly *Coleoptera*, and among these, twenty-five to one, were the Colorado potato-beetle. These were thrown upon the beach by the waves, about one fourth of them still alive, and, singularly enough, I nearly always found those travelling toward the water, instead of away from it, indicating either great stupidity, or an instinctive determination to continue their migrations eastward, at any hazard. Now, this part of the beach is from three to four miles away from any cultivated ground, or from any potato fields, the intervening space being sand hills and flats, with here and there a sparse growth of stiff, wiry grass nothing to the taste of these insects. Their migration over these flats and out

into the ocean, must have been by flight, where they dropped in, and were carried back to the beach, by the returning waves.

In July many of the potato vines are yet green and succulent, therefore what could have induced these creatures to leave their feeding grounds, and cross these arid plains, but an instinctive impulse to extend their domain eastward? Just how far they flew out into the ocean, or how many of them were appropriated by the fishes that inhabit those waters, it would be perhaps, difficult to estimate, but we may infer from these circumstances that no ordinary river would present a barrier to their onward progress, nor have climatic vicissitudes much effect upon them.

But this is not the worst aspect of the case, in reference to the solicitude of European governments, although the non-importation of potatoes from America might be regarded as entirely futile. The "Junction and Breakwater Rail-road," runs from the interior of the State of Delaware, down to the shores of the Bay, and extends about a quarter of a mile out into the Bay on a trestle work called the "Pier," at the terminus of which, cars from the interior are unloaded half-daily and the freight of whatsoever kind is transferred to steam and sailing vessels, and from thence carried to other ports in the country, and perhaps also to those of Europe, or to places having commercial communication with Europe. Now, all along this pier out to the very end of it, I found the Colorado Potato-beetles, doubtless brought down upon the rolling stock of the Rail-road.

It has been clearly demonstrated that this is the manner in which this insect was first introduced into Pennsylvania, at least two years before its normal period. Potato-beetles do not necessarily *all* hibernate under ground. Those that pupate late in the season will remain under ground until the Spring. But the mature beetles, when the autumn sets in will hibernate under almost any cover, and for two successive years I have observed a great number of them crawling into the cellars and under door steps of negligent people in this county, and also issuing from such places early in spring. They have also been found in lumber yards, and under heaps of rubbish, in February and March, in this city. Even those that go into the ground, I have seen revived, after having been cut out of solid blocks of frozen earth. This illustrates that it is not the importation of potatos that the people of Europe need fear, so much, as the hidden insects taken to their

ports in other cargoes. It is not the tubers that these insects specially covet, but the tops of the plants, although they will also feed on the former, when nothing else is accessible.

S. S. RATHVON.

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## Museum Godeffroy at Hamburg.

A very lively book of travels by M. Emile Guimet, entitled *Esquisses Scandinaves*, has been received at the Smithsonian Institution, in which he narrates all that befel him and his friend M. Chantre on their way to Stockholm to meet the Archæological Congress which assembled there in 1874. On their way thither they passed through Hamburg, where "in their quality as strangers and exercising their curiosity as a duty" they found their way to the Museum Godeffroy, of which institution many persons here have desired to receive information. Occasionally we have seen a copy of the *Journal des Museum Godeffroy Geographische, Ethnographische und Naturwissenschaftliche Mittheilungen*, and learned from it that Godeffroy's ships were visiting the most distant oceans, and his agents searching the remote and seldom visited shores and islands, making collections in every branch of science, and with the eargerness of the modern journalist and interviewer, writing down their observations on the spot. The facts thus obtained all of which are curious and new, eventually make up the *Journal*, which is of quarto form and illustrated in the most liberal manner. Of the objects brought to Europe in the ships, Guimet says, "these collections constitute simply a warehouse of exotic varieties, heaped together in one great apartment. It is reached by a small wooden stairway, dark, steep and somewhat worm-eaten. The curators, however, are very obliging and insist that you shall see and handle whatever excites your curiosity." In fact it turns out that M. Godeffroy carries on a great trade in rare zoological objects. You may order from him a rhinoceros, a rattlesnake or a turtle from the Sea of Japan, as you would order from another merchant a bag of coffee or a tierce of rice. The order being received M. Godeffroy at once communicates with his travelling collectors who set off in pursuit of the article. Such of these as are not eaten by tigers or trampled to death by elephants, or squeezed to death by boa-constrictors, send word back when the specimen is obtained and forward it to Hamburg by the first courier.

It is easy to understand that a commerce, so conducted, is attended with vast expense, consequently zoological merchandise is very dear, but the customers of this bold and enterprising house never complain, as it is their custom in the way of civility to send with the article wanted, a series of other specimens which are always acceptable. This generosity has been particularly felt by the Museum of the City of Hamburg which is made up almost entirely of such donations.

Above this Museum. or Magazine of Natural Curiosities, is a loft or store room, and what the curators designate as the *depositorium*. Immense glass vessels here contain the reptiles and fishes preserved in alcohol. Being all thrown in pell mell as the cucumbers, cauliflowers, &c., in a bottle of English pickles, the inquiry was made as to how any special thing could be found when wanted—the answer was that every thing is catalogued and numbered with great care, so that at the slightest demand, when the time has come for a reptile, say, to be exhibited in a public museum, a pair of forceps releases it from this somewhat nauseatiug *depositorium*. Such an accumulation of dead animals necessarily gives out an offensive, even an infectious odor, and as if to help the matter the taxidermist's laboratory is placed close by, where the carcasses are investigated, dissected, skinned or otherwise prepared for sale or future keeping.

From Hamburg M. Guimet proceeded to Stockholm and assisted at the Archæological Congress, but as his report of the sessions is not so interesting as the official one, we will follow him no further.

E. Foreman.

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On the 13th of May 1875, under the American flag, the English Arctic Expedition, erected at the foot of Captain Hall's grave, a brass tablet prepared in England, bearing the following inscription:

"Sacred
to the Memory of
Captain C. F. Hall,
of the U. S. Ship *Polaris*,
who sacrificed his Life
in the advancement of Science,
on the 8th November, 1871.
"This tablet has been erected by the British Polar
Expedition of 1875, who, following in his footsteps,
have profitted by his experience."

# Mosses of the District of Columbia.

PREPARED BY RUDOLPH OLDBERG.

## MUSCI. MOSSES,

SPHAGNUM, Dill. Peat-moss.

1. cymbifolium, Dill. Bogs and swamps.
2. squarrosum, Pers. " "
3. acutifolium, Ehrh. " "
4. cuspidatum, Ehrh. " "

ANDRÆA, Ehrh.

5. rupestris, Tourn. Rocks in mountains.

PHASCUM, L.

6. cuspidatum, Schreb. Old fields, &c.
7. alternifolium, Brid. Fields, &c.
8. subulatum, Schreb. Old fields.
9. Sullivantii, Schimp. Moist ground.

BRUCHIA, Schwaegr.

10. flexuosa, Schwaegr. Damp ground.

WEISIA, Hedw.

11. viridula, Brid. Old fields, hillsides.

TREMATODON, Rich.

12. longicollis, Rich. Clayey and sandy soils.

DICRANUM, Hedw.

13. varium, Hedw.
14. heteromallum, Hedw. Moist grounds.
15. scoparium, L. Earth and decaying logs in woods.

CERATODON, Brid.

16. purpureum, Brid. Earth.

LEUCOBRYUM, Hampe.

17. glaucum, Hampe. Roots of trees and swampy grounds.
18. minus, Hampe. Earth in dry woods.

FISSIDENS, Hedw.

19. mimutulus, Sulliv. Damp rocks in shaded ravines.
20. osmundioides, Hedw. Roots of trees in swamps.

TRICHOSTOMUM. Br. & Schimp.

21. pallidum Hedw. Clayey grounds.
22. glaucescens, Hedw. Dry hillsides.

BARBULA, Hedw.

23. unguiculata, Hedw. Clayey soils.
24. cæspitosa, Schwaegr. Woods about roots of trees.

POTTIA, Ehrh.

truncata, Br. Schimp. Earth.

TETRAPHIS, Hedw.

25. pellucida, Hedw. Earth in woods.

DRUMMONDIA, Hook.

26. clavellata, Hook. Bark of trees.

ORTHOTRICHUM, Hedw.

27. Canadense, Br. & Schimp. Trees.

SCHISTIDIUM, Br. & Schimp.

28. apocarpum, Br. & Schimp. Rocks.

GRIMMIA, Ehrh.

29. Pennsylvanica, Schwaegr. Rocks and stones.

RACOMITRIUM, Br. & Schimp.

30. fasciculare, Brid. Moist rocks.

HEDWIGIA, Ehrh.

31. ciliata, Ehrh. Rocks and bowlders.

DIPHYSCIUM, Web. & Mohr.

32. foliosum, Web. & Mohr. Clayey or barren soils.

ATRICHUM, Beauv.

33. undulatum, Beauv. Moist clay banks.
34. angustatum, Beauv. Shady woods and swamps.

POGONATUM, Beauv.

35. brevicaule, Brid. Moist clayey banks.
36. urnigerum, Brid. Mountains.

POLYTRICHUM, Brid.

37. commune, L. Shady moist places.
38. Juniperinum, Hedw. Margins of woods.

AULACOMNIUM, Schwaegr.

39. heterostichum, Br. & Sch. Shady banks.

BRYUM, Br. & Schimp.

40. pyriforme, Hedw. Earth in burnt woods.
41. Wahlenbergii, Schwaegr. Springy places.
42. argenteum, L. Roofs, walks, pavements, &c.
43. pseudo-triquetrum, Schwaegr. Wet rocks.
44. cæspiticium, L. Rocks in dry places.

MNIUM, Br. & Schimp.

45. stellare, Hedw. Hills in woods.
46. cuspidatum, Hedw. Base of trees in woods.

BARTRAMIA, Hedw.

47. pomiformis, Hedw. Shady banks.
48. fontana, Brid. Springy places.

FUNARIA. Schreb.

49. hygrometrica, Hedw. Earth, and walls.

PHYSCOMITRIUM, Brid.

50. pyriforme, Br. & Schimp. Earth.
51. hians, Lind.

FONTINALIS, Dill.

52. biformis, Sulliv. Rivulets.

LEUCODON, Schwaegr.

53. julaceus, Sulliv. Trees.

LEPTODON, Mohr.

54. trichomitrium, Mohr. Trees in woods.

ANOMODON, Hook & Tayl.

55. attenuatus, Hub. Rocks and roots of trees.

LESKEA, Hedw. Bryol. Eur.

56. obscura, Hedw. Trees within reach of floods.
57. rostrata, Hedw. Base of trees in woods.

THELIA, Sulliv.

58. hirtella, Hedw. (Sulliv.) Roots and trunks of trees.
59. asprella, (Schimp.) Sulliv. Roots and stumps of trees.

PYLAISÆA, Bryol, Eur.

60. intricata, W. P. Schimp. Trees and logs.

PLATYGYRIUM, Bryol, Eur.

61. repens, Bryol, Eur. Old fences and logs.

CYLINDROTHECIUM, Bryol. Eur.

62. cladorrhizans, Bryol. Europ.
63. seductrix, Bryol. Europ. Old logs and roots of trees.

CLIMACIUM, Web. & Mohr.

64. Americanum, Brid. Earth in moist places.

HYPNUM. Dill.

65. Tamariscinum, Hedw. Ground and logs.
66. triquetrum, L. Ground in woods.
67. splendens, Hedw. Ground in woods.
68. hians, Hedw. Ground in woods.
69. Sullivantii, Spruce. Rocks in woods.
70. strigosum, Hoffm. Hillsides in woods.
71. piliferum, Schreb. Ground, &c., in dense woods.
72. Boscii, Schwaegr. Ground in hilly districts.
73. serrulatum, Hedw. Ground in dry woods.
74. rusciforme, Weis. Mountain rivulets.
75. recurvans, Schwaegr. Decaying logs.
76. Schreberi, Willd. Ground in moist woods.
77. stramineum, Dickson. Sphagnous swamps.
78. uncinatum, Hedw. Swamps and bogs.
79. fluitans, L. Stagnant water, and swamps.
80. cupressiforme, L. Shady places.
81. curvifolium, Hedw. Earth, and decaying logs.
82. pratense, Koch. Wet rocks, and ground.
83. salebrosum, Hoffm. Ground, and decaying logs.
84. lætum, Brid. Ground, and decaying logs.
85. hispidulum, Brid. Base of trees on dry places.
86. radicale, Brid. Rocks, and decaying logs.
87. orthocladon, Beauv. Wet springy places.
88. rivariums, Hedw. Swamps, and on stone in rivulets.
89. Lescurii, Sulliv. Wet rocks.
90. sylvaticum, L. Rocks in Mountains.
91. fulvum, Hook & Wils.

## HEPATICÆ. LIVERWORTS.

RICCIA, Mich.

92. lutescens, Schw. Low moist ground.

ANTHOCEROS, Mich.
93. punctatus, L. Wet slopes, sides of ditches.
MARCHANTIA, L.
94. polymorpha, L. Shady moist places.
FEGATELLA, Raddi.
95. conica, Corda. Springy places.
METZGERIA, Radd.
96. furcata, Nees. Rocks and bark of trees.
ANEURA, Dumort.
97. palmata, Nees. Rotten logs.
STEETZIA.
98. Lyellii, Lehm.
PELLIA, Radd.
99. epiphylla, Nees. Moist shady places, on the earth.
GEOCALIX, Nees.
100. graveolens, Nees. Earth, rotten logs, &c.
CHILOSCYPHUS, Cord.
101. polyanthos, Cord. Rocks.
LOPHOCOLEA, Nees.
102. bidentata, Nees. Moist rocks.
JUNGERMANNIA, L.
103. trichophylla, L. Decaying wood, &c.
104. setacea, Weber. Ground.
105. connivens, Dickson. Rotten wood.
106. Schraderi, Martins. Rotten logs.
SCAPANIA, Lind.
107. nemorosa, Nees. Moist banks.
PLAGIOCHILA, Nees & Mont.
108. spinulosa, Nees. & Mont. Banks of rivulets.
109. asplenioides, Nees. & Mont. Banks of rivulets.
FRULLANIA, Radd.
110. Grayana, Mont. Trees, and rocks.
111. Virginica, Lehm. Rocks, and trees.
112. Eboracensis, Lehm. Rocks and trees.
LEJEUNIA, Libert.
113. cucullata, Nees. Moist rocks.
MADOTHECA, Dumort.
114. platyphylla, Dumort. Rocks and trees.
RADULA, Nees.
115. complanata, Dumort. Base of trees.
PTILIDIUM. Nees.
116. ciliare, Nees. Rotten logs in woods.
TRICHOCOLEA, Nees.
117. tomentella, Nees. Moist places.
MASTIGOBRYUM, Nees.
118. tridenticulatum, Lindh.
LEPIDOZIA, Nees.
119. reptans, Nees. Earth.
CALYPOGEIA, Radd.
120. Trichomanis, Cord. Springy places.

ADDITIONAL MOSSES.

PHASCUM.
121. coherens, Hedw.
122. sessile, Br. & Sch.
123. triquetrum, Spring.
MNIUM.
124. Drummondii, Br. & Sch.
DICHELYMA.
125. subulatum.
HYPNUM.
126. diplanatum, Sch.

## Notes on the Trap-door Spider.

The following notes on the trap-door spider, published by the editor of this journal, in the *Rural Carolinian*, were collated from a letter by Dr. Anderson of South Carolina:

One of the first warm sunny days late in February or early in

March, as I rode to visit a patient I espied a thread or small cord stretching completely across the road, and stopping my horse, I perceived that it was a wide strand of spider web, which I could easily trace across the road and over the pine straw and tufts of grass on the side, till it reached a large pine tree, and it was clearly visible on the trunk of the tree to a height of twenty or twenty-five feet.

Being curious to know what the spider was about, to cause it to expend its web so lavishly, I dismounted and followed the strand to the other side of the road and traced it up a bank and over it, down again a few inches, till it stopped on the lid of the trap door, which was held open by the cord about an eighth of an inch at the widest part. The opening presented exactly the appearance or shape of the crescent moon, a few days old.

Going back to examine the silken pathway again, I discovered troops of little insects marching along it like ants, in their progress to and from their nest. The little fellows resembled our largest sized wood ticks, however, more than ants, and in parties of three or four, up to eight or ten, were wending their way to and up into the pine tree.

Having secured four specimens—they were very shy and not easily caught—I put them in an empty vial in my case and turned to examine the rest. Lifting the lid with a straw I perceived a large black looking, thick-set spider near the mouth, but, as the lid spread open, she retired to the recess of her den, which was an inch or more in diameter, and beautifully lined with a silvery web. The lid slipping from the straw in its sudden descent, broke the slender thread which had held it ajar, and it closed, so that no sign of a crack remained.

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## FIELD RECORD.

**An Ancient Apple Tree.**—During a severe storm four years ago, there was blown down upon the farm of Reed P. Clark, in Londonderry, N. H., a large apple tree, whose history is worthy of note. It was a seedling known as the Beebox, and careful inquiry among the oldest residents of the neighborhood, established the fact that it was noted for its great size more than a hundred years ago. At the time

of its destruction it measured 40 feet in height, 13½ in circumference at base of trunk, and 12½ in circumference where it broke off, ten feet from the ground. Its branches spread 60 feet, three of them measuring each 5 feet in circumference.

The trunks had for a great many years been hollow, three grown boys standing inside with ease, the cutting off of two lower limbs giving an easy entrance. Thick ribs of new bark upon the trunk, seemed to give necessary support to its massive branches, the foliage of which was so heavy that an ordinary shower did not wet the ground underneath.

The Beebox was also a prolific bearer; it fell heavily ladened with fruit, and two years before, 17 barrels had been picked from it, no measurement being made of those that fell, or were left upon the tree. The apples were of medium size, and a pleasent sour.

The tree trunk still stands, converted during the summer months into an immense garden rose, where flowers and vines grow in the most luxuriant manner.—M. P. S.

**A Congress of Birds.**—The congregation of different species of birds in one place for mutual protection and perhaps for company, is not an uncommon phenomenon but I have never seen it more clearly exemplified than on yesterday. I had been roving about for several hours through the many finely wooded tracts that line the banks of Rock Creek in the vicinity of Washington and Georgetown, and was remarking the uncommon silence and absence of life that reigned there, when suddenly I came upon what seemed a flock of birds. Some were in the trees, others on the ground or on logs and moving about among the scanty underbrush. Supposing them to be all of one kind, I hastened to determine what birds they were. The first ones identified were Robins, but I soon observed that there were others that were smaller. These I saw to be Blue-birds; then I espied some crests and was able to approch near enough to several Cedar-birds to see the wax on their wings; rustling among the dried leaves near by were a number of Hermit Thrushes (*Turdus pallasii*); numerous snow-birds next made themselves obtrusive as also one Sparrow; hopping about on the trunks of the trees were plainly seen three or four Woodpeckers (*Sphyrapicus varius*). These were all I was able positively to identify, but there were reasons for thinking that still other species

were keeping the same company. Thus had at least seven wholly distinct species of birds belonging to widely separate families and orders huddled together in one spot while the rest of the woods presented the utmost stillness and lifelessness.—LESTER F. WARD.

*November, 13, 1876.*

**A "Stand-off" between Snake and Frog.**—The article in your last issue, entitled "Unusual Accidents to Birds," in which the fact of a stout beetle perforating the oesophagus and skin of the neck of a night-hawk is noted, reminds me of an equally curious circumstance of a similar kind. Many years ago, I caught a snake (*Eutænia sirtalis*) which had partly swallowed a frog hind end foremost. The head and shoulders of the frog were still sticking out of the snake's mouth; and the frog with its vigorous hind legs had scratched and kicked through each side of the snake's gullet and skin of the neck. A curious fix for both animals! The snake could neither finish swallowing the frog, nor let him go; the frog, having freed its hind legs, had nothing left to kick against, and was equally helpless, with its hind legs sprawling from each side of the snake's neck. The snake was too large for the frog to hop away with, and the frog had fatally injured the snake. They were the most woe-begone couple I ever saw; each and "caught a tartar," and neither could get rid of the other. I bottled the precious pair, and kept them for some time in alcohol as the chief-treasures of my boyish museum.—ELLIOTT COUES.

## GLEANINGS IN FOREIGN FIELDS.

**Caterpillars.**—If the experiment related below has never been made before, it appears to me deserving of notice in reference to instict and evolution. The successful result of the experiment in a single case last year led me to repeat it on a somewhat larger scale this autumn. On September 25 I placed a number of the caterpillars of *Pieris brassicæ* in boxes, and fed them with cabbage till they began to spin up. As soon as they had attached themselves by the tail and spun the suspensory girdle, and therefore *before* the exclusion of the chrysalis, I cut the girdle and caused them to hang vertically by the tail in the manner of the *Suspendi*. More than half of the caterpillars had been ichneumonized, and some accidents to the others

finally reduced the number in which the experiment was fairly tried to eight. Of these, *three* came out successfully, the chrysalids maintaining their hold of the caterpillar-skin until they had succeeded in fastening themselves by their anal hooks to the silk to which the catpillars were attached. The other five, as might have been expected of all, fell to the ground for want of the suspensory girdle. Counting the case last year, here then are no less than four out of nine caterpillars of the *Succincti*, when artificially placed in the conditions of the *Suspendi*, adapting themselves to circumstances so greatly changed, and whether by plasticity of instinct or reversion to ancestral habit accomplishing a very difficult operation no less successful.—*Nature*.

**The Locust in England.**—Mr. H. W. Livett writes to *Science Gossip*, that a specimen of the true migratory Locust, *Pachytylus mi-*

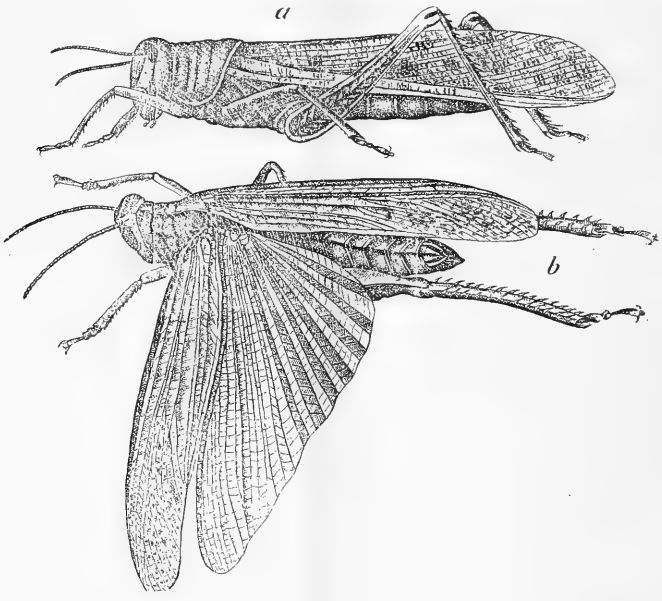


FIG. 3, *b*. PACHYTYLUS MIGRATORIUS.

*gratorius*, was recently found in a bean-field near Wells, Somerset. Upon comparison, it was identical with specimens in his cabinet from Australia and Egypt, and was very different from the large green grass-

hopper, *Acrida viridissima*, often found in his locality. The specimen measured about four inches asross the wings, which were of a greenish hue, the wing cases and body being brown. This species is supposed to be the locust mentioned in the Scriptures by the prophet Joel.

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## EDITORIAL PENCILLINGS.

THE GRASSHOPPER BILL IN CONGRESS.—In the House of Representatives, December 18, 1876, Mr. Hatcher, from the fourth district of Missouri introduced the following bill, making appropration for a commission to investigate and report upon the best means of destroying or providing remedies against the plague of locusts:

*Be it enacted by the Senate and House of Representatives in Congress assembled*, that the sum of twenty-five thousand dollars be, and the same is hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the purpose of paying the salaries and expenses of a commission to consist of three entomologists and two Western men who have had experience with the locusts, to be appointed by the Secretary of the Interior, and whose duty it shall be to examine into the history and habits of the said locusts, and make report thereon; and also suggest such means of destroying them, or remedies against them as their investigations shall prove most practicable.

Congress has taken a step in the right direction in introducing a bill looking toward a solution of the grasshopper question, and the next proper step will be to pass the bill promptly, that the commission may be appointed, and thoroughly organized before spring opens. In the October number of this journal we gave our views on this subject, and it is not necessary to repeat them here, further than to urge the necessity of sending into the field *practical* entomologists, who are used to field work; those who will settle or try to settle the questions as to where these insects come from, and the locality and extent of their feeding grounds before they suddenly make their appearance in the vast hordes that sweep down in a night upon our farming lands.

We are satisfied that much good can be accomplished by this commission, but how much remains to be seen. Of course the total extermination of the pests, is a thing not likely to be accomplished, but we confidentially believe that with a proper knowledge of their habits and natural history, and of their movements during various portions

of the year, that such barriers may be thrown around them in their future incursions, as shall be the means of saving millions to the farming communities, and to the States which have been the scenes of their devastations.

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## OUR BOOK SHELF.

SEVENTH ANNUAL REPORT OF THE GEOLOGICAL SURVEY OF INDIANA for 1875, by E. T. COX, State Geologist, assisted by PROF. JOHN COLLET, PROF. W. W. BORDEN, and DR. G. M. LEVETTE. Indianapolis 1876.

This is an octavo volume of six hundred pages, and contains, in addition to reports by the gentlemen named, detailed reports upon the geology of a number of counties, by Dr. Moses N. Elrod, Dr. E. S. McIntire, and gentlemen connected with the survey; a report on Fossil Marine Plants by Prof. Lesquereux, and a catalogue of the Flora of the Wabash Valley by Dr. Schneck. Dr. Levette has also a report on the Depth and Temperature of some of the Lakes of Northern Indiana. The whole forms a valuable book of reference, though in regard to the catalogue, we think the species should have been numbered consecutively, instead of merely numbering the species of each genus.

THE AMERICAN JOURNAL OF MICROSCOPY and POPULAR SCIENCE, VOLUME I. Edited by JOHN PHIN. [pp. 144. Illust.] New York, Handicraft Publication Co., 1876.

This nicely printed little volume contains much interesting reading matter, not only upon the various subjects pertaining to microscopy, but upon entomology and kindred sciences, and is well worth the subscription price, 50 cents a year, payable in advance. We welcome it to our exchange list.

THE EVOLUTION, A Weekly Review of Politics, Religion, Science, Literature and Art, Edited by JAS. D. BELL. Volume I, Number I. New York, published January 6, 1877. Subscription price $5.00 per annum.

FERTILIZATION OF PLANTS BY INSECT AGENCY, and other papers by THOMAS MEEHAN. From the Proceedings of the Philadelphia Academy of Natural Sciences.

INCREASE ALLEN LAPHAM. A Memorial read before the Wisconsin Natural History Society, by Charles Mann.

# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

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## Ornithological Notes from Texas.

During a brief sojourn in the Brazos River Valley, Waller County, Texas, in the interest of the U. S. Fish Commission, I succeeded in making a few observations on the ornithology of that region. My notes are to a great extent incomplete and fragmentary, as my time was limited to a few days, while I was obliged to make ornithology a secondary matter on account of other business. However, I hope they may contain some facts of interest to the student of geographical distribution, if to no one else. Frequent delays on the railroad through Kansas, Indian Territory and Northern Texas, gave me an opportunity of taking a few notes in that section, that will hardly come amiss under the above head.

My attention was particularly called to the great number of *Archibuteo lagopus*, on the praries of Indian Territory and Kansas; even where not a shrub or tree was in sight, the telegraph poles along the M. K. and T. Railroad, from which they may watch for their favorite Arvicolae, and thus alleviate the necessity of too much exertion on the wing; this may be judging their capacity or inclination rather harshly, but they seem disposed to take life pretty easy, and are satisfied with such vulgar prey as would be spurned by their more vigorous and high-toned relatives. They seem very reluctant to leave their perches even on the approach of the train; I often saw them merely fly to the ground a few rods from the track, wait until the train had passed, and immediately resume their former post. From fifteen to twenty could be seen at a time; and in the vicinity of streams many perch upon

the same tree. I noticed this hawk on the Colorado, at Austin, repeatedly at Hempstead, and a few individuals along the railroad in Harris and Brazoria Counties, but nowhere in such abundance as from the Neosho Valley to the Texan border.

Next in order would perhaps be the lively and bold spirited little *Tinnunculus sparverius*, more abundant in the partially wooded regions, but this occurs so universally that it is impossible to tell where it is most common. *Buteo borealis* perched upright on some dead tree-top was no rare sight anywhere between Fort Scott and Austin. Near North Forktown, Canadian River, Indian Territory, I saw three fine plumaged *Buteo lineatus;* and while skinning birds under a large elm on the banks of Clear Cleek (tributary Brazos River) one lit within a few feet of me; my gun was unfortunately charged with number 12 shot, so he got away, minus however, a good many feathers. Young birds of this species, or perhaps *B. pennsylvanicus*, were noticed, but as none were killed I could not with certainty identify them. Near Fort Gibson, Indian Territory, I saw three *Brachyotus cassini;* they seemed to be hunting over the marsh, after the manner of *Circus hudsonius;* it was about noon one very bright day. I have frequently noticed this habit before, on Lake Koskonong, Wisconsin. Of all the birds I saw or killed, none so surprised me by their presence at this season of the year (December,) as *Elanoides forficatus*, in Ellis County, Texas, and *Ictinia mississippiensis*, in Harris County. I am told by a gentleman of unimpeachable integrity (Prof. L. D. Roberts, Principal Phawano high school, Wisconsin) that the former is far from being a rare bird in the Neosho Valley, Kansas, in summer.

Other hawks identified were *Falco columbarius*, *Nisus cooperi* and *fuscus*, Indian Territory, and *Circus hudsonicus*, Waller County, Texas, also *Aquila canadensis*, near San Bois Mountains, Indian Territory.

*Corvus americanus* was very common along the M. K. T. Railroad, flocks in places. Did not see many in Texas—a few in Waller County. Considerable flocks of *Corvus ossifragus* were seen on the burnt lowlands between Bayou Boeuf and Chuchahoula Louisiana. Associated with them was a large *Quiscalus*, probably *Q. macrourus*. No ravens were seen during the whole trip. *Rhinogryphus aura* was first seen in Northern Indian Territory, and in large numbers, and in the vicinity of Galveston slaughter houses, the ground was black with buzzards.

I have never seen so many within a small Territory in any of the Southern States, as I noticed along Clear and Pond Creeks, Waller County,—Galveston excepted. Larks were common through Indian Territory, but whether *S. magna* or *neglecta* or both I am unable to say. *S. magna* was killed at Hempstead.

*Ortyx virginianus, Cupidonia cupido* on the praries; the former always near timber. *Melospiza lincolni, Dendrœca coronata* and *palmarum* near North Fork, Canadian River. The latter species here, as has been my experience in other of the Western States, seems to prefer the prairie. I would suggest this peculiarity of the western varieties, as one of the probable differences in the habits, between it and its eastern congenor. Mr. Gentry in his Life Histories of Birds of Eastern Pennsylvania, page 132–33, says "frequents the borders of thickets along water courses . . . extremely shy and leads a secluded life . . . always observed as isolated individuals." I have not the least doubt that the above is perfectly correct for var. *hypochrysea*, Ridgway; but it differs materially from my experience with *D. palmarum*, in as much as they are very familiar and often go in loose straggling flocks of a few individuals along the *fences* on the *praries*, (Wisconsin.) In the same locality as the preceeding, we noticed a couple of *Seuri*, but the species is uncertain; also, *Spizella monticola* and *Scolecophagus ferrugineus*.

Shrikes were frequently noticed along the road in the low scattered trees through Nararro, Mestone and Robeson Counties. They were quite common about Hempstead, where I procured typical specimens of *ludovicianius* and *excubitoroides* (identified by Mr. Ridgway) in the same locality and on the same day. At Austin I found a gentleman who had an enclosure within his grounds in which he kept quite an assortment of the larger water fowl; among them the most beautiful specimen of *Grus americana* I ever saw. It was in perfect plumage with a full train. His stately carriage as he slowly and with majestic strides wandered among the subtropical vegetation of the garden, had a very fine effect. He was so tame that I stroked his snow-white plumes without any show of dissatisfaction on his part; he would occasionally turn his head sideways and utter his peculiar note in an under tone—so to speak. I was told this bird was raised from the nest. A few individuals of this species were noticed in Harris and Brazoria Counties. *G. canadensis*, on the other hand, was

common everywhere from Herne to Galveston. I saw one flock near Hempstead that must have contained near five-hundred birds. They also appeared in considerable numbers near Galveston. In the same enclosure with the crane, was a young *Cygnus buccinnator*, and specimens of *Branta canadensis* and *hutchinsi;* did not have an opportunity to inquire minutely the difference in the habits of these two species during confinement, but I am entirely convinced that they are distinct. I venture the theory that when ornithologists have studied them more critcally in the field, something of the same difference that is so appreciable in the notes and flight of *Sturnella magna* and *S. neglecta*, will be found to exist here. Also that *hutchinsi* has a more northern range than *canadensis*. I am willing to admit that in a large series of specimens they grade into each other, as regards size, but never yet have I seen a lot where the *hutchinsi* did not retain their fourteen or sixteen instead of eighteen tail feathers and "butter ball" like bill, even though the size might approach that of a small *canadensis*.

A few *Lophodytes cuceulatus* and *Fulix affinis* were seen in Arkansas near Fort Gibson, Indian Territory. In Waller County, Texas, the ducks coming under my observation, were, *Aix sponsa* and *Anas boschas*,—common. A few specimens of *Dafila acuta*, *Mareca americana*, *Botaurus minor* and *Ardea virescens*, Clear Creek, Waller County. *Ardea herodias* common along the railroad in Harris and Brazoria Counties. *Ardea egretta* and *candidissima* in Galveston Bay. In my note book the following species are enumerated from the vicinity of Clear and Pond Creeks and Piney Island Branch (tributary Brazos near Hempstead.) Most of the species were procured, many in such a tattered coudition, however, that any attempt to restore them to a presentable skin by the art of taxidermy was impossible. *Molothrus pecoris*, associated with *Scolocophagns ferrogenius* in loose straggling flocks. *Agelæus phœniceus* in abundance. A few specimens of *Icterus baltimore*, *Cardinalis virginianus* in the low thickets along streams, very common and in company with *Pipilo erythrophthalmus*, *Zonotrichia albicollis* and *leucophrys*, *Melospiza melodia*, *Harporhynchus rufus*, *Galeoscoptes carolinensis*, and an occasional *Turdus pallasi*. Saw but few *Turdus migratorius* or *Cyanurus cristatus*. An occasional *Sialia sialis* and a superabundance of *Mimus polyglottus*, *Sayornis fuscus* and *Contopus virens*. *Troglodytes aedon* and *Thyothorus bewicki* (too specimens preserved) "the opposite ex-

treme from the light Mexican race (var. *leucogaster*) which occurs on the Texas side of the Rio Grande." (R. Ridgway.) This species of wren was quite common along the low vine-tangled banks of a dry river bed, the locality being nearly inaccessible. I procured but one of the many I shot. On going back to camp I noticed one on the top of a tall dead tree, singing merrily; this one was killed by my companion, Mr. Earll. *Parus atricapillus* and *Lophophanes bicolor*, in the same locality as the above. *L. bicolor* quite common, as was *Regulis calendula* and *Setophaga ruticilla*. In the heavy timber there was no dearth of wood-peckers e g., *Picus pubescens* and *villosus*, *Centurus carolinus* and *Sphyrapicus varius* were shot. In the more open woods, *Colaptes auratus* and *Melanerpes erythrocephalus*. Mr. Earll had a long chase after a *Hylatomus pileatus*, that finally took refuge in a hollow tree and thus defied his pursuers. *Sitta carolinensis* was seen a few times. Also *Mniotilta varia* and *Dendroeca maculosa*. Other warblers were seen, but not procured, and I could not with certainty identify them.

In the low groves on the prairies, *Spizella pallida*, *socialis* and *pusilla* were shot. Among fallen timber, and in brushwood were "fished out" *Passerella iliaca*, *Zonotrichia leucophrys* and *querula* and any number of *Junco hyemalis;* this was the middle of December in south central Texas, and in less than four weeks later I found the same quite common in Jefferson County, Wisconsin: the weather extremely cold and the ground covered with snow. It seems to me there is some inconsistency here; the *Juncos* leave the vicinity of Madison for the North, usually about April the fifteenth. Will some expert give an explanation? By far, the most abundant sparrow on the dry praries of Waller County, was *Passerculus savanna;* in fact you could scarcely go a rod in some localities and not start one. I cannot rid myself of the conviction that some of the suspicious looking sparrows that were targets, but did not become specimens, on account of my poor markmanship, (they had to be shot while flying from one tuft of grass to another, generally about six feet) were *C. lecontii;* one specimen of *Coturniculus passerinus* was killed. Also *Poœcetes gramineus*, *Melospiza palustris* and *lincolni*.

*M. lincolni* next to *savanna* was the most common. Several flocks of *Eremophila alpestris* were frequently seen on the prairie, and procured. One small flock of Titlarks, which from their white

breasts, I think must have been *Neocorys spraguei* were fired at, without effect however. A single *Ceryle alcyon*, a dozen *Ampelis cedrorum* and a few *Zenaidura carolinensis*, near Pond Creek. *Numenius longirostris* in all suitable localities, but shy. It took the combined efforts of Mr. Earll, two others and myself, with a very liberal cannonading, to persuade one to sacrifice himself to science.

On the marshes in the neighborhood of Galveston, I easily recognized *Totanus melanoleuca, flavipes* and *solitarius, Steganopus wilsoni, Tringa maculata, Tringoides macularius, Calidris arenaria* and *Ægialitis vocifera*. I was not a little surprised to meet my old friend *Limosa hudsonica*, but such is the fact. Many more would of course have been found if I had had the time to go into the marshes or on the beach; but I was obliged to be satisfied (?) with viewing this most glorious field, from the deck of the steamer, and lament at leisure my inability to investigate this ornithologist's paradise. As a consequence my notes from Galveston are rather thin. One other reason is that the majority of birds seen here were such as I dare not identify unless I have the bird in my hand. Swans were seen near Houston, and again at Galveston, but which species I cannot say. *Pelecanus fuscus* of course, and several large *Graculi*, but if *carbo, dilophus* or *floridanus*, I am unable to say. *G. mexicanus* I identified from its small size. One *Rhynchops nigra* and several *Puffinus fuliginosus*. When nearing Achafalaya Bay, Louisiana, I noticed the first and only *Larus Smithsonianus, delawarensis* and *C. philadelphia*, I had no difficulty in determining, as a large concourse of these species, with two others, followed the steamer constantly. Saw some large Terns, presumedly *regia*, also some small ones; one in particular about the size of *forsteri*, but with a *black bill* was no doubt *S. cantiaca*. I was left in doubt in regard to many, e g., a *Colymbus*, what I took to be a *Stercorarius*, many Gulls and Terns, and in fact a general assortment of water birds seen from a distance and under circumstances likely to mislead.

LUDOVIC KUMLEIN.

*University of Wisconsin. December, 1876.*

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We shall commence publishing in the March number, a catalogue of the Birds of the District of Columbia.

## Archæological Explorations in Nicaragua.

One of the most successful explorers of antiquities in Central America is Dr. Earl Flint, residing near the northwest border of Lake Nicaragua. He has contributed many curious articles and valuable suggestions to the National Museum. A strip of mountainous country separates his station on the Lake from the Pacific Ocean, having a varying width of from seventy to one hundred miles, and over this uneven country everything has to be conveyed to the sea port. Jnst within the margin of the Lake lie the Islands Omotepec and Zapatero, which abound in aboriginal remains, and if not at one time the residence of extensive populations, bear evidence that a people now extinct formerly swarmed over the adjacent shores. Slight excavations, made almost anywhere, discover a series of tombs of very remote antiquity, containing relics which are almost the sole reliance for solving great ethnological questions. By diligently collecting such objects, studying their connexions with each other, and the style of work or ornamentation exhibited, Dr. Flint has deduced epochs or periods of settlement near the lake, each characterized by such diverse features that he is convinced that they are the monumental records of at least three separate nationalities which have succeeded each other. As the accounts derived from the chronicles of the Spanish invasion, (about A. D. 1523,) are speculative and conflicting, and as it is conceded that the native traditions are worthless, and that even the languages of existing tribes are almost beyond recovery, the relics above referred to, are about all that is now left to illustrate the history of these people. Long intervals of time seem to have passed between the degradation and extinction of one people, and the ascendency of their successors, themselves to be subsequently driven out and to disappear. In one instance it would seem that a stratum of lava and volcanic ashes is recognized as covering the burial places of the second epoch, forming a striking line of demarcation, but conveying only an imperfect idea as to the absolute age of the deposit for the reason that this is the region of all others which has suffered most frequent disturbance from these eruptions. The incursion of warlike races probably from Anahuac, in Mexico, frequently unsettled the country, leading many to suppose that from this cause and a semi-nomadic character prevalent at the time, that no settlement was very permanent, and that many continued only for a generation. The

Chorotegas once held possession of the coast from Fonseca to Nicoya Bay, but this line of occupation was broken in two places and a different people obtruded themselves into the breaches, and, holding fast their positions, divided the original settlement into three districts.

The most ancient epoch and occupying the lowest stratum of burials is indicated by a paucity of objects and the rudeness of their manufacture. The wants of the people seem to have been restricted to some means of bruising their maize, accomplished on a rough stone having a deep circular cavity and may be called a mortar; a roughly chipped stone axe to cut wood and a stone celt for other cutting purpose or for defense, earthenware vessels for cooking or for holding food, rude in shape, very thick and without ornament or glazing; idols of stone so roughly chipped or sculptured and the features so obscure that one hesitates in deciding as to the class to which it belongs; pottery images, chiefly of the human face, and supposed to have been parts of jars, probably the handles. To these may be added beads formed of thick pieces of marine shell and coarse beads of pottery for personal ornaments.

The next highest stratum contains relics of a better class. The corn grinder, in this instance, is a large stone tablet elevated on three, often four feet, known as a metate. It is made of the cellular lava which abounds in that country, and possesses a sharp cutting or grinding surface, which is slightly curved, a flat rubber of the same material being used upon it. The edges of the metate are chiselled into an ornamental border and the feet are made to represent some living object. The celts and axes are more shapely and often polished. The pottery is of various pattern and capacity and burnt harder. Here the shoe-shaped vessels, Fig. 1, make their first appearance. Their peculiar form induced the Spaniards, at the conquest of the country, to bestow on the island where they most abound, the name of Zapatero or Shoemaker island. They are made of clay, similar to that used for our ordinary flower pot, are not much thicker, of the same color, and of all dimensions, from the capacity of a gill measure to twenty or twenty-five gallons. The larger sizes are used as urns or vases for funeral purposes, as they will hold a body of a person of ordinary stature, if it be properly corded or trussed up. This is not however the mode of burial in use among this people, since these vessels are found to contain only the bones of the deceased person. The corpse was carried out to a

Fig. 3.

Fig. 1.

Fig. 6.

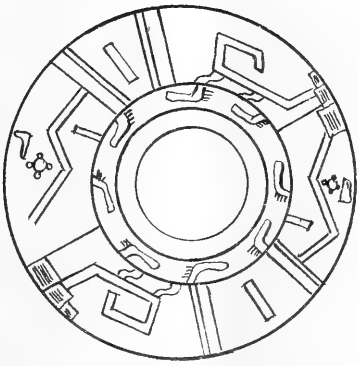

Fig. 4.

Fig. 2.

Fig. 5.

scaffold, erected for the purpose, where it remained until decomposition took place. If after several months had elapsed this was not fully completed, a person, whose function it was, stripped the bones of all remaing soft parts, and cleansed them by washing and otherwise prepared them for a final interment. This was accomplished by inserting the remains in one of these jars together with his weapons, tools, ornaments, and some smaller earthenware vessels containing food and water. They were frequently ornamented with figures of animals, as of the reptile, Fig. 2. This custom of exposure, before the final sepulture, is observed by many of the aborignal tribes of the western side of this continent from the Artic Circle down to the Equator. In some cases stone cists or graves are employed to hold the bones not of a single individual only, but of an entire family. The shoe shaped urns are found buried in yellow clay, a few feet under the surface, the aperture being covered over by one of their large shallow pans shown at Fig. 6. Zapatero Island is very rocky, densely wooded and now but sparsely inhabited, one consequence of there being but a small margin of level land around it. It has been conjectured that it was appropriated in former times to burial purposes only.

Ten stone idols or images belonging to this period are sculptured so as to represent the human figure in a crouching posture, with features which bear, in all of them, the same national character. The human face is a favorite ornament on the earthenware vessels, showing extreme idiocy and degradation, but unfrequently it is replaced by grotesque heads of the monkey, tiger, parrot, toucan or other animals often undeterminable. Their beads were made of a hard jade or nephrite, of greenish color and uniform in size, handsomely polished. Ornaments of gold also are found, consisting of short cylinders formed from a thin plate of the metal rolled together and arranged on a string. Small shells, likewise from the adjacent sea shore, species of *olivella* or *marginella*, perforated lengthwise, so as to be conveniently strung, are found in great numbers. The flint spear heads of this period are large, of good shape but coarsely chipped. The designs painted on the bottom of the large bowls or basins of this period are more artistic than those of later date, and are characterized by the figures being painted broadly and outlined in black. The comparison may be made by the following figures, Fig. 3 being the more ancient. Figure 4 is comparatively a feeble and childish conception. The basin shown at

Fig. 5 is that from which the design, Fig. 3, is copied. The tumid legs of this vessel are hollow and contain small pebbles, making a rattling sound. The elongated handles were often made into whistles, with three or more apertures for varying the sound.

The stratum of graves nearest the surface, regarded as that of the third period, commences previous to the Spanish invasion, and continued down to quite a recent time. It is strongly marked by greater and more refined works of buildings, sculptures, inscriptions, pottery, metal ornaments chiefly of gold, and glass beads, the latter being a proof of intercourse with foreign nations. The great pyramidal mounds, encased with stone, belong to this period; also the hieroglyphic inscriptions, as yet undeciphered, the life-size images or idols, sculptured in hard vesicular lava, well glazed and ornamental pottery, traces of plaited or textile fabrics, copper beads, supposed to have been molded, small idols of gold wire made by soldering into a sort of filagree work, and showing much artistic skill and social refinement. The glass beads are of a very ancient pattern, being made of concentric layers of red, blue and white enamel, a cross section of which exhibits a star shaped figure; as far as we are advised they are not now manufactured. The stone beads are of turquoise or of a greenish shade, and are made by rubbing down the stone into rounded pellets, and perforating them for stringing by an art, which, considering the means at their command, has not been discovered. Clay beads, of three-fourths of an inch long were made by rolling the material around a thread and when burned, left the neeessary bore for the string. The handles and legs or other projecting parts of their fictile wares were molded to represent the animals of their country, monkey, parrot, tiger and others, but often so grotesquely distorted that the design is undecipherable.

The people who dwelt on the shores and islands of the Lake Nicaragua belonged to the nation of Chorotegas, and they set up a centre of civilization which ramified for a long distance up and down the coast. The Spanish writers learned from existing traditions that they were closely related to the Chiapas, occupying one of the more northern states of Mexico, from the table lands of which they emigrated. One of their names, Chapanecas, would seem to confirm this, being so-called after a bird held sacred among them, the chapa or macaw. A portion of them were derived from the ancient city of Cholula, which gave them the name of Cholutecas, easily corrupted into Chorotegas,

by which title they are spoken of by Remesal, Torquemada, and other writers. It was while in possession of these territories that the Spanish invaders encountered them. The merciless warfare waged upon them, their conversion to the Christian religion, the prohibition against any further use of their own language, and the substitution of that of Spain, being all matters of history, need not be further alluded to. These people spoke a dialect of the Maya language, which is so widely diffused over Central America, for the study and recovery of which Dr. C. H. Berendt has devoted many years of travel, undergoing dangers and privations in this unfrequented part of the world. Ethnology is indebted to him for verifying the connection between the Chapanecos and Chorotegas. His own words, as given in a discourse before the American Geographical Society, on July 10, 1876, will best recount the highly interesting discovery: "Having studied the Chapanecan language, on a former expedition, and wishing to compare it with the Chorotegan, I visited Nicaragua in 1874. I found that the Indian population, near Nicoya and Fonseca Bay, had entirely disappeared, and in both districts only met with some local names belonging to the Chorotegan language. In the third district, also, were descendants of the old stock still living in twelve villages around the Lakes Masaya and Apoya. I was informed that no other vestiges of the old idiom were left, the inhabitants speaking exclusively the Spanish language. I had, however, the good luck to ferret out some old people who still remembered words and phrases they had heard in their childhood, and I was enabled to collect material sufficient to convince myself and others of the identity of the Mague or Chortegan idiom with the Chapaneco language of Mexico. I was not a moment too early in obtaining this information for the greater number of my informants died while I was staying in the country."

It will now be seen from what precarious sources any new facts are to be derived for the increase of our knowledge upon this interesting subject. The continuance of Dr. Berendt's labors are of the last importance. His experience in the field, his great knowledge, clear judgment and self sacrifice are combined in no other man known to us. A study of his vocabularies, by which the languages are to be restored, and of the extensive collections at the National Museum for interpreting the arts and customs of the people, will enable archæologists to solve the great problem of Central America.

It would be unjust to those who have been working in the same field to close these brief statements without referring to the very liberal contributions made to the National Museum by Capt. J. M. Dow of the Pacific Mail Service, as also Dr. Van Patten, formerly of Washingington, who likewise deserves honorable mention. More recently Dr. J. F. Bransford, U. S. N., whilst engaged in official duty near the lake, has made very extensive and important collections that are now in the Museum, but as his explorations will be the subject of an official report to his Department, it would be improper to forestall any part of it by a more extended reference.

E. FOREMAN.

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## Phylloxera Vastatrix.

Under the heading "New remedies for the Phylloxera," in a recent issue of *Field and Forest*, it is recommended to plant maize between the rows of grape vines, that by so doing, the vines will be shielded from the ravages of the insects, which prefer the corn roots as an article of diet, and consequently the grape roots are abandoned. This inference is somewhat shaken, however, in the assertion that "the roots of maize planted in a field, alongside the vineyard, did not present any trace of the Phylloxera;" leaving a faint suspicion that the disappearance of the insects might be attributable to some other cause than that of their preference to the roots of the cereal. In another sense it is comforting to be assured that the corn crop is in no immediate danger of annihilation by these insects, and I have no doubt but that this remedy is equally efficacious, and practically as potent, as the numerous other recipes that have been so freely and zealously communicated of late for the destruction of Phylloxera.

It is not uncommon, in the investigation of phenomena connected with the diseases of plants, to mistake a consequence for a cause, and in the present position of the practical application of scientific conclusions the mistake is a very pardonable one indeed.

This is notably exemplified in the history of the Phylloxera, this insect having been blamed for results of which it was entirely innocent, and with which it had not even the most remote connection; at least as a primary cause.

It has been asserted that the cause of the failure in the ordinary vineyard culture of the foreign grape in this country is due to the ravages of this insect, when it is well known that the cause of failure is owing to the liability of the grape to be attacked by fungoid growths.

We know that for more than half a century the foreign grape has been successfully cultivated in this climate when placed under conditions unfavorable to the spread of mildew on its foliage and fruit. In view of facts, well ascertained, it seems superfluous to state that these conditions are purely atmospherical, and have no relation with insect attacks, either on the branches or the roots of the plant.

The primary cause of failure and destruction, not only of the European grape, but of so many popular varieties of our native species, is attributable to the injury they receive from the destruction of foliage by mildew in some of its various species and forms.

The weakening effects of mildew on the grape makes its final destruction by Phylloxera possible; diseased subjects, both in the animal and vegetable kingdom, are liable to become the prey of insects, and when the grape is weakened by repeated attacks of mildew, what little of vitality remains is easily vanquished by the Phylloxera. If we compare a list of native grapes, least subject to mildew, with the list of those varieties acknowledged to be most exempt from the root-louse, we will find them to be identical.

Most of the remedies advanced for the destruction of Phylloxera are impracticable, but even should a practical remedy be discovered the great drawback to grape culture, *mildew*, still remains. On the other hand, we have convincing proof that vines exempted from mildew maintain a healthy constitution and a productive vigor which the Phylloxera cannot overcome.

Without going into details, it may be remarked that thirty years ago the European vineyards were healthy, yielding abundant crops, and the wine interest in a prosperous condition. In 1846 the *oidium* or vine mildew made its appearance in France, rapidly spreading devastation to the vines and ruin to their proprietors. In 1851 it had crossed the Mediterranean, invading Algeria, Syria and Asia Minor. In 1852 it reached Madeira, and made such havoc that in 1856 only 200 pipes of wine were produced; a striking contrast with the crop of 1850, which returned 14,000 pipes. A few years later we hear of a root disease; subsequently we learn that it is caused by an insect "a

minute *aphide*, which formed yellow patches on the roots of the grapes, and proved equally disastrous as the mildew."

This "minute *aphide*" is now better known as the *Phylloxera vastatrix*, and it is not improbable that there, as here, mildew prepared the vines for the rapid increase of the insect and the final destruction it has occasioned.

As to the identity of the leaf-gall insect of the grape and the louse on its roots, it is an entomological question with which I am totally unacquainted. The leaf-gall on grapes is, however, a very old acquaintance, and in some seasons appears in great abundance on some varities of native grapes. The Clinton, a variety of *Vitis cordifolia*, is especially subject to the attacks of the leaf-gall insect, but without any apparent injury to the plant; this variety being one of the most robust and productive grapes in cultivation; it is also one of the least liable to mildew. The Taylor, a variety which may be referred to *Vitis riparia*, (Engelmann,) is also very subject to the leaf-gall; it is also noted for its healthy vigor and freedom from fungoid diseases.

Those who are familiar with the diseases of plants can mostly distinguish from the appearance of a sickly plant, whether the disease is of fungoid origin, or from the effects of insects.

The best remedy, therefore, for the Phylloxera is to maintain healthy foliage on the vines. This is not so paradoxical as it seems.

WILLIAM SAUNDERS.

*Washington, D. C.*

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## Notes on the Preservation of Fungi.

An article in a recent number of *Field and Forest* upon the preservation of fungi, induces me to send you the following notes of my own experience during the past two years.

The only objection to keeping fungi in glass bottles or jars, is that the jars require more space than the most of private collectors can give, besides the specimens are unhandy to get at and untidy to handle.

There is no difficulty in preserving some species in the usual way upon paper, but with the large *Boleti* and *Agarics*, it is next to impossible to keep them perfect for satisfactory examination.

Some specimens can be preserved in silver sand, but if they remain

perfect they pretty generally belong to those genera which will dry equally well in the open air. The others, as a rule, change color and wither in a short time.

*Dædalea*, *Polyporus*, *Thelephora*, and other genera of like character, require only the open air, washing them in turpentine, in which a little finely powdered corrosive sublimate has been mixed. Turpentine will discolor, also carbolic acid, so that in defending them from insects, we make them almost useless to ourselves. Some specimens are so deliquescent that they melt away in a few hours, others in the same time become offensive.

Last summer a large and beautiful collection was sent to me from an adjoining State. They were gathered late in the evening and reached me by the early morning train. Some were even then melting, drop by drop, into an inky fluid. The others I hoped to preserve in silver sand, and proceeded, as usual, to pack them in tin boxes, first giving them a few hours in a dry place to part with their superfluous moisture. So far as the drying went I met with success, but in a few weeks, I found that those which I had noted as involute, were decidedly revolute, those obtusely umbonate were flattened out. Add to this, both gills and pilens had faded from yellow into very dark brown, some almost black.

Repeated experiments and failures proved to me that lasting and perfect specimens could not be obtained by drying in silver sand or on paper; though we read that Klotch, who was an indefatigable collector, did succeed with the large *Agarics* and *Boleti*, by taking thin slices and placing them between blotting paper, but even then he could not preserve the colors. There are always plenty of poison-proof larvæ, mites, etc., roaming about in the herbarium, and our most precious specimens are apt to fall victims to their rapacious appetite.

To retain satisfactory and convenient specimens it is well to keep a large blank book upon the book table. Whenever a specimen is obtained, with a common drawing pencil, sketch its external form. Mark well the character of the pilens, whether smooth, wasted, zoned, plain or floccose. The margin, whether plain, striate or bullate. With a sharp knife cut through the middle, from the top of the pilens to the base of the stem, sketch the half, showing clearly the gills, whether crowded, free, or otherwise. The stem, whether fistulose, or

otherwise—root bulbous, or otherwise. All this will be the work of a few moments, if you draw rapidly.

The spores can be preserved by taking off the stem of the fungus and lying it, gills down, on paper that has been washed over with a little gum water, and dried, the white spored *Agarics* on black paper, the colored spores on white paper, or, they may be placed on glass slides and covered at once.

The spores can be identified by writing on the paper the figures due to the page upon which the specimen is drawn. These sketches can be colored or not, at leisure, even roughly if there is not time for more.

A very slight knowledge of the paint box will tell the pigments required for pilens, gills, stem, etc. Write in a note below: Pilens, burnt umbre, or bistre, for shades, as the case may be. Yellow ochre, or glaze with such and such colors, for high lights. Gills, stem, etc., may in like manner be described. The habitat, also of great importance, can be named in a note below, also the taste of the fungus, whether mild, acrid, or bitter. These drawn specimens will be found much more satisfactory than those dried in sand, much more convenient than those kept in jars.

M. E. B.

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## Botany at the Centennial.

Botany, in several of its branches, particularly in forestry and horticulture, had a conspicuous display at the Centennial Exposition.

And, even in its purely scientific side, it was not neglected. Among the exhibits of our own country we may mention the very large display of ocean vegetation, the marine *algæ*, made by Prof. Farlow, in connection with the Fish Commission exhibit, in the Government Building. We may also include as botanical the very conspicuous engravings and drawings of fungi made by Mr. Thomas Taylor, of the Department of Agriculture.

In the Womens' Building was a very fine collection of marine *algæ* of the New England coast, prepared by Maria H. Bray, of Gloucester, Massachusetts. Also a remarkably full set of the land mosses of Ohio, prepared by Miss Jane Watson, of Massilon; and, also, in the same building an Herbarium of about six hundred species of the plants of Illinois, very nicely prepared by Mrs. Hathaway, of Stevenson

county. In Agricultural Hall there were botanical displays more or less extensive in the exhibits of several States. From California there were some interesting botanical specimens of the Sierra Nevada Mountains. In the Missouri display was an exhibit of two or three hundred botanical specimens, prepared by Miss Mary E. Murtfeldt. A well prepared collection of six hundred species of Illinois plants was among the exhibits of the Illinois Industrial University, in the gallery of the Main Building. In the Main Building, also, was a display of five or six hundred species of plants from North Carolina.

The largest collection of American plants was an Herbarium of the plants of Canada, prepared by Prof. J. Macoun, of Belleville, Canada West. This Herbarium embraced a pretty full representation of the plants of Canada and the country west to the Pacific.

In the Mexican exhibit was an Herbarium in five volumes of medicinal plants of that country, prepared by Dr. Barcena. The Argentine Republic and Chili also presented several small Herbaria of their medicinal plants, mostly in a very rude state of preparation. In the school exhibits of several European countries there were school Herbaria illustrative of important economic plants or of the principal orders. In the Swedish School Building was a very complete and well prepared Herbarium of the Scandinavian Flora, embracing over one thousand two hundred species. This Herbarium was purchased by Mr. J. C. Martindale, of Camden, New Jersey. From Sweden also came a small but nearly complete collection of the Flora of Spitzbergen, embracing about three hundred species. This collection was donated to the Smithsonian Institution. In the Spanish Building was a pretty large collection of the woody and herbaceous plants of the Phillipine Islands, prepared by Dr. Videl, a member of the Spanish Commission. In the exhibit of the Sandwich Islands all visitors will remember the large display of the beautiful ferns of that country. A similar display was made by New Zealand. In the Queensland display were some five or six hundred species, prepared by F. M. Bailey, Government botanist at Brisbane. But the largest and most valuable collection from Australia was a pretty complete Flora of New South Wales, prepared in two royal large volumes and embracing, probably, one thousand five hundred species. These Australian collections were presented to the Department of Agriculture.

Last among the botanical productions represented, may be mentioned the specimen of that vegetable prodigy, the Welwitchia, from one o the Portugese provinces of South Africa. This was displayed in Agricultural Hall, but was not placarded, and was consequently recognized by very few persons among the hundreds of thousands who saw and passed by it.

GEORGE VASEY.

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## FIELD RECORD.

**Sagacity of a Fox.**—A very remarkable circumstance, showing the sagacity of our common fox, occurred in Maryland some years ago. A party of fox hunters, after a long day's chase, captured a live fox. Wishing to continue the sport on the following day they determined to lock up the fox in a barn, where there was no possible mode for escape.

The game being secure, the next morning was anticipated with pleasure. The horses were brought to the door, hounds called out, servant sent to unlock the barn door to let the fox out, when, to the astonishment of all, no fox could be found. Search was made, and it was discovered that Reynard, true to his character, never at a loss in an emergency, had, by some unaccountable means, made known his danger to a relative in a distant field. During the night another fox came to the rescue and both gnawed through the thick plank of the barn floor an opening large enough for the prisoner to escape. The Reynards went off rejoicing, leaving the hunters to look up other game.

We are aware that animals have very acute hearing, that there are sounds heard by both horses and dogs that the human ear cannot perceive. May we not attribute this rescue to the remarkable hearing of the fox?—M. B.

Mr. Thomas Edwards, of Providence Township, Lancaster county, Pa., took a beautiful and intensely odored specimen of *Cychrus Viduus*, Dej., in October last, (1875)—the first insect of this species ever known to have been taken within the limits of this country—and sent it to us alive. He found it in an "upland" strip of forest, under a pile of wood, which he was engaged in hauling away.—S. S. R.

**Acridium Americanum.**—Two correspondents, of the Department of Agriculture, writing from Vevay, Indiana, about the middle of last November, reported the visitation in that place of an immense cloud of grasshoppers that literally covered the streets of the town. One of the gentlemen observed about five P. M., dense cumulo-stratus clouds in the southwest, gradually overspreading the sky ; at six o'clock the wind had risen to moderate gusts, and within half an hour a rattling noise was heard against the windows, like that of light hail. On open-

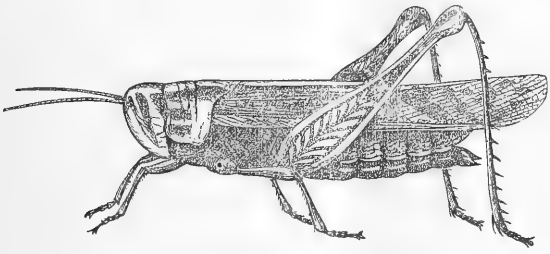

FIG. 4. ACRIDIUM AMERICANUM.

ing the doors, grasshoppers entered in immense numbers, covering the floors, furniture, clothing, &c. The shower continued till eight o'clock, P. M., when the ground was thickly covered, and the boys began to burn them, shoveling them into bonfires. The specimen sent shows the insect to have been the *Acridium (Cyrtacanthacris) americanum*, one of our largest American grasshoppers, and more than twice as large as either the *C. spretus or C. femur-rubrum.*

These same insects were so plentiful in Suffolk county, Virginia, about three years ago, that some of the farmers became greatly alarmed at their presence, supposing them to be the true migratory species. They ate up all kinds of farm produce and then commenced on the trees. The species was determined by scores of specimens sent us for examination. The insects are numerous in this locality, but, with the two instances above cited, we have not known of their coming in such swarms before.—C. R. D.

**Appearance of Snow Fleas.**—Charles M. Nes, of York, Pennsylvania, writes to the Smithsonian Institution that with the snow-fall of the 8th of January, (about 12 inches,) there appeared myriads of "springtails" or *Podurœ*, samples of which were enclosed, covering the surface of the snow to such an extent as to entirely discolor it.

The phenomenon extended over an area of country two miles in length, and half a mile in width. In a later communication Mr. N. says: "They were in clusters, and where I gathered the specimens I had simply to take them up by handsful; the snow was literally covered. They still exist in great quantities on fences, bushes, stones, &c., in the vicinity where they first fell."

Dr. J. G. Morris, of Baltimore, also reports a similar appearance about ten miles north of Baltimore, about the same time, and last season they were observed in numbers near Sandy Spring, Maryland.

They are probably the *Podura nivicola*, which are found under the bark of trees and in similar situations, as their food consist of decaying vegetable matter. They do not fall with the snow, as is supposed by many persons, but are attracted by it and suddenly appear upon it in countless numbers, becoming at once conspicuous and interesting objects.—Ed.

**Caution to Mushroom Eaters.**—At a meeting of the Royal Horticultural Society, December 6th, Dr. M. C. Cooke read a communication from Dr. R. Gerard, as follows:

"As an item of mycological interest, I would state that in 1874 I started a Mushroom bed in my cellar, and had an abundant supply from spring till fall. Next spring (1875,) without renewing the materials of the bed, I planted new spawn, which I bought, as before, of a seedsman. No mushrooms came, although the surface of the bed assumed a whitish appearance, as it did in the first case. This spring (1876,) the bed having remained undisturbed, I one day heated some water, and having added to it some aqua ammoniæ, I drenched the bed thoroughly with it. In about a week's time some 'buttons' began to make their appearance, but having no occasion to use them just then I allowed them to mature, when, much to my surprise, instead of having *Agaricus campestris*, I found that I had a large crop of *A. fastibilis*. The bed was entirely covered with this poisonous species, and not a single 'pink gill' appeared. The cellar was a closed one, and only used for storage purposes, and I cannot see where the *fastibilis* came from unless the spores existed in the spawn that was sold me. At any rate, it might have been the cause of a serious accident had it been sold to a person unfamiliar with the edible Mushroom."

Mr. W. G. Smith spoke of great external resemblance existing between the two species, and stated that no fungus was so commonly mistaken for the true Mushroom as the dangerous *Agaricus fastibilis*,

## EDITORIAL PENCILLINGS.

American Postal Micro-Cabinet Club.—From the report of the president and secretary of this club, for 1876—printed for private circulation through the liberality of a member of the club—we glean the following interesting statements:

The club, on the whole, has worked smoothly and satisfactorily. There has been but one box lost in two years, and but few broken slides. The circuits now numbering twenty-four, it will take tw years for a slide to make the entire round, and in doing this it must travel not less than thirty thousand miles by mail. The problem of safety has been a difficult one to solve, but new boxes are now preparing which will enable the members to send even their choicest slides. When these are ready two boxes will be given to each circuit per month instead of one, as at present. There were, January 1, 1870, eleven circuits; added during the year, thirteen, making at present twenty-four. Two hundred boxes and as many letter packages have been dispatched upon the several circuits.

The *personel* of the club the Secretary thinks, speaks for itself, and the quality of the microscopic work contributed compares favorably with what one has reason to expect from such well-known workers, as appear on the list of members.

The expenses of the year, about $95, have all been met, leaving a "small balance" in the treasury, and the assessments of 1877 and unpaid accounts of 1876, it is thought will carry the club through the coming year.

On the whole the success of the club is assured, and both managers and members may feel a just pride in their organization, which seems to be doing good work, and serving a useful end in many ways.

American Forestry Association.—This new organization for the protection of American forests and the propagation and planting of forest trees; has a Vice President for each State and Territory in the country. The especial duty of these officers is the collection of local statistics. The President for the current year is Dr. John A. Warder, of Ohio. Prof. H. H. McAfee, of Iowa, is Secretary. Dr. Franklin B. Hough, the Treasurer, has been appointed by the Com-

missioner of Agriculture to investigate and report, under the provision of the last Congress for a commission on forestry.

An organized association of this kind, should exercise a prompt and persistent influence in procuring more efficient legislation to prevent the spoliation of forests on public lands, and in enforcing such laws. There is much prohibition now, but the law is practically a dead letter.

FRANKLIN SOCIETY OF PROVIDENCE, R. I.—A Botanical Section of this Society has been instituted, which meets every alternate Thursday evening. In addition to the exhibition of specimens and the friendly exchange of views, a topic is chosen for discussion, and to this special attention is given. It is also proposed that the Association devote itself to the systematic work of collection of Rhode Island plants, and to establish exchanges. &c. Ladies as well as gentlemen take part in the proceedings, and a growing interest is manifested in the science to which the Society is devoted. The officers are: W. W. Bailey, Chairman, L. W. Russel, Secretary.

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## OUR BOOK SHELF.

A CATALOGUE OF THE FOREST TREES OF THE UNITED STATES, BY GEO. VASEY, M. D. (8 vo. pp. 38.] Washington, Government Printing Office, 1876.

This is a catalogue of the forest trees of the United States, which usually attain a height of sixteen feet or more. Four hundred and nineteen species are represented, the more important species being accompanied with notes as to peculiarities or use, habitat, &c., with brief description, making altogether an interesting and useful pamphlet. It illustrates the collection of forest tree sections on exhibition by the Department of Agriculture at the Centennial Exhibition, Philadelphia. The collection was very complete, having been made with great care, many of the specimens having been received from remote portions of the United States.

ON EXCRESCENCES AND ECCENTRIC WOOD-GROWTHS ON THE TRUNKS OF TREES, BY THOS. MEEHAN. From Proceedings of Academy of Natural Sciences, Philadelphia.

# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

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## The Musk Ox.

The musk ox, *Ovibos moschatus*, is one of the most remarkable quadrupeds inhabiting the high latitudes of North America, and unlike the majority of animal life of this region, has no living representative in the corresponding latitudes of the Old World. Fossil remains of an analogous species, are, however, found in conjunction with those of the *Mastodon* and *Megatherium*, in Siberia and the contiguous isles of the Arctic Ocean. Similar remains have been found at Eschscholtz Bay; while the *Bos Pallasii* of Dr. Kay, and other fossil oxen have been found in various parts of the United States; a full description of these from the pen of Dr. Leidy will be found in Volume five of the "Smithsonian Contributions to Knowledge." The *Bos bombifrons* and *Bos latifrons*," he says were probably clothed in a long fleece, and inhabited the great Mississippi Valley just anterior to the Drift Period.

M. Blainville assigned the musk ox—as the technical name, *ovibos*, indicates—a place between the sheep and the ox, in consequence of its resemblance to both these animals, The long fleece, hairy muzzle, short tail, and curling horns, would suggest the sheep; but the head and eye are unmistakably bovine. To M. Pennant, however, belongs the honor of defining the zoological position of this quadruped, as well as furnishing the first extended account of habits and general characteristics. Pennant, however, was indebted to Hearne for his information, who also procured and forwarded to England a skin. M. Jeremie is also entiled to the honor of introducing the musk ox to the civilized world, through a pair of stockings made from the un-

der wool, which are said to have rivaled in texture the finest silk hose. Previous to this the existance of such an animal had been asserted, but such claims were looked upon in the light of fables, the authors of which desired a reputation of some sort, prefering that of a munchausen to none at all.

The hair or fleece is long, thick—brown or black in color—and hangs below the middle of the leg. Underneath this, and covering all parts of the animal is an ash colored wool of exquisite fineness, capable of being formed into the most beautiful of fabrics. It was this close under-fur that furnished the material for M. Jeremie's hose, and is the clothing which enables the musk ox to withstand the inclemency of an Arctic winter, even beyond the 70th parallel of North Latitude.

The southern range of the animal extends but little if any below the barren grounds, while its northern limit is only bounded by the Polar Sea; it having been seen in the most northern regions reached by man. Where the Polaris wintered they were seen in great numbers, along with the raindeer of the barrens, arctic foxes, and hares.

Although numbers winter in the highest latitudes, by far the greater portion migrate to the verge of the forest-region during the Autumn, returning to the shores of the Arctic ocean with the incoming of Spring and populating Mellville Island and the shores of Smith's Sound. Even when there is no ice the musk ox is not restrained from visiting the islands as he is a powerful swimmer, capable of passing over long stretches of water, as shown by Franklin, who found them on the islands of York Archipelago long after the ice had disappeared; a careful examination of the island in question had been made but a few days previous, showing no forms of animal life larger than foxes. As the island was three miles from mainland, and more than double the distance from the nearest of its sister islets, no doubt remains that the musk ox is accustomed to swim long distances.

The weight of the musk ox has, I opine, been over estimated, being given approximately at seven hundred pounds, or nearly thrice that of the caribou. This is doubtless due to its apparent size which is owing to the huge mass of wooly hair with which it is thickly covered giving rise to the statement that it rivals in size the Highland cattle.

The musk ox measures about five and one half feet from the nose tip to root of the tail. The head is large, with a broad nose, the nostrils being divided by a naked but narrow space. Both sexes are

provided with horns, which are large and very remarkable, being not unlike those of the ram in general appearance, but lacking the transverse corrugations of that animal. In the male the horns are joined at their bases, and fall down on either side of the head from their insertion, curving slightly forward through the middle third, while the tip is turned sharply upward. In the female these weapons are set wide apart, falling down and curving in the same manner as the male, but without the upturned tips.

These are powerful weapons either for offense or defence, protecting the wearer effectually from the assaults of the polar bear, or the arctic wolf. The horns are very broad at their base, but taper swiftly toward the points which are very sharp; they are of a dull white color, rough at the basal extremity, but smooth and shining beyond, and black at the tips.

The legs are short and almost hidden by the voluminous fleece; hoofs broad and inflexed, making a track not dissimilar to that of the raindeer,—possibly a trifle longer, from which it is difficult to be distinguished, except by the more experienced hunters. The shortness of its legs render it admirably suited to barren grounds—as the treeless arctic wastes of America are called—and of which it is a characteristic inhabitant; yet it runs with speed, and climbs high and steep rocks with the agility of the chamois or mountain goat.

Although not generally believed to be an inhabitant of Greenland, it is certainly a visitant, as proven by the remains so frequently found, though no living specimens have chanced to meet the eye of the Caucassian explorer. Their western limit appears to be the 130th degree of longitude west from Greenwich. Braving, as it does the fierce blasts and biting cold of an arctic winter, the musk ox is forced, like the raindeer, to feed upon the *tripe de roche* and other lichens of the region, and like the latter quadruped it posesses an unerring instinct which points out to the hungry animal the whereabouts of food, which it easily procures even when buried to considerable depth by "earth's snow mantle," by digging with its sharp hoofs. During the spring and summer they feed upon the tender shoots of the willow, its leaves and buds, and the stunted herbage of the barrens.

Like other bovines, the musk ox is gregarious, and may be found in herds varying in numbers from twenty to fifty, or more rarely eighty to one hundred. One marked peculiarity of these droves is the small

number of bulls; there being but two or three to the largest herd. As annually numbers of bulls are found dead, and they are known to be extremely pugnacious, particularly during the rutting season, it is safe to say, that the lords of the herds have attained their position only through gage of battle and death of the vanquished. The rutting season is in August; so jealous are the males of their mistresses, at this season, that they will attack man or beast that ventures too close, even running and bellowing at ravens or other large birds that chance to light near them. The female brings forth a single calf late in May or early in June, which is supposed to follow the cow for two seasons, unless as frequently occurs, it is driven away upon the advent of another offspring.

Except during the rutting season, this quadruped seems the least watchful of all wild animals, and, when grazing, is not difficult of near approach, providing the hunter go against the wind. They do not seem to mind the report of a gun, merely raising the head at the sound, which, if repeated, causes them to crowd closer together, disdaining to separate or flee from the danger until the drove has been well decimated. At last, when fully aroused to their danger they gallop off; then woe to the hunter that crosses their path; little less than a miracle can save him. If the game be seriously wounded, yet not mortally, it becomes enraged and darts in the most furious manner upon the hunters who must need exercise all their agility to avoid the onslaughts and sharp horns of his quarry.

The Indians shoot them with arrows. Their bows are made of three pieces of fir, the center piece alone being bent, while the other two lie in the same straight line as the bow-string, the pieces being neatly tied and whipped with sinew. They approach sufficiently near by crawling, or else drive the game by ranges of turf, behind which the archers are concealed. In this way great numbers are killed; as high as four thousand weight of frozen flesh having been brought to Prince of Wales Fort alone during a single season, and the smallest quantity has seldom been less than half that amount. It is purchased by the Hudson's Bay Company as provision for their employes.

When in condition, the flesh of calves and cows are exceeding palatable; but it does not in the least resemble that of beef, neither does it approach the flavor of mutton; but has been likened to that of the caribou or moose but of coarser fibre. The fat is of a clear white,

with a slight azure tinge. The flesh of lean animals is strongly flavored with musk, while that of the bulls is so excessively impregnated with the odor, as to preclude the possibility of its being taken into the stomach except upon the direst necessity. M. Drage affirms the heart to be most impregated; while other writers, as positively assert the kidney to be the organ. I am inclined to believe that both are wrong. The musky odor is undoubtedly associated with the sexual fuction, for the organ of the male is lubricated with a gummy substance which preserves the musky odor indefinitely. In the British Museum is a specimen of the generative apparatus of the male ovibos, which retains the odor to a marked degree, although received by that institution upward of a century since.

The skin of this strange animal, when properly dressed, is said to make excellent leather which when worn as an article of clothing effectually protects the wearer from the severest cold. Another reason of its being much sought after by the Indians is, the fact, that it does not become stiff, neither does it shrink upon drying after being wetted. From the horns, spoons are manufactured by the Esquimaux. If the under wool could be obtained in sufficient quantity it would be exceedingly valuable in the arts; but the rigor of an Arctic climate precludes such a possibility except some nearer and more urgent demand arise than at present exists.

Unless the Smithsonian Institute has received a skeleton within a few years, there is none in the United States excepting that presented by Dr. Elisha Kent Kane to the Academy of Natural Sciences at Philadelphia.

G. A. Stockwell.

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At the Annual Meeting of The American Microscopical Society of the City of New York, held Tuesday Evening, January 9th, 1877, the following officers were elected for the ensuing year:

*President* John B. Rich, M. D., 1 West 38th Street; *Vice Pres't*, Wm. H. Atkinson, M. D., 41 East 9th Street; *Secretary*, O. G. Mason, Bellevue Hospital; *Treasurer*, T. d'Oremieulx, 7 Winthrop Place; *Curator*, John Frey, Bellevue Hospital. President, Vice President, and Treasurer were re-elected.

O. G. Mason, *Sec'y.*

## Catalogue of the Birds of the District of Columbia.

PREPARED BY PIERRE LOUIS JOUY.

Those species given in italics have been added to the list by the compiler. Those marked with the asterisk are of very rare or accidental occurrence.

### Family TURDIDÆ.

Subfamily TURDINÆ.

TURDUS.

1. migratorius, L.
2. mustelinus, Gm.
3. pallasi, Cab.
4. swainsoni, Cab.
5. fuscescens, Steph.
6. aliciæ, Bd.

Subfamily MIMINÆ.

MIMUS.

7. polyglottus, (L,) Boie.
8. carolinensis, (L.) Gray.

HARPORHYNCHUS.

9. rufus, (L.) Cab.

### Family SAXICOLIDÆ.

SIALIA.

10. sialis, (L.) Hald.

### Family SYLVIIDÆ.

Subfamily REGULINÆ.

REGULUS.

11. calendula, (L.) Licht.
12. satrapa, Licht.

POLIOPTILA.

13. cærulea, (L.) Scl.

### Family PARIDÆ.

LOPHOPHANES.

14. bicolor, (L.) Bp.

PARUS.

15. carolinensis, Aud.

### Family SITTIDÆ.

SITTA.

16. carolinensis Lath.
17. canadensis, L.

### Family CERTHIIDÆ.

CERTHIA.

18. familiaris, L.

### Family TROGLODYTIDÆ.

THRYOTHORUS.

19. ludovicianus, (L.) Bp.

TROGLODYTES.

20. aedon, Vieill.
21. parvulus, var. hyemalis, Vieill.

TELMATODYTES.

22. palustris, (Wils.) Cab.

### Family ALAUDIDÆ.

EREMOPHILA.

23. alpestris, (Forst.) Boie.

### Family MOTACILLIDÆ.

ANTHUS.

24. ludovicianus, (Gm.) Licht.

### Family SYLVICOLIDÆ.

MNIOTILTA.

25. varia, (L.) Vieill.

PARULA.

26. americana, (L.) Bp.

PROTONOTARIA.

27. * citrea, (Bodd.) Bd.

HELMITHERUS.

28. vermivorus, (Gm.) Bp.

HELMINTHOPHAGA.

29. pinus, (L.) Bd.
30. chrysoptera, (L.) Cab.
31. ruficapilla, (Wils.) Bd.
32. peregrina, (Wils.) Cab.

DENDRŒCA.

33. æstiva, (Gm.) Bd.
34. virens, (Gm.) Bd.
35. cærulescens, (L.) Bd.
36. coronata, (L.) Gray.
37. blackburniæ, (Gm.) Bd.
38. castanea, (Wils.) Bd.
39. pennsylvanica, (L.) Bd.
40. pinus, (Wils.) Bd.
41. striata, Bd.
42. maculosa, (Gm.) Bd.
43. * tigrina, Bd.

14. * dominica, (L.) Bd.
45. discolor, Bd.
46. palmarum var. hypochrysea, Ridg.

SEIURUS.

47. auricapillus, (L.) Bd.
48. noveboracensis, (Gm.) Nutt.
49. ludovicianus, (Aud.) Bd.

OPORORNIS.

50. agilis, Bd.
51. formosus, (Wils.) Bd.

GEOTHLYPIS.

52. trichas, (L.) Cab.
53. * *philadelphia*, (Wils.) Bd.

ICTERIA.

54. virens, (L.) Bd.

MYIODIOCTES.

55. * mitratus, (Gm.) Aud.
56. pusillus, (Wils.) Bp.
57. canadensis, (L.) Aud.

SETOPHAGA.

58. ruticilla, (L,) Sw.

## Family TANAGRIDÆ.

PYRANGA.

59. rubra, (L.) Vieill.
60. æstiva, (Gm.) Vieill.

## Family HIRUNDINIDÆ.

HIRUNDO.

61. horreorum, Barton.

TACHYCINETA.

62. bicolor, (Vieill.) Cab.

PETROCHELIDON.

63. lunifrons, (Say.) Cab.

COTYLE.

64. riparia, (L.) Boie.

STELGIDOPTERYX.

65. serripennis, (Aud.) Bd.

PROGNE.

66. purpurea, (L.) Boie.

## Family AMPELIDÆ.

AMPELIS.

67. cedrorum, (Vieill.) Gray.

## Family VIREONIDÆ.

VIREO.

68. olivaceus, (L.) Vieill.
69. gilvus, (Vieill.) Bp.
70. flavifrons, Vieill.
71. solitarius, (Wils.) Vieill.

## Family LANIIDÆ.

COLLURIO.

72. borealis, (Vieill.) Bd.

## Family FRINGILLIDÆ.

PINICOLA.

73. * enucleator, (L.) Cab.

CARPODACUS.

74. purpureus, (Gm.) Gray.

LOXIA.

75. * *curvirostra*, var. *americana*, (Wils.)
76. * *leucoptera*, Wils.

ÆGIOTHUS.

77. linaria, (L.) Cab.

CHRYSOMITRIS.

78. pinus, (Wils.) Bp.
79. tristis, (L.) Bp.

PLECTROPHANES.

80. * nivalis, (L.) Meyer.

PASSERCULUS.

81. savanna, (Wils.) Bp.

POOECETES.

82. gramineus, (Gm.) Bd.

COTURNICULUS.

83. passerinus, (Wils.) Bp.
84. henslowi, (Aud.) Bp.

MELOSPIZA.

85. melodia, (Wils.) Bd.
86. palustris, (Wils.) Bd.

JUNCO.

87. hyemalis, (L.) Scl.

SPIZELLA.

88. monticola, (Gm) Bd.
89. socialis, (Wils.) Bp.
90. pusilla, (Wils.) Bp.

ZONOTRICHIA.

91. albicollis, (Gm.) Bp.
92. leucophrys, (Forst.) Sw.

PASSER.

93. *domesticus*, Auct.

PASSERELLA.

94. iliaca, (Merr.) Sw.

EUSPIZA.
95. americana, (Gm.) Bp.
HEDYMELES.
96. ludovicianus, Sw.
GUIRACA.
97. cærulea, (L.) Bd.
CYANOSPIZA.
98. cyanea, (L.) Bd.
CARDINALIS.
99. virginianus, (Briss.) Bp.
PIPILO.
100. erythrophthalmus, (L.) Vieill.

Family ICTERIDÆ.

DOLICHONYX.
101. oryzivorus, (L.) Sw.
MOLOTHRUS.
102. pecoris, (Gm.) Sw.
AGELÆUS.
103. phœniceus, (L.) Vieill,
STURNELLA.
104. magna, (L.) Bd.
ICTERUS.
105. spurius, (L.) Bp.
106. baltimore, (L.) Daud.
SCOLECOPHAGUS.
107. ferrugineus, (Gm.) Sw.
QUISCALUS.
108. purpureus, (Bart.) Licht.
109. *æneus*, Ridg.

Family CORVIDÆ.

Subfamily CORVINÆ.

CORVUS.
110. americanus, Aud.
111. ossifragus, Wils.

Subfamily GARRULINÆ.

CYANURUS.
112. cristatus, (L.) Sw.

[*To be continued.*

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## Insect Longevity.

Two or three instances have come under my observation during the last twenty years, of most remarkable longevity in wood-boring species of *Coleoptera*, and especially of those belonging to the *Longicornia;* only one of which I will relate here, because it is the latest, and only reached its final development in the month of October 1876, or rather the denouement only occured near the end of that month.

In 1861, Mr. John Best, of this city, purchased a Cabinet Sewing Machine, the agent for the sale of which was then occupying premises of which I was the leaser, so that I am certain as to the year. Mr. Best has had the machine in his possession from that period up to the present time, and still possesses it. Very frequently during that long interval, and especially during last year, he, his wife and his family, heard a "ticking," or "clicking" noise, inside of the machine or in proximity to it, when it was not in motion; which they attributed to the ominous "Death-watch," which is said to be caused by species of *Anobium;* but I suppose any wood-boring species would produce a similar noise in penetrating hard wood, of which the sequel will be an illustration.

On the last day of October 1876, or the first day of November, Mrs. Best had occasion to open a bottom drawer that had never been previously used, and was surprised to find a large quantity of finely granulated debris or woody cuttings "like fine sawdust," as she described it, and upon examination she discovered that a portion of that side, and a large portion of the floor, or bottom of the Cabinet, had been excavated in irregular longitudinal burrows, with nothing but a thin shell of wood on the outside, which could be broken in, in some places, by the ordinary pressure of the thumb. On further exploration of this spongy wood, in one of the cavities, a single specimen of *Hylotrupes bullatus*, Hald, was found. The individual is a female, with a prominently exserted ovipositor, and was dead. The cabinet is made of black-walnut, but the drawers, and the inner casings are made of white-pine.

The insect was given to me, and I subsequently made a further exploration of the infested parts of the cabinet, but no other specimen was found, and therefore it seems conclusive that this solitary individual had been burrowing in that cabinet for fifteen or sixteen years at least; for there seems to be no room for the supposition that the egg had been deposited there after the cabinet was manufactured. I have never captured either *Hylotrupes bullatus* or *bajulus* in this locality, except in the vicinity of lumber yards, and therefore I have inferred that they have all been brought here from the pine regions, in timber or sawed lumber; and if so, the eggs of these insects must have been deposited in these articles before they were brought here, if not in the trees as they stood in their native forests, and therefore, that the longevity of the species I refer to may have been greater than the period I have suggested. I do not think however, that the normal longevity of *bullatus* is necessarily to be regarded as sixteen years; at the same time it is difficult to account for its long continuance in the wood of this cabinet, when a transverse cut of an eighth of an inch on either side would have extricated it from its confinement. Nor does is seem reasonable to suppose that the females became fertilized within the wood, and that one generation had succeeded another, even if a larger number had been found, instead of a single specimen. But, what were the causes of its retardation, if it was abnormally retarded? was it the absence of the necessary humidity? was it the quality of its food? We can hardly suppose it was the absence of the normal tem-

perature, for sewing machines are usually kept in warm rooms during winter, and this we might suppose would rather be an accelerating than a retarding cause. Whatever the reasons for the phenomenon may be, such as I have related are the *facts*.

S. S. Rathvon.

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## Local Plant Catalogues.

Within two or three years past has sprung up a literature which promises not only to facilitate exchanges among botanists, but to give precision and definite purpose to botanical explorations, and to connect the results of such explorations, so as at no distant day to increase very largely our knowledge of botanical geography, and to throw much light upon questions of special and varietal differences.

It is to be hoped that such local catalogues may be multiplied, and that to render them of the greatest scientific value and practical use, the species may be numbered consecutively, so as to give at a glance the relative richness of different localities. It will also be well that notes respecting exact locality, time of inflorescence, station, &c., be added to an extent not inconsistent with moderate cost.

If every state and county, or perhaps every botanical district, could have such a catalogue, and if in addition every town could have its local collection of its flora and fauna, it would not only add greatly to the accuracy and extent of our scientific knowledge, but would do much to excite in the community, especially among the young, an interest in, and promote an acquaintance with the natural history of their own immediate localities. *Field and Forest* will be glad to notice any such catalogues that may come in its way.

Among the earliest, and altogether the most comprehensive, attractive in appearance, and decidedly extravagent in width of margin, had it not been the work of private generosity, is "*A Catalogue of plants growing within thirty miles of Amherst College*," *by Edward Tuckerman, M. A., and Charles C. Frost, M. A.*

Recalling the long and thorough explorations of these veterans, with the valuable aid of Rev. H. G. Jesup, Profs. Clark, Goodale, Hitchcock and others, since the publication of the first catalogue by Prest. Hitchcock in 1829, it need hardly surprise us to find here enumerated, of *Phae-*

*nogams* 1185, *Aerogens* 60, *Musci* 190, *Hepaticae* 45, *Characeae* 7. *Licheus* 240, *Fungi* 1200. Making a total of over 2900 species, these figures being in round numbers, as the species are not numbered consecutively, an unfortunate lack, in an otherwise very satisfactory work.

"*Catalogue of the Phaenogamous and Acrogenous Plants of Suffolk County, Long Island,*" *by E. S. Miller, Wading River, and H. W. Young, Aquebogue, P. O., Long Island.*" This contains *Phaenogams* 844 species, *Acrogens* 27 species, and embraces quite a number of rarities.

"*Catalogue of plants growing without cultivation in the State of New Jersey, with a description of all the species of Violet found therein, &c.,*" *by Oliver R. Willis, Ph. D.*" This catalogue, covering so wide and varied a domain, enumerates, about 1390 species of *Phaenogams,* 40 species of *Acrovgens.* Its species are not numbered consecutively, but the notes are interesting, and the list of localities valuable as far as it goes.

*The Botanical Directory* from the *Bulletin* is hardly up to the present time, and together with the directions to botanists and teachers, similar to those in every manual, adds more to the price than to the value. It is well printed, and will be a great assistance to any one making a trip to the Pine Barrens.

"*Catalogue of the Flora of Nebraska,*" *prepared by Prof. Samuel Aughey, Ph. D., of the University of Nebraska.*" The author of this catalogue, although apologizing for it, as an incomplete work, has here enumerated 1670 *Phaenogams,* 50 *Acrogens,* 220 *Musci, Hepaticae* and *Lichens,* 90 fresh water *Algae*; making 2030 in all. He accounts for this large number by stating what the catalogue clearly shows, that alike from the North, the South and the West, many peculiar species of those regions have migrated to Nebraska, while the general character of the flora is that of New England and the Northern tier of States.

"*Contributions to the flora of Iowa. A catalogue of the Phaenogamous plants, prepared by J. C. Arthur, Charles City.*" This enumerates 979 species, which are largely identical with those of the Eastern States. *Ericacae* and *Orchidacae* are conspicuously lacking in representatives.

"*Catalogue of the flora of the Wabash Valley, below the mouth of White River.*" *Prepared by J. Schneck, M. D., Mt. Carmel, Illinois.* This catalogue enumerates 630 species of *Phaenogams,* and 30 of

*Acrogens.* Quite a number of plants have crept up the Valley of the Mississippi and thence up the Ohio and the Wabash.

Two check lists of the Ferns of North America, one by Wm. Edwards, of South Natick, Massachusetts; the other by John Robinson, of Salem, Massachusetts, are worthy of notice, and are a help in making exchanges. J. W. CHICKERING.

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## The "Lubber" Grasshopper.

The following notes on the habits of this large grasshopper *Romalia microptera*, were jotted down from observations made in the Department of Agriculture two years ago: A few days ago I was surprised to find a large wardian case in my room swarming with little black grasshoppers, about half an inch long. At first I was not a little surprised, but recollecting that I had imprisoned in this case for a few days in the fall, two or three pairs of this grasshopper, which had been received from a correspondent in Florida, they were easily accounted for.

The female of this insect deposits her eggs, to the number of forty or fifty, in the soil. The eggs are linear in shape, somewhat resembling very small grains of oats, though perhaps less pointed at the end, and measuring probably a quarter of an inch or more in length. The eggs in our wardian case hatched about the 27th of February, but whether that is the usual date of hatching or the warmth of the room helped to develop earlier than is usual in a state of nature, I cannot say. The young grasshoppers are black, marked with bright red, and keep these colors through several moultings; the pupæ are also black, but the thorax is shaded and mottled with yellow or orange-red, while the abdomen is banded and the hind thighs bordered with the same color. The mature insect is is nearly three inches in length, it is of a yellow color, barred and spotted with black. The wing covers are extremely short, reaching only half way to the extremity of the abdomen, and are, of course, perfectly useless for flight. The wing-covers in color are yellowish, barred and marked with black, and tinted with rosy-pink. The wings themselves are very small and are a beautiful brilliant carmine, edged with black.

The insect is quite common through the Gulf States, and at times is quite plentiful, and somewhat injurious on "truck farms," as it de-

stroys all kinds of vegetables, melons, &c., even crawling up into peach and fig trees to devour the fruit. The insects are extremely voracious and should they ever occur in large numbers, would prove very destructive, not only in market gardens, but to vegetation generally. Even the little fellows in my breeding cage showed good signs of having sharp jaws and sharper appetites, for in the first few days of their existence they made way with a large turf of rank grass, more than a foot square. On account of their rudimentary wings these insects are unable to fly, their only modes of locomotion being crawling and jumping, which is at best a clumsy performance, hence they are easily destroyed when troublesome, by sweeping into nets or by simply crushing them on the ground with the foot, first jarring them down from the plants, on which they may be found feeding.

CHARLES R. DODGE.

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## GLEANINGS IN FOREIGN FIELDS.

**The Venemous Spider of New Zealand.**—The following narrative of the effects of the bite of the "kapito," a native spider of New Zealand, is given by Mr. Meek of Waimera, in *Science Gossip* for February:

It was on the morning of the 24th ultimo, at three o'clock, my son (a man of thirty-one years of age) was awakened from his sleep by the bite of one of those poisonous insects, and came into our bedroom about an hour afterwards, and exclaimed to his mother and myself, "I am bitten by one of those spiders that the natives have so often spoken to me about, and am full of pain. See, here it is in the bottom of the candlestick." I looked at the insect, whose body was about the size of an ordinary pea, and in color nearly approaching to black. His mother on looking at his back, saw the puncture the spider had made, and immediately commenced sucking the wound. I proceeded to the hotel, and obtained the services of Dr. Mohnbeer, when on my return with him to my house, my son was suffering the most excruciating pain in the groin, the virus apparently working its way in that direction. After an application of ammonia by the doctor, the pain shifted from the groin and worked its way up the spine, affecting the arms and chest during the remainder of the day and lasting till the following morning, my son moaning with pain the whole time. On

Tuesday the pain became intense, the virus, working its way into his legs, causing the veins to swell very much. We applied turnip poultice to the wound, and when taken off, a quantity of black fluid came from the sore. During the afternoon the pain in the legs and big toes still continued. Dr. Mohnbeer prescribed a liniment, which after rubbing well into the legs, caused a black, inky colored fluid to emit itself through the pores of the skin in large drops, from which my son began to improve, and has continued improving ever since, but suffers much from weakness. From the time he was bitten on the Monday till the Friday following he lost twelve pounds in flesh. I forgot to state that when he first was bitten, I gave him small doses of brandy at intervals during the first two days, which seemed to have the effect of greatly relieving the pain. I am informed by Te Hemera, native chief here, and also by other natives, that many fatal cases among their ranks have taken place by the bite of the "kapito;" they also believe the sufferer is sure to die if they cannot find the spider; but on the contrary, if they find it and burn it in the fire, the patient gets well in three days. If they cannot find the insect, they set fire to the house and burn building, effects and everything else. In this case the spider was found and preserved in spirits.

**Sense of Hearing in Birds and Insects.**—Mr. G. J. Romaines in a recent number of *Nature* presents the following suggestions on this subject:

I do not know whether ornithologists are acquainted with the peculiar manner in which curlews frequently obtain their food on sandy flats which have been left bare by the tide. The birds force their long bills into the wet sand as far as the nostrils, and then again withdraw it, leaving a small hole, which, when probed, is found to be only just large enough to have taken in the bill. The animal, therefore, can only have made a single prolonged push without adding any lateral or exploring movements of the bill, as birds which feed in mud may be observed to do Now it cannot be supposed that curlews adopt this mode of feeding without obtaining from it some degree of profit. Neither can it be supposed that they make their thrusts into the sand at random; for, their bills being so pointed and slender, the birds would usually require to make a vast number of ineffectual thrusts before they happened to hit upon a worm or other edible object. The question therefore is,

how do the birds know the precise spots where their victims lie buried in the sand? That this knowedge is not derived by sight I am quite sure, for I have repeatedly observed innumerable curlew marks of the kind described occurring on tracts of sand which, in virtue of their high level, presented a perfectly smooth and uniform surface. I can therefore only suppose that the birds are guided in their probings by their sense of hearing. Doubtless it is difficult to believe that this sense is so delicate and precise as to enable the curlew to perceive so exceedingly slight a sound as that which must be caused by the movement, say of a small worm at a distance of ten or twelve inches from the surface of the sand, and at the same time to localise the exact spot beneath the surface from which so slight a sound proceeds. I cannot see, however, that any other explanation is open, and perhaps the one now offered may not seem so incredible if we remember the case of the thrush. No one, I think, can observe this bird feeding and doubt that it finds its worms and grubs almost exclusively by the sense of hearing. And if the distance which it runs between successive pauses for listening represents—as we cannot but suppose it must—the diameter of the circle within which this bird is able to hear the movements of a worm, I think that the hypothesis I have just advanced with regard to the curlew ceases to be improbable.

It seems worth while to add a few words with respect to the sense of hearing in insects. So far as I am aware, the occurence of such a sense in this class had never been actually proved, although on *a priori* grounds there can scarcely be any doubt concerning the fact of some insects being able to hear; seeing that in so many species stridulation and other sounds are made during the season of courtship. In the case of moths, however, I believe that sounds are never emitted—except of course the death's-head. It therefore becomes interesting to observe that an auditory sense is certainly present in these insects. Several kinds of moths have the habit of gently, though very rapidly, vibrating their wings, while they themselves are at rest on a flower or other surface. If, while this vibrating movement of the wings is going on, the observer makes a sudden shrill note with a violin or fife, &c., the vibrating movement immediately ceases, and sometimes the whole body of the insect gives a sudden start. These marked indications of hearing I found invariably to follow a note with a high pitch, but not a note with a low one.

**Friendly Spiders.**—Spiders are unamiable, quarrelsome, spiteful creatures, even to their own kin,—such is the character these Arachnids bear, though I do not believe they always deserve it. Upon the window of an out-house last summer, I noticed there were spread the webs of several spiders, two being in close contiguity. A fly bounced into one of these two webs, and his size gave the occupant trouble. Hearing the buzzing (or feeling the vibrations of the threads, for it has been conjectured by several naturalists that spiders are deaf,) the spider in the adjacent web entered and gave his aid, and the two spiders sucked the juice of the fly very amicably. I have seen, however, as I must confess, under other circumstances, when one spider has approached another's prey, that the owner has either fled or "rushed to the charge" and fought, or frightened away the intruder.—J. R. S. C.

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**Recent Arrivals at Zoological Garden, Philadelphia.**—1 red shouldered hawk, *(Buteo lineatus;)* 1 Virginia deer, *(Cervus virginianus;)* 1 great horned owl, *(Bubo virginianus;)* 1 red-tailed hawk, *(B. borealis;)* 1 *Pseudemys concinna;* 3 oppossums, *(Didelphys virginianus;)* 6 white rats and young, *(Mus rattus;)* 1 golden eagle, *(Aquila chrysaetus;)* 4 English rabbits, *(Lepus cuniculus)* 1 king dove, *(Turtur risorius;)* 1 red fox, *(Vulpes fulvus;)* 1 quail, *(Ortyx virginianus;)* 1 sparrow hawk, *(Falco sparverius;)* 3 Canadian lynxes, *(Lynx Canadensis;)* 3 *Menobranches maculus;* and 1 turkey buzzard, *(Cathartes aura.)*—Arthur E. Brown.

**Trox Scaber.**—Mr. Samuel Auxer, of Lancaster City, Pa., a close student and a vigilant collector in entomology, for more than twenty years; took over *fifteen hundred specimens* of *Trox scaber*, Linn, within a space of four feet long and ten inches wide, at one "take," in the month of October last. Although this species is said to occur in every quarter of the globe, and in our own fauna from Canada to Texas, yet, singular to say, Mr. A. with all his observation, had not been fortunate enough to find a single specimen of this species before those alluded to above. These insects had all gathered along the Northern and Eastern margin (inside) of a "cold frame," in his garden. Has any other entomologists had a similar experience? We have never taken more than one or two specimens of this species in thirty years.—S. S. R.

# Field and Forest

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## On Plant Galls.

*(Translated by Wm. H. Seaman.)*

The following abstract of an article on the above subject, by M. W. Beyerinck, in the January number of the *Botanische Zeitung*, may assist in the study of these objects.

In 1674 Marcello Malpighi of the London Royal Society, published his work "*De Anatome Plantarum*," containing a more original and valuable treatise on galls than any that has since appeared. Reaumur alone beside has treated of galls in general "*Memoires pour servir a l'histoire des insects, Ed. Paris, 1737, Mem. XII.*" Numerous contributions to our knowledge have been made by Lacaze Duthiers, *Annales des Sciences Naturelles, Botanique, 1853*, Dr. A. W. F. Thomas in *Giebels Zeitschrift*, 1869, and *Botanische Zeitung*, 1872; while their biology has been discussed by the entomologists, Coquebert, Olivier, Frisch, de Geer, Swammerdam, Roesel, Bremi, Giraud, Perris, Frauenfeld, G. Mayr and others. Hammerschmidt "*Oesterreichische Zeitschrift fur Landewirth, &c., 1838.* Frauenfeld, *Sitzungsberichte der kaiserlichen Acad. der wissenchaften zu Wien, 1855*, and Dr. C. Czech, "Arrangement of Plant Galls" in programme of the Realschule, Dusseldorf, 1858, according to their inhabitants, are the most important attempts at classification of these objects.

As complete an examination of the literature of the subject as pos-

sible, seemed to indicate as a leading idea that all galls result from an effusion of sap in the affected plant cells. They may be classified as follows:

I. Galls of unlimited growth in which, though commenced by an adult individual, many generations of insects live and propagate.

II. Galls of limited growth only inhabited by larvæ.

III. Malformation of flowers or fruit.

In the first class we have two orders, internal and external galls.

*Order I.* External galls in which the foreign organism clings to the outside of the organ on which it grows, air is freely admitted to it, and its form sometimes admits of considerable motion.

*Family I.* Galls of the Hemiptera. In this family I include leaf distortions caused by swellings on one side, which embrace two noteworthy kinds of heteromorphism, that is the formation of two kinds of galls on the same plant by the same insect, as in

*(a.) Phylloxera vastatrix*, Planchon, on *Vitis vinifera* which forms leaf galls or root galls.

*(b.)* The four sorts of *Brachyscelis Schrad* (a species of coccus) on *Eucalyptus hæmastoma* in Australia. The gall produced by each female insect is covered with a lid, but those of the males are open cups on the leaves, containing many individuals.

The effect of the insect's work sometimes extends to a distance, as in the greening (*i. e.* green-bark) of *Psylla fediæ*, Frst., on *Valerianella olitoria* or the woody petioles of *Ulmus campestris* when the leaves are affected by the blisters of *Schizoneura lanuginosa*, Htg. The formation of galls on cryptogamous plants by Hemiptera is entirely unknown. Among *Monocotyledons* we have only the flowering stems of Juncus affected by *Livia juncorum*, Str.

*Group I.* Galls of centrifugal development. The direction of the growth of main axis being changed by the inhabitant of the gall—diffuse in the case of *Chermes*.

*Series I.* Simple galls. Conversion of a single organ to the gall.
*(A.)* Various distortions of leaves, (16.) *(D.)* Hollow galls with active cell formation, (23.)
*(B.)* Torsion of the stem, (3.)
*(C.)* Local swellings, (4.) *(E.)* Hypertrophy of flower, (2.)

*Series II.* Collective galls.—Leaves and stems enter at the same time into the formation of the gall.

*(A.)* Galls on buds, usually rosette-like with great shortening of the

internodes, (11,) as *Psylla buxi* on *Buxus sempervirens*. Box like malformation, *Chermes viridis*, Ktz. on *Picea excelsa*. One sided ball galls.

(*B.*) Distortion of leaves as in *A*, with teratological changes of the supporting axis. (6.)

*Group II.* Galls of centripetal development. The axis of growth increases in a direction corresponding to the axis of inhabitant. Native, we have only *Pachypappa vesicalis* on *Populus nigra*.

*Family II. Phytoptus* galls parallel to the preceding family. The characters are less doubtful and inconstant.

*Group I.* Simple galls whose morphological value is that of tricomes.

*Series I.* Distortions of leaves from their normal plane. I have found seventeen kinds on thirty-six plants, none of them *monocotyledons*.

*Series II.* The lamina of the leaves remain in its normal plane. The *Erineums* and *Phylleriums* belong here as well as the *Cephaloneon* and *Ceratoneon* of Bremi, &c. The number cannot yet be accurately known. Fee in 1834 described seventy *Erineums*. I have catalogued on *Tilia* six, on *Acer* seven, on *Alnus* four, on *Prunus* four, on *Salix* five, on *Carpinus* three, on *Ulmus* two, on *Juglans* one, on *Æsculus* one, on *Fagus* one or two. On soft wooded plants they are rarely found, perhaps on account of deficient shelter in winter. *Phytoptus* is known on *Fragaria*, *Salvia* and *Teucrium*.

*Group II.* Collective galls.

*Series I.* Galls on buds. Ordinarily the axis enlarges and the distinctive forms of leaves, scales and stipules are obliterated, ten or eleven various cases are known to me.

*Series II.* Abnormal green coloration by *Phytoptus*. Formerly considered as teratological modification (*Mouquin Tandon, Pflanzen Teratologie.*) The extra floral branching of *Torilis anthriscus* is very striking. About fourteen of these interesting forms are known to me. But one affects *Monocotyledons*, viz., on *Bromus mollis* and *B. erectus*.

*Order II.* Interior galls. In the previous order the gall makers only bite through the epidermis, but in this they enter and propagate in the *parenchymal* tissues.

*Family I.* Some *Phytoptus* galls. Flax seed like *protuberances* on the leaves of *Pomaceæ* (*Sorauer, Handbuch der Pflanzen krankheiten,*

Berlin, 1874.) *Acariasis* is the best known. A very small opening leads to the inner cavity. Seven kinds of galls on ten plants.

*Family II.* Anguillula galls. (See A. Braun, Ueber *Gallenbildung durch Aelchen, Botanische Zeitung*, 1875, No. 23.) These do not properly belong to the Arthropoden galls.

*Class II.* Galls of limited growth. The inhabitants (one or more) remain in the gall only during their larval condition. These galls ripen quickly, usually before the larva have completed their growth. The commencement of the gall is always a group of cells.

*Order I.* Larval galls. The larva for a short period of their youth abstract the sap. According to entomologists the egg is always laid on the outside of the plant, but in botanical works the opposite is usually asserted, viz: that the female insect makes a hole with its ovipositor and inserts in it the egg. Tachenberg in *Forstwirthschaftliche Insectenkunde*, 1874, p. 42) says of *Cecidomya saliciperda Duf*, that the female lays its eggs like a chain on the bark, the larva as they come out bore perpendicularly through the bark into the wood.

*Family I.* Mantel (or scale) galls. The insects life is spent on the outside of the epidermis, hence the sap must exude through this to supply the gall tissues proper. In some cases the epidermis is raised on both sides, as in the galls of of *Cecidomyia corni* and *C. ulmariæ.*

*Group I.* Simple galls that are morphologically an extension of leaf tissue.

*Series I.* Various kinds of leaf distortion in which the lamina abandon their natural plane of growth. About twenty-two *Cecidomyias* are known to produce such malformations, mostly on trees.

*Series II.* Spherical leaf galls opening freely to the air, usually near large nerves. Of these I count about twenty, as *Cecidomya annulipes*, Hrt. and *C. fagi*, Hrt. on Beech. *C. tremula*, Winn. on *Populus tremula*, *C. urticæ*, Perz., on *Urtica dioica*, &c.

*Group II.* Collective galls. Morphological value is variable. They may be composed of one or more leaves or segments of leaves or of a leafy stem. There are about thirty-five of these, among them *C. millefolii*,L., and *C. hyperici*, Bremi.

*Series I.* In which leaves alone enter into formation of the gall, as the pod like galls of *Cecidomyia genistæ*, L., on *Genista germanica*, and the large flower buds of some *Verbascums* and *Scrophularias* at-

tacked by *Cecidomyia verbasci*, Macq. About fifteen of these galls are known to me.

*Series II.* Stems and leaves form the gall. In this series Asparagus is the only monocotyledonous representative. *Cecidomyia rosaria* on willow aud *C. juniperina* on *Juniperus communis* are among the twenty examples I have in this series.

*Family II.* Closed galls. The larvæ bore into the tissues beneath the epidermis, the external wound sometimes remains visible a long time, as in the *Cecidomyia* galls on *Selaginella pentagona* (*Botanische Zeitung*, 1873, p. 105.)

*Group I.* Mine galls. The larvæ live in galleries in the leaves or stems. The parenchyma tissues surrounding the galleries often enlarge, especially in compositæ, and become hard through the development of *sclerenchyma*. They consist of

*I.* Leaf miners. (14,) *Diptera*, *Lepidoptera* and some *Coleoptera*, all in leaves.

*II.* Enlargements of petioles and stems.

*A.* caused by *Diptera* on *dicotyledons*.

Eighteen distortions of various kinds externally visible. Among these *Trypela cardui* forms curious three to six-chambered galls on *Cirsium arvense*.

*B.* Distorted receptacles on *Compositæ*.

Sometimes the *achenia* are modified or the *torus* is lengthened like a horn or the *pappus* grows to resemble five green calyx lobes, all o which are secondary appearances, the primary gall is a hard walled larval cavity. (Sixteen species.)

(*b.*) On *Monocotyledons*, beside the doubtful stem thickening of *Lasioptera alisma* on *Alisma plantago*, I am acquainted with eleven of these formations on grasses, some of which are of great interest, as *Lonchæa lasiopthalma*, Lu., on *Cynodon dactylon*. These are characterized by short opposite leaves, shortened internodes and enlarged nodes.

*B.* Caused by *Lepidoptera* and *Coleoptera*. Most of these are not galls strictly speaking, but are secondary consequences of wounds received, as the tumors on trees caused by *Carpocapsa*, *Cossus*, *Grapholitha*, *Tortrix* and *Incurvaria* among butterflies, and *Agrilus* and *Saperda* among beetles.

*III.* Distortions of flowers and fruit. Caused by eight flies; by an

unknown butterfly which makes the embryo of *Polygonum arviculare* assume a horn-like appearance, and thirteen (perhaps fifteen) *Curculionidæ*.

*Group II.* Closed larval galls properly so called. The limits of this group are difficult to prescribe. The larval cavity is at first always spherical and is never surrounded by *sclerenchyma*. The galls are broadly attached but never included in tissues that do not enter into the formation of the gall, and the larva usually abandon the galls, having gnawed away the interior.

This group includes about 10 Dipterous galls among which are those of the *Selaginella* discovered by Braun aud described by Strasburger, the well known malformation on the stems of *Poa nemoralis* caused by *Cecidomyia poae*, Bosc, some on *Tamarix*, 6 or 8 *Lepidoptera* that cause galls on German plants in North Africa, and at least twenty of the *Curculionidæ*.

*Order II.* Imago galls, a perfect insect of the section *Hymenoptera* bores with its ovipositor some portion of the plant in which its eggs are laid, and at the same time pours into the wound a peculiar fluid that causes the formation of the gall, which is usually nearly or fully grown before the egg hatches.

*Family I.* Galls of the *Tenthredonidæ* or leaf wasps. The wounds in this case remain visible covered with a corky bark. They are made by the insects saw over the middle of the vascular bundles and an egg laid therein. The swelling does not take place precisely in the wound but a little way off. The galls show on both sides of the leaf, but usually unequally, and the larvæ leave the gall to undergo transformation in the ground. Two stem galls on *Clematis* and *Lonicera*, 4 on *Salix* and *Populus*, ten Leaf galls on *Salix* and *Lycium*.

*Family II.* Galls of the *Cynipidæ*. In these the wound usually closes entirely, but sometimes leaves a small brown canal leading to the interior. This in my opinion is the result of moistening the cells with formic acid which the gall wasps usually secrete, the acid kills the cells which become brown. It must be observed however that these brown canals are often (possibly always) caused by Inquilina and parasites that lay their eggs in the tissues of the galls or in the larva itself.

The egg is shaped like a long stemmed pear with the neck at first protruding out of the wound but this dries up, and the egg is shut in.

One or more layers of cells distended with protoplasm, form on the walls of the cavity, they incline to make little grape like masses. According to Lacaze Dutheirs this alimentary tissue is often surrounded (especially in group 2) by a tissue filled with starch that later becomes a sclerenchymatous wall. The galls are one or many chambered, deciduous or not, and the metamorphoses are completed within the gall. I am acquainted with 94 kinds in central Europe on four species of oak, and not more than about 20 on other plants including two on grasses, *Festuca*, and *Psamma*.

*Group I.* The three kinds of tissues viz *Dermatogen Peribleme* and *Plerom* take part in the formation of the gall, the last however but slightly. The gall is covered by the true epidermis, sometimes stomate are found. To this group belong all galls not found on the oak and also those of the oak which develop in the spring with the leaves (except those of *Andricusler terminalis*) as *Spathegaster aprilinus* on the young sprouts, *Spathegaster albipes*, *Sp. tricolor*, *Sp. baccarum*, *Sp. verrucosa*, *Andricus curvator*, *A. crispator etc.* all upon the leaves.

Farther the terminal and side galls on the buds of the oak as *Cynips Kollari*, *Aphilothrix callidoma* which is usually terminal, also the galls on the staminate flowers as in *Spathegaster grossulariae*, etc.

*Group II.* The female *Cynips* inserts her egg in the *Plerom* of some organ either the *cambium* of the vascular bundles of the leaves or axes. The growing gall tears the peribleme and dermatogen forming a cleft from which the gall issues. The wounded vascular bundle sends off branches which ramify in the gall.

As examples we may cite most leaf galls as; *Dryophanta scutellaris*, *Dr. folii*, *Dr. diosa Dr. disticha*, *Dr. agama* etc. Also *Neuroterus numismatus*, *N. fumipennis*, *N. lenticularis*, *N. lanuginosus* etc. and the stem galls of *Aphilothrix Sieboldi*, *Dryocosmus cerriphilus* &c. I contemplate a farther revision of the galls of the *Cynipidæ*.

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**Singular Occurrence.**—It is noted in the transactions of the Botanical Society of Vienna, that a weeping willow in that city, has borne staminate and pistillate flowers at the same time.

## The Museum Godeffroy.

In the January number of *Field and Forest* there is an article descriptive of this museum, the points of which were translated from a book of travels by M. Emile Guimet, and as that writer presents them with his own coloring, the following may not be without interest to the readers of this journal.

The firm of Godeffroy & Co., of Hamburg, are extensive ship-owners and traders with many of the islands of the Pacific Ocean, where they own plantations devoted to the cultivation of cotton, the cocoanut, and as an experiment, coffee. On some of the Samoan Islands they hold a monopoly of trade and exercise authority over the natives. It may be remembered that they were instrumental in causing the removal of Steinberger from the Samoas last year.

The head of this firm, Mr. J. Cæsar Godeffroy, has from his youth been an enthusiastic lover of science, and for many years past he directed the captains of his vessels, whom he selected among the more intelligent of their craft, to collect objects of natural history in the countries they visited, and to record their observations in reports on their arrival home. He also induced young men of scientific attainments to make voyages of exploration at his expense. Among these I will mention: Dr. Ed. Graeffe of Zurich, the present director of the Vienna Aquarium, who went to the Samoa and Feejee Islands, where he was active for ten years in his special department of zoology, making besides observations on their geology, geography, ethnology, &c. The Pole, J. Kubary, visited various groups of islands and returned in 1874 after making observations in all departments of science. Our countryman Andrew Garrett made ichthyology his speciality and I will have an opportunity to refer to him further on. A German lady, Amalia Dietrich, was sent to Eastern Australia in 1863, where she labored principally in Queensland; her collections along the Brisbane River and on many of the islands on the coast, include delicate mosses and algæ as well as skulls and skeletons of extinct races. She returned in '73 to take charge of the botanical department of the Museum, while the others are under the direction of Mr. J. D. E. Schmeltz, Jr.

The museum is the result of all these and many other travels, and it may be cited as the first instance in which a lover of nature make. use of his advantages and great wealth, for the advancement of sciences

There have been enterprises of the kind before, but they were restricted to special departments, while in this one no branch of natural history is neglected. The microscopic diatomaceæ as well as the high sphere of man, are considered, and there is at present hardly an academy of science which unites in so successful a manner so many efficient workers in a common cause.

The materials collected are placed in the hands of eminent specialists for determination, and in order that the results of their examinations might not be scattered in the various scientific journals, but that a complete picture of nature in the Pacific might be presented, Godeffroy founded a special publication, the "Journal des Museum Godeffroy," in which the observations of his travellers and the elaboration of their collections are recorded.

Among the many monographs which have appeared in its pages, one by our countryman Garrett on the fishes of the Pacific, deserves special mention. Captain Cook long ago spoke in glowing terms of the beauty of the fishes among the coral reefs, and regrets that a scene of such splendor should be hidden, where man is but seldom able to admire it. When Garrett sent home a collection of water color sketches from life, it was at once determined, without regard to the cost of the enterprise, to reproduce them in the Journal and the plates are said to be unequaled for beauty of execution.

When we bear in mind that the Museum Godeffroy is not a money producing institution, but is sustained by the liberality of one man for the advancement of science, and is open to all scientists who may desire to study its rich collections, we must admire the noble manner in which this modern Mæcenas makes use of his wealth, and wish the world knew more of them. Cæsar Godeffroy's name is linked with the story of the exploration of the islands of the Pacific Ocean, and it may without exaggeration be asserted that it is mainly to him that science owes its knowledge of that region.

*Passaic, New Jersey.* MARTIN EICHE.

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## Hints upon Skeleton Making.

We are frequently asked how skeletons are prepared; a simple question, but not an easy one to answer without giving a lengthy preamble on the preparatory process. Many persons seem to have an idea

that a beautiful white skeleton can be obtained with but little trouble and in a marvelously short space of time, but we can assure such persons that as far as we know, no easy method has been discovered, as it takes time, patience, and experience in manipulating the bones.

An important item, one too, decidedly necessary to ensure success, is a knowledge of the anatomy of the bird or the beast about to be skeletonized. Our knowledge must be so exact, that if a bundle of bones were placed in our hands each could be given its proper position, and without this knowledge, it is folly to attempt a skeleton. We must not omit informing our querists that their olfactory nerves will at times be called upon to endure very disagreeable odors. Some persons would perhaps draw up their faces at all this, while we hear in a whisper, shocking! Perhaps such persons would be equally shocked, when informed that a skeleton teaches the striking analogy between their finely formed arms, and hands, and the wings of birds and bats, and further to the leg of a turtle, or the paddle of a whale.

In making a skeleton, we are making a model explanatory of the structural relationship between form and purpose. We are showing, how, through the largely represented family of vertebrates, the one great original type form is not departed from. We are making a link which connects the forms of the present with the forms of the past; but not until we study the habits of the animal do we learn the adaptation of those forms to his life wants. Truly a lesson in bones, is a lesson in faith; they are the visible forms of God's handy work, modified to suit the wants of his creatures.

The question how do you make skeletons? can be followed by another much more to the purpose. Can everyboby make skeletons? We should doubt it unless we might assert that everybody could paint a dog equal to the "Old Shepherd's Chief Mourner." by Sir Edwin Landseer, or oxen, like those in the "Ploughing in the Nivernois," by Rosa Bonheur. But we cannot apply to everybody the well known "emphatic French phrase, applied to Rosa Bonheur and her family, 'they possess their ox,' meaning that such possession can neither be bought, nor inherited, but must be attained by sympathy, by love, by labor."

We regard a skeleton as a work of art, every bone must be made to speak its own marvel. These must be a quiet expression of truthfulness in its every part, a certain *embonpoint,* though no longer in the

flesh; in a word, it must look the very counterpart of the animal it is intended to represent.

What the artist terms a trick of the brush, in hastily producing fine effects, the skeleton maker may with equal propriety term a trick of the fingers. But it is not a trick; like the touch of the artist, it is a gift, perfected by study and practice.

A skeleton is certainly an object of beauty to adorn a private cabinet, or the case of a public museum; it shows the animal standing, couching, or coiled, according to its peculiarity of attitude in life, but to gain this, a certain degree of strength must be had through the agency of wire, or glue (for small animals the latter is the best,) and thus many of the joints are covered. There is a great difference in the manner in which the clavicle of some birds, unites with the corocoid bone, and again where it unites with the sternum. An expert skeleton maker is particular about this, endeavoring to keep uncovered as far as possible the point where the bones unite. There is also a sesamoid bone, which lies between the metacarpus, and the ulna, which is very difficult to make fast (especially in small birds,) without the risk of being covered with glue. There is again another sesamoid bone, which is found in the joint which unites the fibula with the femur; it is bound to them by strong ligaments, and they in a manner rest and turn upon it. This bone is difficult to manage so as to be clearly seen, occupying as it does a position of great strength in the leg of a bird, living or skeletonized, and in the most finished work it is rarely seen.

As we have before said, skeletons are works of art, and they are equally objects of beauty. But do they meet the entire wants of the student in osteology? We think not, because many of the bones and joints are concealed. In the head of the fish for instance, there are bones entirely obscured by the overlapping of others, and without some knowledge of the anatomy, one would little suspect that such bones were there. Skeletons are necessary helps to the student in giving a correct idea of the structure, the general outline and attitude of the animal; but there is a further and very important want which the mounted skeleton cannot supply (if it is a model of form,) separate bones for examination; we will hazard the opinion that only one half the object is attained when there is no corresponding set of bones for examination. In our out door walks through the open fields

we frequently meet with bones beautifully bleached by the sun and the weather, and these bones make no poor show in our collection.

We have seen entire skeletons left by birds of prey clean enough to grace a cabinet, we have stood beside them with sketch book, and pencil, have drawn their varied forms, until we were as familar with their structure as a child with his marbles. But when we wish specimens for our cabinet we cannot rely upon our luck in getting whitened bones from the fields, we must resort to our own energy and labor to procure them. Yet those field studies are invaluable helps, they facilitate our progress in the work, and they teach us that knowledge gained from nature in her simplest forms, is valuable, because learned from a book on whose title page is inscribed the word Truth.

There are two methods for preparing bones. One is to keep the subject covered with water, never changing it or pouring it off until the flesh is entirely decomposed, and the bones free to wash off in clean cold water; they must then be placed in the sun to whiten. We confess to having tried this upon one occasion, but it was too offensive to bring near an inhabited dwelling. Another method is to clean the animal as for cooking any intelligent cook can do this, with the caution to break no bones. It is best to have two specimens of the same animal, to provide for any accident, as the breaking, or the loss of a bone, so that it can be replaced by one of its own kind. A vessel of boiling water must be ready to receive the subject, where it can remain not longer than twenty minutes, longer than that will injure the bones, by making them oily. Small subjects, such as bats, humming-birds and the like, must never be subjected to boiling water save by dipping them occasionally to free them from blood.

A very little instruction will teach the plain rules for cleaning the bones; this we term the rough work of skeleton making, though some bones require the most delicate manipulation, we refer especially to the hyoid bones. It is also difficult to preserve the cartilage attached to the ribs and other parts; frequently it gives way, and we have to substitute cotton or cord, dipped in glue, and looped to imitate it, but with care the cartilage, unless extremly delicate, can be preserved. The vertebræ must be cleaned separately, as well as the other bones, using for this purpose delicate knives, scissors and brushes.

After separating the bones, proceed to cut off the flesh with knives,

or scissors, which ever suits best. Having removed the heavest portion of the flesh, each bone is thrown in cold water to stand all night. The next morning pour the water off and clean the bones a second time, throwing them again in clean cold water; proceed in this way until they are perfectly free from flesh. Lay them on a board and when dry, clean and brush them repeatedly, to remove any particles that may adhere about the joints. They must now have an exposed situation to whiten in the sun and the weather; the rapidity of this process depends very much upon the season and the exposure of the situation.

The bones of birds, being hollow, are sometimes moderately white without much bleaching; in this case, we can proceed in a few weeks to mount them. In the mammalia, the bones contain more marrow, and they require a longer time to whiten.

When the bones are sufficiently bleached proceed to mount them. First wrap the wire with spool cotton, even silver or plated wire is best wrapped, it prevents rust, and it also prevents the bones turning dark. Cut a proper length of wire to extend the full length of the vertebræ, on this adjust the bones in their regular rotation. Take soft old linen, or silk handkerchiefs, which ever is most convenient, roll them up—not tightly—to the size of the bird or beast, somewhat after the fashion of the taxidermist in stuffing birds, place this within the sternum, and tie to it in natural position, and with fine cotton, the vertebræ, which have already been strung on wire. Make this stuffing perfectly uniform, and proceed to adjust the bones. Set on the head, the wings, the legs, and the feet. When every bone is regulated, pull out the soft old handkerchief, carefully, so as not to disturb the delicate rib bones.

The bones of large animals must be fastened together with wire. The bones of smaller subjects are too delicate, as a general thing, for wire to pass through, and in most cases we have to use glue. It is almost impossible to give written rules for mounting, there are so many contingencies to guard against, which only experience can teach. Some bones warp in drying, and we have to adopt every expedient to force them into proper form. Small subjects require the most skillful and delicate handling, and every device is called for, with an insurmountable degree of patience.

In conclusion, we assure our readers that in giving our own views

and experience in skeleton making, we make not the slightest pretence to being learned in the science of osteology; in fact our knowledge goes little further than practical experience in manipulation and examination of bones, and in mounting them for private gratification.

M. E. B.

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## Catalogue of the Birds of the District of Columbia.

PREPARED BY PIERRE LOUIS JOUY.

Those species given in italics have been added to the list by the compiler. Those marked with the asterisk are of very rare or accidental occurrence.

### Family TYRANNIDÆ.

MILVULUS.

113. *——?

TYRANNUS.

114. carolinensis, (Gm.) Temm.
115. * *verticalis*, Say.

MYIARCHUS.

116. crinitus, (L.) Cab.

SAYORNIS.

117. fuscus, (Gm.) Bd.

CONTOPUS.

118. virens, (L.) Cab.

EMPIDONAX.

119. acadicus, (Gm.) Bd.
120. trailli, (Aud.) Bd.
121. minimus, Bd.
122. flaviventris, Bd.

### Family CAPRIMULGIDÆ.

ANTROSTOMUS.

123. vociferus, (Wils.) Bp.

CHORDEILES.

124. virginianus, (Gm.) Bp.

### Family CYPSELIDÆ.

CHAETURA.

125. pelagica,(L.) Bd.

### Family TROCHILIDÆ.

TROCHILUS.

126. colubris, L.

### Family ALCEDINIDÆ.

CERYLE.

127. alcyon, (L.) Boie.

### Family CUCULIDÆ.

COCCYGUS.

128. erythrophthalmus, (L.) Bp.
129. americanus, (L.) Bp.

### Family PICIDÆ.

HYLOTOMUS.

130. pileatus, (L.) Bd.

PICUS.

131. villosus, L.
132. pubescens, L.

SPHYRAPICUS.

133. varius, (L.) Bd.

CENTURUS.

134. carolinus, (L.) Sw.

MELANERPES.

135. erythrocephalus. (L,) Sw.

COLAPTES.

136. auratus, (L.) Sw.

### Family STRIGIDÆ

STRIX.

137. *flammea* var. *pratincola* (Bon.) Ridg.

BUBO.

138. virginianus, (Gm.) Bp.

SCOPS.

139. asio, (L.) Bp.

OTUS.

140. vulgaris var. wilsonianus, (Less.) Allen.

BRACHYOTUS.

141. palustris, (Bechst.) Gould.

SYRNIUM.

142. nebulosum, (Forst.) Boie.

NYCTEA.

143. * scandiaca, (L.) Newt.

## Family FALCONIDÆ.

CIRCUS.

144. cyaneus var. hudsonius, (L.) Schl.

ACCIPITER.

145. fuscus, (Gm.) Gray.
146. cooperi, (Bp.) Gray.

ASTUR.

147. * atricapillus. (Wils.) Jard.

FALCO.

148. columbarius, L.
149. sparverius, L.

BUTEO.

150. borealis, (Gm.) Vieill.
151. lineatus, (Gm.) Jard.
152. pennsylvanicus, (Wils.) Bp.

PANDION.

153. haliaetus, (L.) Cuv.

HALIAETUS, (L.) Sav.

154. leucocephalus.

AQUILA.

155. chrysaetus, L.

## Family CATHARTIDÆ.

RHINOGRYPHUS.

156. aura, L. Ridg.

## Family COLUMBIDÆ.

ECTOPISTES.

157. migratoria, (L.) Sw.

ZENAIDURA.

158. carolinensis, (L.) Bp.

CHAMÆPELIA.

159. * passerina, (L.) Sw.

## Family MELEAGRIDIDÆ.

MELEAGRIS.

160. gallopavo, L. [Exterminated?]

## Family TETRAONIDÆ.

### Subfamily TETRAONINÆ.

BONASA.

161. umbellus, (L.) Steph.

### Subfamily ODONTOPHORINÆ.

ORTYX.

162. virginiana, L. Bp.

## Family CHARADRIIDÆ.

Subfamily CHARADRIINÆ.

CHARADRIUS.

163. fulvus var. virginicus, (Borck.) Coues.

ÆGIALITIS.

164. vocifera, (L.) Bp.
165. *semipalmata*, (Bp.) Cab.

## Family SCOLOPACIDÆ.

PHILOHELA.

166. minor, (Gm.) Gray.

GALLINAGO.

167. wilsoni, (Temm.) Bp.

EREUNETES.

168. * pusillus, (L.) Cass.

TRINGA.

169. minutilla, Vieill.
170. maculata, Vieill.

TOTANUS.

171. semipalmatus, (Gm.) Temm.
172. melanoleucus, (Gm.) Vieill.
173. flavipes, (Gm.) Vieill.
174. solitarius, (Wils.) Aud.

TRINGOIDES.

175. macularius, (L.) Gray.

ACTITURUS.

176. bartramius, (Wils.) Bp.

NUMENIUS.

177. longirostris, Wils.

## Family ARDEIDÆ.

### Subfamily ARDEINÆ.

ARDEA.

178. herodias, L.

HERODIAS.

179. egretta, Gray.

GARZETTA.

180. candidissima, Bonap.

FLORIDA.

181. * caerulea, Bd.

BUTORIDES.

182. virescens, L.

NYCTIARDEA.

183. grisea var. naevia, (Bodd.) Allen.

Subfamily BOTAURINÆ.

BOTAURUS.

184. minor, (Gm.) Boie.

ARDETTA.

185. exilis, (Gm.) Gray.

## Family GRUIDÆ.

GRUS.

186. * canadensis, (L.) Temm.

## Family RALLIDÆ.

Subfamily RALLINÆ.

RALLUS.

187. elegans, Aud.
188. virginianus, L.

PORZANA

189. carolina, (L.) Cab.
190. * jamaicensis, (Gm.) Cass.

Subfamily FULICINÆ.

GALLINULA.

191. *galeata*, (Licht.) Bp.

FULICA.

192. americana, Gm.

## Family ANATIDÆ.

Subfamily CYGNINÆ.

CYGNUS.

193. americanus, Sharpl.

Subfamily ANSERINÆ.

BRANTA.

194. canadensis, (L.) Gray.
195. * *bernicla*, (L.) Scop.

Subfamily ANATIDÆ

ANAS.

196. boschas, L.
197. obscura, Gm.

DAFILA.

198. acuta. L.

CHAULELASMUS.

199. streperus, (L.) Gray.

MARECA.

200. americana, (Gm.) Steph.
201. * *penelope*, (L.) Selby.

NETTION.

202. carolinensis, Bd.

QUERQUEDULA.

203. discors, (L.) Steph.

SPATULA.

204. *clypeata*, (L.) Boie.

AIX.

205. sponsa, (L.) Boie.

Subfamily FULIGULINÆ.

FULIGULA.

206. marila, (L.) Steph.
207. affinis, Eyton.
208. collaris, (Donov.) Bp.
209. ferina var. americana, (Eyt.) Coues.
210. vallisneria, (Wils.) Steph.

BUCEPHALA.

211. clangula, (L.) Coues.
212. albeola, (L.) Bd.

HARELDA.

213. * glacialis, (L.) Leach.

OIDEMIA.

214. * americana, (Wils.) Sw.
215. * velvetina, Cass.
216. * perspicillata, (L.) Steph.

ERISMATURA.

217. rubida, (Wils.) Bp.

Subfamily MERGINÆ.

MERGUS.

218. merganser, L.
219. serrator, L.
220. cucullatus, L.

## Fam. PHALACROCORACIDÆ.

GRACULUS.

221. * dilophus, (Sw.) Gray.

## Family LARIDÆ.

Subfamily LARINÆ.

LARUS.

222. argentatus var. smithsonianus, (Brunn.) Coues.

223. delawarensis, Ord.
224. atricilla. L.
225. philadelphia, (Ord.) Gray.

Subfamily STERNINÆ.

STERNA.

226. anglica, Mont.
227. *forsteri*, Nutt.
228. hirundo, Auct.
229. superciliaris var. antillarum, Coues.

HYDROCHELIDON.

230. lariformis, (L.) Coues.

Subfamily RHYNCHOPINÆ.

RYNCHOPS.

231. * nigra, L.

## Family PROCELLARIIDÆ.

Subfamily PROCELLARIINÆ.

CYMOCHOREA.

232. * leucorrhoa, (Vieill.) Coues.

* OCEANITES.

233. * *oceanica*, (Kuhl.) Coues.

PUFFINUS.

234. *——?

## Family COLYMBIDÆ.

COLYMBUS.

235. torquatus, Brunn.

## Family PODICIPIDÆ.

PODICEPS.

236. cristatus. (L.) Lath.
237. cornutus, Lath.
238. griseigena var. holbolli, (Reinh.) Coues.

PODILYMBUS.

239. podiceps, (L.) Lawr.

*Add to* VIREONIDÆ :

240. *Vireo noveboracensis*, (Gm.) Bp.

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## Potomac-Side Naturalists' Club.

*January 22, 1877, (208th meeting.)*

Prof. Chickering read a paper on Local Plant Catalogues. (Published in *Field and Forest.)*

Dr. Schaeffer called attention to the very unusual display of glacial phenomena exhibited along the banks of the Potomac, below Little Falls.

Mr. Seaman spoke of experiments with the juice of the *Phytolaceæ decandra*, as a medium for staining microscopic specimens ; also of fine examples of raphides to be found in the leaves of *Nelumbium*, and of jelly and diatoms on the stems of *Brasenia pellata*.

*February 5th, (209th meeting)*

Prof. Seaman read a paper on the Geological Characteristics of the District. (To be published hereafter.)

Dr. Vasey read a paper on the Botanical Exhibits at the Centennial. (Already published.)

Dr. Schaeffer presented a collection of plants, made in 1858–9, containing several species not known to be detected since within our limits.

*February 18th, (210th meeting.)*

Mr. Dodge read a paper on Insect Artisans, as anticipating and applying many processes in the mechanic arts.

A warm discussion followed upon hereditary development and improvement of instinct in animals, and the transmission by hereditary descent of mechanical and artistic aptitudes in the human race, through different families and nations.

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## CORRESPONDENCE.

Editor FIELD AND FOREST:

I was much interested in the article in your February issue on "Botany at the Centennial," and am glad my friend Dr. Vasey has made a record of the various botanical exhibits, for such a display has never heretofore been made in this country; a more detailed account would have been of great service to students and others.

In regard to the Scandinavian herbarium which came into my possession, it contains about fifteen hundred species, and is probably one of the most complete representations of the flora of Sweden to be found in this country. There are many points of interest in comparison with our own flora, some genera having no representative here, whilst in others the number of species is very largely increased; for instance, there are thirty species of the genus *Hieracium* while Gray's Manual enumerates only six. The asters and solidagos so numerous here and so puzzling to the young student of Botany, have each a single representative, *Aster Tripolium L.* and *Solidago virga-aurae L.* both species common throughout Northern Europe. There are also thirty one species of Salix, ninety species of Carex, and one hundred and sixteen species of grasses. The *Erigeron canadense L.* so abundant here, I was informed by the Swedish commisioner is quite rare in that country, and is represented in the collection by a very diminutive specimen with but few flowers, the specimens are nicely mounted and labled in illustration of the interest which is felt in the study of Natural Science in that country.

*Camden, N. J. March 13th, 1877.* ISAAC C. MATINDALE.

Dear Sir:

From the fragmentary extract in your Specimen sheet * of "Ornithological Notes from Texas," I note the following: I have never noted *A. lagopus*, here, (extreme head of Trimiby River) but have one specimen of var. *Sancti Johannis* (Black) I do not doubt however but that the typical bird will be taken here, but it is evidently not so plentiful as noted by Mr. Kumlein in the "Nation" which is only 7 miles from here. I did not expect *Elanoides forficatus*, and *Ictinia mississippiensis*, still in Texas, so late in the season as December, and the question arises, do they not pass the entire Winter? In connection with this, I am just is receipt of a letter from Bell County, (near Waco on the Brown River) stating that the Scissor-tail fly-catcher (*M. forficatus*) passes the winter in that county.

I have noted only the var. *excubitoroides* of *C. ludovicianus* here. It seems strange that I have never noted *Icterus baltimore*, here, even during the migrations, as it must pass through this locality, from the fact that Mr. Kumlein noted it *South* of here.

*Gainsville, Texas, March 15.* G. H. RAGSDALE.

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## FIELD RECORD.

**Earth-worms on the Pavements.**—On Thursday morning March 15th, great numbers of the common Earth-worm (*Lumbricus terrestris, L.*) were seen lying scattered about on the pavements of all the streets of Washington. They were dead and presented a somewhat shrivelled appearance. They were of all sizes and lay in all positions, on the brick walks and stone flaggings wherever one chanced to look. As the weather was freezing cold they were of course frozen stiff. I counted over a hundred, some of a very large size, in walking the length of the U. S. Treasury Building, lying about upon the broad flag stones that form the walks around it. It will be remembered that the weather on Wednesday was mild and rainy, and during the early part of the night a heavy fall of rain occurred, followed by a high wind and a fall of temperature to considerably below the freezing point. We may presume that the ground, already saturated with moisture, became so wet during the heavy rainfall that the

* Containing in addition to prospectus &c., the first four pages of the February number of *Field and Forest*.

worms could no longer exist below the surface and crawled out in immense numbers. Reaching the surface they travelled about in all directions, perhaps in search of drier places than were afforded by the sod and grass of public parks and open ground. They thus found themselves on the pavements when the change came and succumbed to the increase ! cold and sharp drying wind.

Singularly enough none were to be found on the asphalt pavements of the streets or even on the walks of that material passing through certain parks. May it not be that their senses warned them of the presence of this bituminous substance, which, proving disagreeable to them, instructively turned them away from it as soon as reached in their wanderings?—LESTER F. WARD.

**Hungry Anthreni.**—We recently unearthed an old case of butterflies—or at least the remains of one—that had been hidden away for a year or so, and undisturbed, finding little else but empty pins, labels, shed *Anthrenus* skins and dust, but the thing that struck us most strangely was that nearly all the labels had been deeply notched and eaten on all sides. We know these destructive pests are not very particular about their diet, but a diet of paper was something new. Was the paper eaten from choice, or because the insects were driven to it, as as there was nothing else to eat?—C. R. D.

The Davenport Academy of Science has been presented with a fine building site, worth $4.500 or $5.000, by Mrs. P. V. Newcomb. The lot has a frontage of 45 feet with a depth of 150 feet. Prof. Parvin of Iowa City has also presented to the Academy his fine geological collection, cases and all complete.

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**Analysis of Grape Roots.**—M. Boutin, according to the *Bulletin of the Botanical Society of France*, having analysed the roots of American vines, (*Vitis estivalis*, *cordifolia* and *labrusca*) finds they contain five per cent. of malic acid, which is not found in the roots of the *V. vinifera*, or European vine. The roots of the American vines also contain eight per cent. of a resinous principle, and their bark fifteen per cent. M. Fabre thinks they are enabled to resist the *Phylloxera* by the resin they contain, which flows over the wound made by the insect, and thereby hinders the escape of sap.

# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.—MAY, 1877.—NO. 11.

## On the Exploration of some Indian Graves in Utah.

It happened to the writer to be so fortunate as to visit the Territory of Utah in the summer of 1872, and in the month of August of that year a short stay was made at a place some two hundred miles from Salt Lake City, the name of the locality being suppressed for obvious reasons. After the first day or so, having about exhausted the flora and fauna at hand, we cast about us for further material for our collecting chest, and knowing that a tribe of Pah-Vant Indians had lived in the neighborhood for a long time, we naturally supposed that the burial place for their dead could not be far distant, and if such cemetery could be found we felt assured of a rich harvest of crania and archæological material for the National Museum. Accordingly a visit was paid to their camp and after a judicious distribution of trinkets, carefully guarded inquiries were made of the Chief as to the disposition of the dead, whether cremated or buried, but without eliciting any definite information.

All that we could discover was that the dead were buried as the Chief said "heap way over there," pointing at the same time as he spoke to the Wah-satch range of mountains some four or five miles distant. This was discouraging but we determined to try again and in other directions. To make a long story short we finally succeeded in purchasing the secret from a person who had witnessed a funeral procession one night and who had had the curiosity to follow the cavalcade to the burying place. For a consideration, this "peeping

Tom" agreed to conduct us direct to the spot, and one morning two of us, with two soldiers as escort, started for the mountain or rather the peak of one directly in rear of our camp. It is hardly worth while to describe the road, suffice it to say that it was the worst mountain trail I have ever ridden over and so obscure, that without a guide we had most assuredly lost our way both going and returning; at some parts it was necessary to alight or run the risk of being thrown over fearful precipices. Finally our guide made a halt and we found that we had arrived at a sort of plateau some few hundred feet below the mountain's peak; pointing to a rock-slide composed of masses of stone ranging in size from a pebble to the enormous boulder, he said "there are the graves." At first we saw only a confused mass of rocks piled up apparently without design, but a nearer inspection revealed a grave-like outline. To reach them we were obliged to walk over the osseous remains of many unfortunate horses butchered to accompany their masters to the happy hunting grounds. It was not our intention to disturb the remains at this time with a looker on who might object, but we removed enough of the stones from one of the piles to satisfy ourselves that they actually contained dead Indians, after which we carefully replaced them and descended again to camp, not however without marking the trail in such a way that it could easily be found again; this task was entrusted to one of our cavalrymen who purposely lagged behind.

The next day we were on the ground at an early hour and the work of exhumation commenced. It was found after removing the boulders, that a layer of branches was reached upon which the stones had been piled, displacing these, the body was perceived resting in a sort of concavity formed by the removal of stones. In all, seven such graves were opened and in each instance the skeleton was found lying on the back with weapons and utensils of different kinds on either side. In a grave supposed to be that of a medicine-man were found a number of articles pertaining to his trade, a gourd rattle, painted truncheon of wood, besides beads, bow and arrows and various cooking implements. In a grave separated a little from the rest a skeleton was found wrapped in skins and surrounded by all sorts of odds and ends, kettles, bows, arrows, two old-fashioned rifles and quite a number of brass buttons. In this same grave was found the head of a child, the other bones having been probably dragged out by animals. Tradition relates that

a Chief was buried at this place and that a captive Piegan boy was interred with him to act as his servant on the trip to the other world, and the discovery of the cranium would seem to lend a plausibility to the story. It is hardly necessary to add that we secured the crania from all the graves and such articles as seemed to have a certain ethnological and archæological value, after which every stone was carefully replaced so as to leave no indication that a disturbance of the bones of the dead had taken place.

At the time of the burial of the Chief already alluded to as having been watched by our guide, the following ceremonies took place: the funeral party consisting of most of the men and women of the villiage mounted on horseback, started at about dusk in the evening to ascend the mountains; the corpse was fastened upon a horse like a sack of grain the animal being led by one of the mourners; during the whole of the ascent the entire party shrieked and wailed in the most mournful manner, this noise not ceasing as my informant stated until daylight next morning. Arriving at the spot the grave was hastily made as already described, the body deposited and shots fired, either to scare away bad spirits or as a parting salute, after which the butchery of horses commenced by cutting their throats. At the burial of this Chief twenty are said to have been sacrificed. In removing these remains the requirements of poetic and retributive justice was to a certain extent fulfilled as the band to which their owners belonged murdered Lt. Gunnison and his party on the Sevier River some years previously.

In the vicinity of Beaver, Utah, several graves were explored which were situated near the mouth of a canyon at the foot of a mountain, these were five feet deep and exactly similar to the graves of white persons. In one of them was found the skeleton of a child aged perhaps five years, who had suffered from a disease of the dorsal vertebræ. With the body had been buried a number of rude toys and play-things.

In western Utah a cave was discoved in which the Gosh-Ute Indians deposited their dead wrapped in skins and surrounded with different objects used in life, and another similar cave was heard of near the Nevada border; neither of these were explored for want of time. Simpson relates in his most interesting volume lately published by the Engineer Bureau entitled "Explorations across the Great Basin of Utah," the manner of disposing of the dead in vogue amongst the

tribes or sub-tribes he encountered and the following account is taken from the work in question. * * * "Skull Valley which is a part of the Great Salt Lake Desert and which we have crossed to day, Mr. George W. Bean, my guide over this route last fall, says, derives its name from the number of skulls which have been found in it and which have arisen from the custom of the Gosh-Ute Indians burying their dead in springs, which they sink with stones or keep down with sticks. He says he has actually seen the Ute Indians bury their dead in this way near the town of Provo where he resides."

From this brief account of different methods of burial practiced by the Utah Indians, it will be seen that no regular method of procedure has been adopted, as is generally the case with most of the aboriginal tribes, each one as a rule having a distinct mode of burial peculiar to itself, as for instance in the case of the former aborigines of the coast of California, whose burial places have been thoroughly explored by Mr. Paul Schumacher and the members of Lt. Wheeler's Expedition, all the burials were alike and the finding of the first grave with its peculiar snrroundings and marks, served as a sure and certain indication to others.

It is proposed, should time and circumstances permit, to continue this article with others describing the manner of disposing of the dead practiced by other Indian tribes.

Dr. H. C. Yarrow.

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## The Scientific Names of our Common Sunfishes.

In the fresh waters of the North-eastern and Western United States, are generally found several species of *Centrarchoids* confounded under the common name of "Sunfish" whose nomenclature seems still to be involved in doubt and not considered settled. Among those who have been misled by the current views has been Prof. David S. Jordan, but that excellent icthyologist has lately signified his entire concurrence with the author as to the appellations of the several species, and the reasons, pro and con, have been re-weighed with the following results.

## I. Lepomis, *Raf.*

The Sunfishes were first grouped under a distinctive name by Rafinesque in 1819, in the *Journal de Physique* (p. 420), and the genus named *Lepomis* was especially based on the *Labrus auritus* of Linnæus. Therefore it must be restricted to whatever group is typified by that species. This question, however, involves one of specific identification, some naturalists connecting it with the common red and black-eared Sunfish, and others with the large long black-eared species. The doubt must be settled by reference to the writings of Linnæus.

Linnæus, first in 1758, in the tenth edition of Systema Naturæ,* p. 283, introduced the *Labrus auritus* as follows:

auritus. 9. L. cauda bifida, operculis branchiarum pinniformibus. $D.\frac{10}{21}.P.15.V.6.A.13.C.17.$
*Habitat in* Philadelphia. *Mus. De Geer.*

In 1766, in the twelfth edition of the same work, p. 475, he redescribed it as follows:

auritus. 9. L. cauda bifida, operculis branchiarum pinniformibus.
$B.6.D.\frac{10}{21}.P.15.V.6.A.\frac{3}{13}.C.17.$
*Catesb. car. 2. p. 8. t. 8. f.* 3. Perca fluviatilis gibbosa, ventre luteo?
*Habitat in* Americæ *septentrionalis aquis dulcibus. D. Garden.*
*Cauda biloba. Irides lutei. Opercula apice membranaceo, elongato, obtuso, nigro.*

Now, if these words have any meaning, it is evident that they cannot be applied to the short red-eared Sunfish, but they are entirely appropriate to the long black-eared species. Be it further remarked that there is also no reference at first to Catesby's work, and the final reference is accompanied with a mark ot doubt. There can, in truth, be no question as to its applicability to the species suggested, and its inapplicability to the other species for which it has been used. The

* It is not referred to in the edition of 1748.

question of specific identity being thus settled, the species follow thus :

1. *Lepomis auritus*, Gill.
*Labrus auritus*, Linn.
*Pomotis solis*, Cuv. and Val.
*Pomotis rubicauda*, Storer.
*Pomotis appendix*, Storer, Holbrook, etc. (Not *Labrus appendix*, Mitchill.)

The common oblong black-and-long-eared Sunfish.

2. *Lepomis pallidus*, Gill and Jordan.
*Labrus palladus*, Mitchill, Trans. Lit. and Phil. Soc. N. Y., v. 1, p 407, 1815.
*Labrus appendix*, Mitchill, Am. Month. Mag. and Crit. Rev., v. 2, p, 247. Feb. 1818.
*Pomotis incisor*, Cuv. and Val., Hist. Nat. des Poiss., v. 7, p. 466, 1831.
*Pomotis luna*, Girard. Expl. and Surv. for Pacif. R. R., v. 10, Fishes, p. 22, and several others.

The large short black-and-square-eared Sunfish of the Eastern and Northern States.

Having directed Prof. Jordan's attention to the descriptions of Mitchill, he fully concurred with me in the identifications above indicated.

II. Eupomotis, Gill and Jordan.

Rafinesque knew no species of the present genus, and although I have heretofore retained his name *Pomotis* as revived in another sense by Cuvier and Valenciennes, I am now convinced that it is better to slightly modify it to remove all misapprehension, and in this Prof. Jordan entirely concurs. We therefore suggest the name here given.

*Eupomotis aureus*, Gill and Jordan.
*Perca fluviatilis gibbosa ventre luteo*, Catesby, 1754.*
*Labrus auritus*, Schœpft et. al.
*Sparus aureus*, Walbaum, 1792.
*Labrus maculatus*, Mitchill, 1814.
*Sparus mocasinus*, Raf. 1814.
*Pomotis auritus*, Putnam, Gunther, et. al. (Not *Labrus auritus*, Linn.)
*Pomotis vulgaris*, Cuv. and Val.
*Pomotis Catesbœi*, Cuv. and Val.,
and others.

The common yellow spotted Sunfish with a short opercular flap, mostly black but tipped with red and yellow.

Theodore Gill.

* "*Perca fluviatilis gibbosa ventre luteo.* Small. Upper parts dusky blue, back darkest, belly yellow, gills blue with streaks of dark yellow, red spot at angle of each gill, joined to a black spot," &c. &c. Carolina and Virginia. Catesby, 1754, vol. 2, p. 8, tab. 8, fig. 3.

## Remarks on Birds of the District of Columbia.

By Drs. E. Coues and D. W. Prentiss.

Our earliest experiences in ornithology resulted in a List of the Birds of the District of Columbia which was published in 1861, in the Annual Report of the Smithsonian Institution. We may now be permitted to refer to that production with some little pride, as one which has stood the test of time better than boys' work generally does. It was, we believe, the first attempt at a formal enumeration of the birds of the National Capital, and it has remained unique up to the present time, when we cordially welcome the appearance of Mr. P. L. Jouy's Catalogue, with its important additions to the list of species then known to us. As Mr. Jouy's list is not annotated, it occurs to us that some remarks upon points of difference between the two papers may be desirable.

In 1861, we gave 226 species and indicated 15 others as "probably" or "undoubtedly" occurring. Mr. Jouy subtracts one species, namely, *Parus atricapillus*, from our list, and adds 15 species, namely, * *Geothlypis philadelphia*, *Vireo noveboracensis*, *Passer domesticus*, * *Loxia americana*, **L. leucoptera*, *Quiscalus* "*æneus*," *Tyrannus verticalis*, *Strix flammea*, **Ægialitis semipalmata*, *Gallinula galeata*, *Spatula clypeata*, *Mareca penelope*, *Branta bernicla*, **Sterna forsteri*, *Oceanites oceanica*; of which 15, only 5, namely, those here marked with the asterisk, were indicated by us as among the "probabilities." The total is thus raised to 240.

We have our doubts of the propriety of erasing *Parus atricapillus* from the list. Robert Ridgway professes to distinguish *P. carolinensis* specifically from it and he tells us, as we presume he did Mr. Jouy, that all the Tits from this locality are *carolinensis*. But aside from the question of specific distinction, it seems that the Tits from Baltimore are acknowledged to be *atricapillus*, and it is not likely that forty miles divides the two in such complete way. We think after all, that the two boys may have been right in stating, as they did with evident hesitation, that *P. carolinensis* is the ordinary summer Tit, and that specimens not distinguishable from ordinary *atricapillus* occur in winter.

There are, however, three species in our list which may be fairly challenged. One of these is the *Milvulus*. Mr. C. Drexler, our in-

formant, may have seen a *Milvulus*, or what he thought was a *Milvulus*, but we are not sure about it. He once colored the throat of a *Dendræca coronata* yellow, and tried to pass it off for a *D. auduboni* shot here. Another is *Meleagris gallopavo*. It may have been proper to introduce the bird in 1861, but we doubt that a live wild Turkey has been in the District or immediate vicinity for several years, though the birds are constantly brought from surrounding country to the city for sale. The third is *Podiceps cristatus*, which was introduced, as it proves, without satisfactory authority, our understanding of that species having been insufficient.

There are on the other hand some species included in neither list, which "certainly" do occur, though they have not yet been detected. Such are *Dendræca cærulea*, *Vireo philadelphicus*, *Cistothorus stellaris*, *Macrorhamphus griseus*, and others we could name. But Mr. Jouy has wisely refrained from introducing these, or any such, and we trust there never will be a bird added to the list hypothetically, or upon considerations of its known general distribution; the great beauty of the list as it stands being its reliability to an unusual degree, especially considering how extensive it is. We suppose that not over twenty or thirty more species will ever be legitimately added.

By a singular oversight, *Vireo noveboracensis*, though a very common bird with which we were perfectly familiar, was omitted from our list, and Mr. Jouy, by a curious coincidence, only remembered it just in time to add it to his.

*Quiscalus "æneus,"* which Mr. Jouy allows, was not described as a species until after our list appeared. We should not admit it, even now. There are plenty of these bronzy grackles in the Smithsonian grounds, but we don't like the way they have of mixing with ordinary *purpureus*.

*Passer domesticus*, the nuisance, was introduced some years after our list appeared, and now these rowdy little *gamins* squeak and fight all through the city, to our great disgust. The introduction of these exotics clutters up ornithology in a way that a student of geographical distribution may deplore, and interferes decidedly with the "balance of power" among the native species. Whatever may be said to the contrary notwithstanding, these sparrows *do* molest, harass, drive off, and otherwise maltreat and forcibly eject and attempt to destroy various kinds of native birds, which are thereby deprived

of certain inalienable rights to life, liberty and the pursuit of happiness after their own fashion.

We understand that in Boston, where the Sparrows are extremely numerous, the Butcher-birds (*Collurio borealis*) lately appeared in force, and feasted upon the birds, until the legislators, or whoever had authority in the matter, ordered them to be systematically destroyed, thus thwarting, with characteristic human short-sightedness, the first efforts Nature made to readjust the disturbed balance of her forces.

*Tyrannus verticalis*, which Mr. Jouy introduces, was not known to have been secured in the District, but was certainly shot in the immediate vicinity, as Mr. Jouy found it fresh in market, on the 30th of September, 1874. The specimen is preserved in the Smithsonian Institution.

*Gallinula galeata*, according to our private memoranda, was first got here in the autumn of 1863, when a specimen, doubtless from the immediate vicinity, was bought in the market by Mr. Drexler; others besides ourselves have since seen it in the District or vicinity.

*Mareca penelope* was got, according to the same token, in same manner, by same person, about the same time; but in the case of a duck, exposed for food in market, there is no assurance that it came from the immediate vicinity. It was, however, doubtless shot on the Potomac.

Respecting *Oceanites oceanica* we find a memorandum in our MS. that a specimen was got many years ago and was at time of writing in the Museum of the Smithsonian Institution.

*Strix flammea (americana)* and *Spatula clypeata*, are very properly added, having been omitted by us through "sheer ignorance."

The propriety of adding *Branta bernicla*, is, we suspect, open to question. Brant are found in market, but it does not follow that they were got here.

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A writer in *Science Gossip* says that the common house-fly has a strong dislike for the musk-plant (*Mimulus moscatus,*) and it is suggested that if boxes of this plant are placed before the windows of rooms affected, the nuisance may be abated.

## A New Killing Bottle.

I notice on page 35 of the present volume of *Field and Forest* an article on collecting Hymenoptera, &c., by E. W. in *Science Gossip*, in which the writer says "the most convenient collecting bottle is an ordinary two ounce or four ounce wide mouth, with turned back rim and tight fitting cork, &c." I have used glass bottles for some time, and unfortnately have had them broken on several occasions, when several miles away and where no substitute could be procured. You can imagine the feelings of an enthusiastic collector in such a predicament. After having walked four or five miles, and just getting interested with *Catocala* and other moths, on placing his bottle in a side pocket while stooping down to a spring for a drink, the coat flies around, hitting the bottle upon a rock, with the inevitable smash. Such accidents have caused me to think that glass is *not* the most convenient or best to use. During the last two seasons I have been using a killing bottle of my own invention, which has proved very satisfactory; they have also been used by several gentlemen of our profession in the west, who to the best of my knowledge, are satisfied with them.

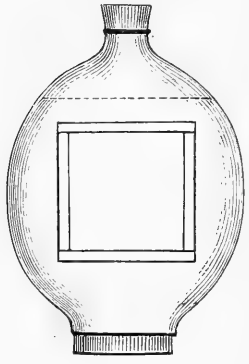

Fig. 5.

A glance at the accompanying illustration—drawn to a scale of one-fourth—will give a very good idea of the shape of the bottle and style in which it is made, but I append the following description: It is oval in form, and convenient for the pocket. The chamber for holding the killing material is separated from the body by a perforated tin floor,—indicated by dotted lines—so as to prevent the insect from coming in contact with the poison. The mouth of the bottle is two inches in diameter, and the sides have a plate of glass an inch and a half square, so that the specimen can be examined without taking out. The smaller end may be stopped with an ordinary cork, though one of rubber will be found much more secure.

It is designed for ether, chloroform, or cyanide of potassium. If

used with ether or chloroform the chamber is to be filled with cotton or sponge and then saturated, and the cork put in tightly. If cyanide of potassium is used, the chamber is filled with sawdust, mixed with the cyanide broken up small, but this should never be used in taking Hymenoptera, as it changes yellow to crimson or red.

*Frankford, Phila.* J. S. JOHNSON.

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## Mrs. Maxwell's Colorado Museum.

### CATALOGUE OF THE BIRDS.

The following is a systematic catalogue of the birds contained in the "Colorado Museum," prepared by Mrs. M. A. Maxwell, of Boulder, Colorado, and by her exhibited at the Centennial Exposition held in Philadelphia during the past summer. The collection consists of excellently mounted specimens, many of which were procured by the lady herself, while all were put up by her hands. It illustrates very fully the avian fauna of Colorado, while it bears testimony, not only to the great richness and variety which characterize the productions of the new State, but also to the success which has crowned the enthusiastic and intelligent efforts of a "woman Naturalist."

The collection embraces many species whose occurrence in Colorado was wholly unlooked for; such as *Nyctherodias violaceus*, *Garzetta candididssima*, and *Tantalus loculator* among southern species, and *Stercorarius parasiticus*, *Xema sabinei*, and *Œdemia americana* from the high north; the latter, it will be observed, is a strictly littoral species, hence, its occurence in Colorado, the very centre of the continent is all the more remarkable.

### Family TURDIDÆ: Thrushes.

1. Turdus migratorius, *β.* propinquus, Ridgw.—Western Robin. a, ♂ ad.; b, ♀ ad.
2. Turdus guttatus, *γ.* auduboni, Baird. Rocky Mountain Hermit Thursh. a, ♂ ad.; b, ♀ ad.
3. Turdus ustulatus, *β.* swainsoni. Olive-backed, or Swainson's Thrush. a, ♂ ad.
4. Turdus fuscescens, Stephens. Tawny Thrush; Wilson's Thrush. a, ♂ ad.
5. Galeoscoptes carolinensis, (Linn.) Cat Bird. a, ♂ ad.; b, ♀ ad.
6. Oreoscoptes montanus, (Towns.) Sage-Thrasher; Mountain Mocking Bird. a, ♂ ad.; b, Juv.

7. Mimus polyglottus, (Linn.) Mocking Bird. a, ♂ ad.; b, ♀ ad.
8. Harporhynchus rufus, (Linn.) Brown Thrasher. a, ♂ ad.; b, ♀ ad.

## Family CINCLIDÆ: Water Ouzels.

9. Cinclus mexicanus, Swains. American Water Ouzel. a, ♂ ad.; b, ♀ ad.; c, d, e, f, young.

## Family SYLVIIDÆ: Warblers.

10. Myiadestes townsendi, (Aud.) Townsend's Solitaire. a, ♂ ad.; b, ♀ ad.
11. Sialia sialis, (Linn.) Eastern Blue Bird. a, ♂ ad.; b, ♀ ad.
12. Sialia mexicana, Swains. California Blue Bird. a, ♂ ad.; b, ♀ ad.
13. Sialia arctica, Swains. Rocky Mountain Blue Bird. a, ♂ ad.; b, ♀ ad.
14. Regulus calendula, (Linn.) Ruby-crowned Kinglet. ♂ ad.
15. Regulus satrapa, Licht. Golden-crowned Kinglet. a, ♂ ad. a, ♀.
16. Polioptila cærulea, (Linn.) Blue-gray Gnatcatcher. a, ♂ juv.

## Family CERTHIIDÆ: Tree Creepers.

17. Certhia familiaris, β. americana, Bonap. Brown Creeper.

## Family PARIDÆ: Titmice or Chickadees.

18. Lophophanes inornatus, (Gamb.) Gray Titmouse. a. adult.
19. Parus montanus, Gamb. Mountain Chickadee. a, adult.
20. Parus atricapillus, β. septentrionalis, Harris. Long-tailed Chickadee. a, adult.
21. Psaltriparus plumbeus, Baird. Lead-colored Least Tit. a, ♂ ad.

## Family SITTIDÆ: Nuthatches.

22. Sitta carolinensis, β. aculeata, Cass. Slender-billed Nuthatch. a, ♂ ad.; b, ♀ ad.
23. Sitta canadensis, Linn. Red-bellied Nuthach.
24. Sitta pygmæa, Vig. Pigmy Nuthatch. a, ♂ ad., b, ♀ ad.

## Family TROGLODYTIDÆ: Wrens.

25. Catherpes mexicanus, β. conspersus, Ridgw. Cañon Wren. a, ♂ ad.
26. Salpinctes obsoletus, (Say) Rock Wren. a, ♂ ad.; b, ♀ ad.
27. Troglodytes ædon, β. parkmanni, Aud. Parkmann's Wren. a, ♂ ad.; b, ♀ ad.; c, d, e, f, g, h, young.
28. Telmatodytes palustris, β. paludicola, Baird. Tule Wren. a, ad.

## Family MOTACILLIDÆ: Wagtails. and Titlarks, or Pipits.

29. Anthus ludovicianus, (Gm.) American Titlark. a, ♂ ad.; b, ♀ ad. [Breeding abundantly on mountains above timber-line, at an altitude of about 12,000 feet!]
30. Neocorys spraguei, (Aud.) a, ad.

## Family MNIOTILTIDÆ: American Warblers.

31. Dendrœca auduboni, (Towns.) Audubon's Warbler. a, ♂ ad.; b, ♀ ad.; c juv.
32. Dendrœca coronata, (Linn.) Yellow-rump Warbler. a, ♂ ad.; b, ♀ ad.

33. Dendrœca nigrescens, (Towns.) Black-throated Gray Warbler. a, ♂ ad.
34. Dendrœca æstiva, (Gm.) Golden Warbler; Summer Yellow Bird. a, ♂ ad.; b, ♀ ad.
35. Parula americana, (Linn.) Blue Yellow-back Warbler. a, ♂ ad.
36. Helminthophaga celata, (Say.) Orange-crown Warbler. a, ad.
37. Helminthophaga peregrina, (Wils.) Tennessee Warbler. a, ♂ ad.; b, ♀ ad.
38. Geothlypis trichas, (Linn.) Maryland Yellow-throat. a, ♂ ad.; b, ♀ ad.
39. Geothlypis macgillivrayi, (Aud.) McGillivray's Warbler. a, ♂ ad.; b, ♀ ad.
40. Icteria virens, *β.* longicauda, (Lawr.) Long-tailed Chat. a, ♀ ad.
41. Myiodioctes pusillus, (Wils.) Black-cap Green and Yellow Warbler.
42. Setophaga ruticilla, (Linn.) American Redstart. a, ♂ ad.; b, ♀ ad.

## Family VIREONIDÆ: Greenlets or Vireos.

43. Vireosylvia gilva, *β.* swainsoni Baird. Western Warbling Vireo. a, ♂ ad.; b, ♀ ad.
44. Vireosylvia olivacea, (Linn.) Red-eyed Vireo. a, ♂ ad.; b, ♀ ad.
45. Lanivireo plumbeus, Coues. Lead-colored Vireo. a, ad.
46. Lanivireo solitarius, (Wils.) Solitary Vireo. a, ad.

## Family LANIIDÆ: Shrikes.

47. Collurio borealis, (Vieill. Great Northern Shrike. a, ♂ ad.; b, juv.
48. Collurio ludovicianus, *β.* excubitoroides, Swains. White-rumped Shrike. a, ♂ ad.; b, ♀ ad.

## Family AMPELIDÆ: Wax-wings.

49. Ampelis garrulus, Linn. Northern Wax-wing. a, ♂ ad.; b, ♀ ad.
50. Ampelis cedrorum, (Vieill.) Cedar Wax-wing. a, ♂ ad.

## Family HIRUNDINIDÆ: Swallows.

51. Progne subis, (Linn. Purple Martin. a, ♂ ad.
52. Petrochelidon lunifrons, (Say.) Cliff Swallow. a, ad.
53. Hirundo erythrogaster, *β.* horreorum, Barton. Barn Swallow. a, ad.; b, juv.
54. Tachycineta bicolor, (Vieill.) White-belled Swallow. a, ♂ ad.; b, c, d, juv.
55. Tachycineta thalassina, (Swains.) Violet-green Swallow.
56. Stelgidopteryx serripennis, (Aud.) Rough-winged Swallow. a, ad.
57. Coltyle riparia, (Linn.) Bank Swallow.

## Family TANAGRIDÆ: Tanagers.

58. Pyranga ludoviciana, (Wils.) Western Tanager. a, ♂ ad.; b, ♀ ad.
59. Pyranga æstiva (Wils.) Vermilion Tanager.

## Family FRINGILLIDÆ: Finches.

### Sparrows and Buntings.

60. Pinicola enucleator, *β.* canadensis, (Linn.) Pine Grosbeak. a, ♂ ad.; b, ♀ ad. [Breeds on high mountains of Colorado.]
61. Loxia curvirostra, *γ.* mexicana, Strickl. Mexican Crossbill. a, ♂ ad.; b, ♀ ad. [Breeds in Colorado!]
62. Hesperiphona vespertina, (Cooper.) Evening Grosbeak. a, ♂ ad.; b, ♀ ad.
63. Plectrophanes nivalis, (Linn.) Snow Bunting. a, ♂ ad.; winter plumage.
64. Centrophanes lapponicus, (Linn.) Lappland Long-spur.
65. Centrophanes ornatus, (Towns.) Chestnut collared Long-spur. a, ♂ ad.; b, ♀ ad.
66. Rhynchophanes maccowni, (Lawr.) McCown's Long-spur. a, ♂ ad.; b, ♀ ad.; c, juv.

67. Leucosticte tephrocotis, Swains. Gray-crowned Leucosticte. a, ♂ ad.; summer pl.; b, ♀ ad.; summer pl.; c, ad.; spring pl.; d, ad.; summer pl.
68. Leucosticte tephrocotis, *β.* littoralis, Baird. Hepburn's Leucosticte. a, adult, winter pl.
69. Leucosticte atrata, Ridgway. Aiken's Leucosticte. a, ♂ ad.; winter pl.
70. Leucosticte australis, Allen. Allen's Leucosticte. a, ♂ ad.; summer pl.; b, ♀ ad, summer pl.; c, ♀ ad, winter pl.
71. Chrysomitris tristis, (Linn.) American Gold-finch. a, b, ♂ ad., summer pl.; c, ♀ ad.
72. Chrysomitris psaltria, (Say). Green-backed Gold-finch. a, ♂ ad.
73. Chrysomitris pinus, (Wils.) Pine Gold-finch. a, b, adult.
74. Carpodacus cassini, Baird. Cassin's Purple Finch. a, ♂ ad.; b, ♀ ad.
75. Carpodacus frontalis, (Say). House Finch. a, ♂ ad.; b, ♀ ad.
76. Centronyx bairdi, (Aud.) Baird's Bunting. a, ♂ ad.
77. Chondestes grammaca, (Say). Skylark Bunting. a, ♂ ad.; b, ♀ ad.
78. Pooecetes gramineus, *β*, confinis, Baird. Western Bay-winged Bunting. a, ad.
79. Passerculus sandvichensis, *γ.* alaudinus, Bonap. Western Savanna Sparrow. a, ♂ ad.; b, ♀ ad.
80. Junco aikeni, Ridgw. White-winged Snowbird. a, ♂ ad.; b, ♀ ad.
81. Junco hyemalis, (Linn.) Eastern Snowbird. a, ♂ ad.; b, ♀ ad.
82. Junco oregonus, (Towns.) Oregon Snowbird. a, ♂ ad.; b, ♀ ad.
83. Junco caniceps, (Woodh.) Gray-headed Snowbird. a, ad.; (variety; see note page—;) b, ad.; (normal style,) c, juv.
84. Junco annectens, Baird. Pink-sided Snowbird. a, ad.; (normal style) b, ad.; (variety, see note on page—;)
85. Spizella socialis, *β.* arizonæ, Coues. Western Chipping Sparrow. a, ♂ ad.; b, ♀ ad.
86. Spizella monticola, (Gm.) Tree Sparrow. a, ♂ ad.; b, ♀ ad.
87. Spizella breweri, Cass. Brewer's Sparrow. a, ad.
88. Spizella pallida, (Swains.) Clay-colored Sparrow. a, ad.
89. Zonotrichia leucophrys, (Forst.) White-crowned Sparrow. a, ♂ ad.; b, ♀ ad.
90. Zonotrichia intermedia, Ridgway. Ridgway's White-crowned Sparrow. a, ♂ ad.; b, ♀ ad.; c, juv.; in winter plumage.
91. Melospiza fasciata, *γ.* fallax, Baird. Rocky Mountain Song Sparrow. a, b, c, adults.
92. Melospiza lincolni, (Aud.) Lincoln's Sparrow. a, ♂ ad.; b, ♀ ad.; c, juv.
93. Coturniculus passerinus, *β.* perpallidus, Ridgway. Western Yellow-winged Sparrow.
94. Passerella iliaca, (Merrem.) Fox-colored Sparrow. a, ♂ ad.; b, ♀ ad. [Typical *iliaca.*
95. Calamospiza bicolor, (Towns) Black Lark Bunting. a, ♂ ad.; b, ♀ ad.
96. Euspiza americana, Gm.) Black-throated Bunting. a, ♂ ad.
96*a*. Hedymeles melanocephalus, (Swains.) Black-headed Grosbeak. a, ♂ ad.; b, ♀ ad.
97. Guiraca cærulea, (Linn.) Blue Grosbeak, a, ♀ ad.
98. Cyanospiza amœna, (Say). Lazuli Bunting. a, ♂ ad.; b, ♀ ad.
99. Pipilo maculatus, *δ.* megalonyx, Baird. Long-clawed Ground Robin. a, ♂ ad.; b, ♀ ad.
100. Pipilo chlorurus, (Towns.) Green-tailed Ground Robin. a, ♂ ad.; ♀ ad.; c, juv.
101. Pipilo fuscus, *γ.* mesoleucus, Baird. Cañon Bunting. a, ♂ ad.
102 a, Cyanospiza cyanea, (Linn.) Indigo Bird. a, ♂ ad. [*To be continued.*]

ROBERT RIDGWAY.

## The Phylloxera and Insecticides.

Some time ago we published in our columns a short account of the results of the investigations of various scientific men in France into the nature of the Phylloxera—that terrible scourge which is committing such wide-spread ravages among the French vineyards. Latterly we have received some reports communicated to the French Academy of Sciences dealing with the attempts which have been made during the last three or four years to arrest the mischief done by the insect, and ultimately to destroy it altogether, by means of some potent drug. It is obvious that the remedy to be employed must possess two qualities, viz., it must destroy the insect and it must not damage to any great extent the vine. But, further, it is not sufficient that when put in close contact with the roots of a plant—as in a pot—it should prove fatal to the insect, it is necessary, if the remedy is to be of real practical value, that it should reach and destroy the Phylloxera on all the parts attacked by it in vines which are planted out in the open air. This is a real difficulty to overcome, as the remedy, be it in the form of solution or vapor, cannot easily permeate the soil, sometimes clayey, sometimes sandy, in which the vine is growing, so as to reach and act upon the smaller root branches whose nutrition the Phylloxera diverts into itself.

M. Mouillefert, a professor at the School of Agriculture at Grignon, was the gentleman delegated by the Academy of Sciences to make the necessary experiments for the purpose of determining what agent was the most practically applicable to the destruction of the Phylloxera, and the account of the numerous substances employed by him with varying results fills no less than two hundred pages of a memoir presented to the Academy of Sciences. It is not our attention here to do more than give a brief *resume* of the results at which he arrived.

He divides the substances used by him into seven groups, the first of which was composed of manures of various kinds, such as guano, superphosphates, farm-muck, &c, ; the second of neutral substances, as water, soot and sand ; the third of alkalies, as ammonia and soda ; the fourth of saline products, amongst which were the sulphates of iron, copper, zinc, potassium, ammonia and sea-salt ; the fifth of vegetable essences and products, as decoctions of hemp, datura, absinthe, valerian and tobacco ; the sixth of empyreumatic products ; and the

seventh of sulphur compounds. It was only with some of the substances contained in this last group that really satisfactory results were obtained, and it is to M. Dumas, the permanent secretary of the French Academy of Sciences, that the credit is due for suggesting the employment of the alkaline sulpho-carbonates of potassium and sodium and those of barium and calcium. All the other classes of remdies mentioned above were either without effect on the Phylloxera, or in destroying it, also destroyed or damaged the vine.

The sulpho-carbonates, which were carefully studied by the great Swedish chemist Berzelius, are obtained by combining the alkaline mono-sulphides, with the bi-sulphide of carbon, are either liquid or solid and emit a powerful odor of sulphuretted hydrogen and bi-sulphide of carbon.

The alkaline sulpho-carbonates in solid states are of a beautiful reddish color and deliquescent, but are not easily obtainable in that condition; the sulpho-carbonate of barium can be easily procured, however, in a solid state, and presents the appearance of a yellow powder, but little soluble in water. The sulpho-carbonates decompose under the influence of carbonic acid, forming a carbonate, and evolving sulphuretted hydrogen and bi-sulphide of carbon. These two latter substances are gradually liberated and, as they have a very powerful effect on the Phylloxera, one can understand that the sulpho-carbonate placed in the ground, may prove by its slow decomposition, a powerful insecticide. In the case of the sulpho-carbonate of potassium, over and above its toxic effect, it has a direct invigorating influence upon the vine, as the carbonate of potassium is an excellent manure.

The employment of the sulpho-carbonates as a means for the destruction of the Phylloxera, was suggested to M. Dumas, by the clearly recognized need that there was of some substance that would evaporate less quickly than the bi-sulphide of carbon; he saw that it was desirable to apply the insecticides in some combination which would fix them and only allow them to evaporate gradually, so that their action might continue long enough in any one place to infect with their vapors all the surrounding soil.

But the task of eradicating the Phylloxera has by no means been accomplished by the mere discovery of the value for the purpose of these substances; there is the further difficulty of applying them to

the vine in cultivation. One thing seems very certain, that in order to render the sulpho-carbonates practically efficacious in killing the insect, it is necessary to use water as the vehicle by which they may be brought to all the underground parts of the plant, and that the best time of the year for their application is the winter or early spring, when the earth is still moist and the quantity of water necessary to be brought on to the ground by artificial means is consequently less. Mixed with lime in the proportion of two to one, these sulpho-carbonates give a powder which can be spread over the ground before the heavy rains, that is, between October and March, and which will probably prove itself very efficacious.

The conclusion at which M. Mouillefert arrives at the end of his report is that the efficacy of the sulpho-carbonates is proved, and all that is necessary is to bring to perfection their employment in agriculture, whieh can only be accoinplished by the intelligence and practical knowledge of the vine grower who is well able to discover the economic processes of culture which are conducive to their successful application.

He ends by saying that "Science has accomplished its mission, and it remains for Agriculture to fulfil its part" in the eradication of the Phylloxera from the vineyards of France.—*Nature.*

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## FIELD RECORD.

**Hints on Hunting Catocala.**—My experience in this locality—N. W. Philadelphia—has been that *Catocala serena*, Edwards, *C. obscura*, Strecker, *C. flebilis*. Grote, *C. retecta* Grote, secrete themselves far better than any in the group except *C. antinympha*, and I do not doubt that the cause of these being marked rare in some localities is simply that they are not hunted for properly. When hunting for these I always arm myself with a stout switch or young sapling and then look for trees with very loose bark. After giving the tree an outward inspection and taking off anything I may see, I give it a beating, not a few light taps, but a good thrashing commencing at the bottom and working up and around; nearly always I start some of the above from under the bark. The shellbark Hickory tree, (*Carya alba*) is an exellent example, and on this tree I take *C. serena*, and on no other unless it has been disturbed, generally it will alight on the same

tree, but a little above the place from which it came out. As an instance of how difficult they are to be disturbed, I have whipped a tree as I supposed thoroughly, and upon leaving would give it two or three heavy blows as a parting salute, when to my surprise out would fly one or more of the above species; on several occasions I have had them drop at the base of the tree crushed.—J. S. J.

**Good Words.**—Mr. James H. Bell, in a communication to the *Canadian Entomologist*, says: "I think it would be beneficial if a portion of the journal-space were devoted each month to a notice of the localities, habitats, food and habits of some of our rarer species, the best methods and apparatus for their capture, and the most approved way of putting them to death without damage, as also of pinning, setting and preserving them. These matters may seem of but slight consequence to the practiced collector, but they assume an aspect of the greatest importance in the eyes of a beginner. In this connection, if entomologists would relate their experience in successfully collecting certain families of insects and describe any method, implement or apparatus which they have found advantageous, and at the same time record the date, time of day, locality and habitat of their captures, a judicious selection of the same would, I think, add much to the popularity, and not a little to the utility of the journal."

[As this expresses our ideas upon the subject, we gladly give it space, and invite the readers of *Field and Forest* in *all* branches of natural history to make use of our pages for the recording of any interesting notes of original research, observation, or experiment, as above, that may be gleaned in the various fields of study occupying their attention. Knowledge is the accumulation of little facts, and little facts or discoveries often lead to more important ones. Our "Field Record" was established for this purpose, and we only wish our many readers, who are also workers, would make use of it.—ED.]

**Note on the Green Snake.**—We have always understood that this quite common little snake would not feed in confinement, and such has been our experience heretofore, as well as the experience of a number of readers of this journal whose opinions we had asked. Last fall a fine specimen was brought to us alive, and was kept in a wardean case all Winter, refusing any food that was offered. With the advent of Spring, however, our attempts to feed the little creature were

rewarded with success, a repast of croton bugs, cockroackes, with large flesh flies for dessert, having temped his snakeship to break his long fast and show the manner in which he catches and devours his prey. Since then we have seen him feed a number of times.—C. R. D.

**Two Pupæ in One Cocoon.**—I found in opening some *cecropia* cocoons lately, *two* pupæ in one cocoon. These were of different sex, and in opposite position as regarded the loose end of cocoon; neither was perfectly formed, apparently owing to their being crowded out of shape in the limited space. The cocoon was one of the "loose" kind; both inner and outer cocoons and floss were uniform in texture, showing no line by which the work of two larvæ could be distinguished. There was, however, a rudimentary division on the inside of the inner cocoon at its close end, partly enclosing the abdominal end of the ♂ pupa.—C. E. WORTHINGTON, *in Canad. Entom.*

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## CORRESPONDENCE.

The following letter received through the Smithsonian Institution, we take pleasure in presenting to our readers entire: "A year or two ago I read some articles in *The Popular Science Monthly* upon 'singing mice' and the question was mooted, whether they sang when in their normal state of health. I had heard them sing, but had no experience as to what their condition was until the past six weeks. I now feel sure that it is not health that inspires their song, but rather a realization of the dying Swan.

This winter our whole place became infested with the common house-mouse *(Mus musculus,)* and after finding traps and springs of no avail to abate the nuisance we at last resorted to poison, using phosphorus paste for that purpose. For three or four days we considered even that a failure, as mousie seemed as active and ubiquitous as ever; but about the fourth or fifth night every wall in the house, up stairs and down, bed rooms, sitting rooms, dining room, library, parlor and halls were vocal with the sweetest twitterings. They commenced about eleven o'clock, and woke me from a sound sleep. I had a few days before received some new fish for an aquarium that sits in a room adjoining my bed room, and I thought I had fallen upon the wonder, a musical fish. But on rising and softly approaching the

aquarium, I found it was not there, and soon after detected the sound in the wall. By the time I returned to my own room I found there were serenaders there also; they continued to multiply until, as I have stated above, there was not a spot on the premises where their voice was not heard. Finally they sang all day, leaving their lurking places within the walls, and boldly—or stupidly—coming out on pantry, china closet, and library shelves and even upon the floor, singing away regardless of observation. Every morning the maid would find them on the carpet dead; sometimes one or two in each room, sometimes more, until finally the songs died out and the mice too. We have not seen a mouse nor heard so much as a nibble for three or four weeks, they seem to be entirely exterminated.

The volume and tone of their song seemed almost identical with that of a young canary, when first learning to sing, though now and then rising to fuller and more varied power.

Thinking, perhaps, these facts might be interesting to you I have presumed to send them."

*Houston, March 30.* MRS. M. J. YOUNG.

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Dear Sir:

The article in the April number of *Field and Forest* p. 173, headed "Hints upon Skeleton making," by M. E. B., reminds me of an experiment I saw printed some twenty years ago and which I tried; I herewith send it, as near as I can recollect. I think it was entitled, "To make skeletons of small fish or other small objects." It was suggested to take the object to be made a skeleton of, to a pond where there are plenty of tadpoles, suspend it with waxed thread in their midst, and, when the flesh commences to decompose, the tadpoles will thouroughly cleanse the skeleton of every particle of flesh and fibre. It can be then taken out by the threads, and be bleached.

I tried it with a small fish, suspending it by means of threads under the gills and tail to two sticks. In the course of four weeks, I had a beautiful skeleton hanging in the loops. Not being a student of osteology, however, I did not carry the experiment any farther, neither can I say whether the tadpoles ate the flesh, or wether it was cleansed by their swimming through the frame.

*Frankford, April 16, 1877.* J. S. JOHNSON.

# Field and Forest

A MONTHLY JOURNAL

*DEVOTED TO THE NATURAL SCIENCES.*

VOL. II.—JUNE, 1877.—No. 12.

## Insects in Colorado.

About a year ago we gave in this journal a short article on the "Comparative Scarcity of Insects in the Mountains of Colorado." Mr. Meehan, in the January number of *Popular Science Monthly*, writing on the fertilization of flowers by insect agency, quotes a portion of our remarks as bearing him out in a previous statement to that effect, which had been questioned. To a request from him for a list of insects found in the Rocky Mountains, a letter in reply, written by Mr. J. Duncan Putnam, is published in the March number of the same journal, which would go to prove that insects are *not* scarce in the locality in question.

It is not our purpose to discuss the question further, but, as Mr Putnam remarks that "the 'entomologists' of Mr. Meehan's party were certainly unfortunate in finding so few insects," to state in justice to the entomologists of the party that their work was confined to the month of August in a single year, while Mr. Putnam gives the experience of a whole season. We certainly used every endeavor to make collections, even to setting up lights in canned fruit boxes at night, to allure the noctural species, and with very slender returns for the effort; and, as for collecting by day, in the previous article I make the statement that "after a few hours collecting, it was not an easy matter to find anything strikingly different from the dozen or so *species* secured in the collecting box." Perhaps fifty specimens of a common butterfly would make a sufficient abundance for the fertilization

of flowers, but a collector on looking over his captures, is apt to regard *species* to a certain extent when speaking of *abundance*.

On looking over my notes on this trip (1871) I find the following: "I was much surprised at finding so few insects in the *mountain* regions, compared with other localities. Even the Colorado potato-bug, which is supposed to be at home, is less injuries than at the east. At many points I examined potato fields, and found only a few of the beetles. Occasionally the wild prickly *Solanum* is seen growing, as a weed, near cultivated potatoes, and in many cases the proportion of insects found on the wild plants are three to one. Every few years *Caloptenus spretus* swarms in untold numbers, devouring every green thing; but, aside from this, it seems vegetation is not seriously injured by insect depredations.

Some species of gall insects appeared to be particularly destructive. On some of the dwarf oaks, at low elevations, the galls were as plenty as the acorns, and not confined to one bush, but spread over a large space. On other varieties of trees, the entire foliage was curled and distorted by leaf-galls.

The lady-bugs, in infinite variety, were very abundant everywhere, aud many individuals of the commoner species of butterflies were plenty enough during the warm part of the day, but the night-flying moths were remarkably scarce, very few being attracted to our fires or lights."

From Mr. Mead's statements and the figures given, in the May number of the *Popular Science Monthly*, it would seem that in the early summer months the mountains of Colorado are a tolerably good collecting ground, but from *my own experience*, I am satisfied that I can collect in August a larger number of species of insects in various orders, in almost any of the eastern states, than in the Colorado Mountains during the same time.

CHARLES R. DODGE.

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**Strength of the Stag-beetle.**—I had a specimen of the Stag-beetle that lifted nearly three pounds in weight. A boy brought me one a short time since, in a tumbler, and I placed it in a strong card box, four inches square, so as to examine it next day. Before going to bed that night, I placed the box, with the beetle in it, on a glass case, and placed a large polished, outside slab of madrepore on the box containing the beetle. In the morning I found the box turned over, and the cover off the box, and the beetle walking round the floor.—J. R. S. in *Science Gossip*.

## Note on Indian Graves in Utah.

Since the article on an "Exploration of Indian Graves in Utah" appeared in the last number of your magazine I have stumbled across an earlier report of Capt. Simpson's exploration in that Territory, in which he alluded to the disposal of the dead and certain funeral ceremonies, and as this paper is almost unobtainable, and has a direct bearing on the subject, I feel tempted to annex it as a note to my article.

Extract from Capt. Simpson's *Report and map of wagon road routes in Utah Territory, Ex. Doc. No. 40, 35th Congress, 2nd Session.* "They, (the Gosh-Utes) as well as the Utes, frequently bury their dead in springs, by attaching a stone to them and sometimes by pushing and keeping them down by a stick. Mr. Bean accounts in this way for the skulls which are found in Skull Valley, and which has given it its name. It is somewhat difficult to credit this, but the guide, who bears the character of a reliable man by all who know him, and has never shown me that he is anything different, says he has actually seen several buried in this way near Provo, where he resides. Those they bury in this mode are not persons of any distinction. The chiefs they bury under a pile of stones. Wacca, sometimes called Walker, a renowned Ute, and chief of all the tribes called Utes, Pawans, Pieds, and Goshoots, died early in 1855, and was buried on a high mountain twelve miles south-east from Fillmore. Mr. Bean informs me that four Pied prisoners (three children and one squaw) were buried with him. Three of the prisoners were first killed and then thrown into the grave; the other was thrown in alive. Ten horses were also killed and thrown into the pile; also ten blankets and ten buckskins.

His people lamented over him some twenty days, all the while crying and singing. Mr. Bean was sent by the superintendent Governor Young, to comfort them and give them provisions. He represented that it was with the greatest difficulty they got the horses up the mountain."

The spelling of the names is given just as Capt. Simpson wrote them but at present there is a slight difference not enough however, to obscure the real meaning with the exception of the word "Pawans" which should be written Pah-vant.

H. C. Yarrow.

## Mrs. Maxwell's Colorado Museum.

### Catalogue of the Birds.

(*Continued from page 198 May number.*)

### Family ICTERIDÆ: American Starlings; Hang-nests.

98. Dolichonyx oryzivorus, (L.) Bobolink. a, ♂ ad.
99. Molothrus ater, (Bodd.) Cow Blackbird. a, ♂ ad.; b, ♀ ad.
100. Xanthocephalus icterocephalus, (Bonap.) Yellow-headed Blackbird. a, ♂ ad.; b, ♀ ad.; c, pullus.
101. Agelæus phœniceus, (Linn.) Red-and-buff-shouldered Blackbird. a, ♂ ad.; b, ♀ ad.
102. Sturnella neglecta, Aud. Western Meadow Lark. a, ♂ ad.; b, ♀ ad.
103. Icterus bullocki, Swains. Bullock's Oriole. a, ♂ ad.; b, ♀ ad.; c, juv.
104. Icterus baltimore, (Linn.) Baltimore Oriole. a, ♂ ad.
105. Scolecophagus cyanocephalus, (Wagl.) Brewer's Blackbird. a, ♂ ad.; b, ♀ ad.

### Family CORVIDÆ: Ravens, Crows and Jays.

106. Corvus corax, *β.* carnivorus, Bartram. American Raven. a, ad.; b, juv.
107. Corvus cryptoleucus, Couch. White-necked Raven. a, ad.; b, c, juv.
108. Corvus americanus, Aud. Common Crow. a, b, c. [Breeds in Colorado!]
109. Picicorvus columbianus, (Wils.) Clarke's Nutcracker. a, ♂ ad.; b, ♀ ad.
110. Gymnokitta cyanocephala, (Max.) Maximilian's Nutcracker. a, ♀ ad.
111. Pica rustica, *β.* hudsonica, Sabine. American Black-billed Magpie. a, ♂ ad.; b, ♀ ad.; c, juv.
112. Perisoreus canadensis, *β.* capitalis, Baird. White-headed Gray Jay. a, ♂ ad.; winter pl.; b, ♂ ad.; summer pl.; c, juv.
113. Cyanocitta macrolopha, Baird. Long-crested Jay. a, ♂ ad.; b, ♀ ad.; c, d, e, juv.
114. Aphelocoma woodhousii, (Baird.) Woodhouse's Jay. a, ad.

### Family ALAUDIDÆ: Larks.

115. Eremophila alpestris, (Forst.) Shore-Lark. a, b, adults.
116. Eremophila alpestris, *γ.* leucolæma, Coues. White-throated Shore Lark. a, b, c, adults.; d, ♀ ad.; e, juv.

### Family TYRANNIDÆ: Tyrant Flycatchers.

117. Tyrannus carolinensis, (Linn.) Eastern Kingbird. a, ♂ ad.; b, ♀ ad.
118. Tyrannus verticalis, Say. Western Kingbird. a, ♂ ad.; b, ♀ ad.
119. Tyrannus vociferans, Swains. Cassin's Kingbird. a, ♂ ad.
120. Contopus borealis, (Swains.) Olive sided Flycatcher. a, ♂ ad.; b, ♀ ad.
121. Contopus richardsoni, (Swains.) Richardson's Pewee. a, ♂ ad.; b, ♀ ad.
122. Sayornis sayus, Bonap. Say's Pewee. ♂ a, ad.
123. Empidonax pusillus, (Swains.) Little Flycatcher; Traill's Flycatcher. a, ♂ ad.; b, ♀ ad.; c, juv.
124. Empidonax difficilis, Baird. Western Flycatcher. a, ♂ ad.. b, ♀ ad.
125. Empidonax obscurus, (Swains.) Wright's Flycatcher. a, ♂ ad.
126. Empidonax hammondi, Xantus. Hammond's Flycatcher. a, ♀ ad.
127. Empidonax minimus, Baird. Least Flycatcher.

## Family CAPRIMULGIDÆ: Night-jars.

128. Antrostomus nuttalli, (Aud.) Poorwill. a, ♂ ad.; b, ♀ ad.
129. Chordeiles popetue, *β.* henryi, Cass. Western Night Hawk. a, ♂ ad.; b, ♀ ad.; c, d, juv.

## Family TROCHILIDÆ: Humming Birds.

130. Selasphorus platycercus, (Swains.) Broad-tailed Hummer. a, ♂ ad.: b, ♀ ad.; c, ♂ ad. With nest and two young.
131. Selasphorus rufus, (Gmel.) Rufous-backed Hummer.

## Family CUCULIDÆ: Cuckoos.

132. Coccyzus americanus, (Linn.) Yellow-billed Cuckoo. a, ♂ ad.; b, ♀ ad.
133. Geococcyx californianus, (Less.) Chaparral Cock; Road-runner. a, ♀ ad.

## Family PICIDÆ: Woodpeckers.

134. Picus harrisi, Aud. Harris's Woodpecker. a, ♂ ad.; b, ♀ ad.
135. Picus gairdneri, Aud. Gairdner's Woodpecker. a, ♂ ad.; b, ♀ ad.
136. Picoides americanus, *β.* dorsalis, Baird. White-backed Three-toed Woodpecker. a, ♂ ad.; b, ♀ ad.
137. Sphyrapicus varius. (Linn.) Red-throated Woodpecker. a, ♂ ad.
138. Sphyrapicus nuchalis, Baird. Red-naped Woodpecker. a, ♂ ad.; b, ♀ juv.
139. Sphyrapicus thyroideus, (Cass.) Black-breasted Woodpecker. a, ♂ ad.; b, ♀ ad.; c, ♂ juv.; d, ♀ juv.
140. Centurus carolinus, (L.) Red-bellied Woodpecker. a, ♂ ad.; b, ♀ ad.
141. Melanerpes erythrocephalus, (Linn.) Red-headed Woodpecker. a, ♂ ad.; b, ♀ ad.
142. Melanerpes torquatus, (Wils.) Lewis's Woodpecker. a, ♂ ad.; b, ♀ ad.
143. Colaptes mexicanus, Swains. Red-shafted Flicker. a, ♂ ad.; b, ♀ ad.; c,
144. Colaptes "hybridus," Baird. "Hybrid Flicker." a, ♂ ad.; b, ♀ juv.

## Family ALCEDINIDÆ: Kingfishers.

145. Ceryle alcyon, (Linn.) Belted Kingfisher. a, ♂ ad.; b, ♀ juv.

## Family COLUMBIDÆ: Pigeons or Doves.

146. Columba fasciata, Say. Band-tailed Pigeon. a, ♂ ad.
147. Zenædura carolinensis, (Linn.) Mourning Dove. a, ♂ ad.

## Family TETRAONIDÆ: Grouse.

148. Centrocercus urophasianus, (Bonap.) Sage Hen. a, ♂ ad.; b, ♀ ad.
149. Pediœcetes columbianus, (Ord.) Sharp-tailed Grouse. a, ♂ ad.; b, ♀ ad.
150. Canace obscura, (Say.) Dusky Grouse. a, ♂ ad.; b, ♀ ad., and nine chicks.
151. Lagopus leucurus, Swains. White-tailed Ptarmigan. a, d, adult, winter pl.; b, ♂ adult, summer pl.; c, ♀ ad.; summer pl.; and 3 chicks.

## Family STRIGIDÆ: Owls.

152. Bubo virginianus, *β.* subarcticus, Hoy. Western Great Horned Owl. a, b, adults.

153. Otus brachyotus (Gmel.) Short-eared Owl. a, adult. [Apparently the typical form, and evidently different from the usual American style.]
154. Otus brachyotus, β. cassini, Brewer. American Short-eared Owl. a, b, adults.
155. Otus wilsonianus, Less. American Long-eared Owl. a, b, adults; c, d, pullus.
156. Scops asio, ε. maxwelliæ, Ridgway. Mrs. Maxwell's Owl. a, ♂ ad.; b, ♀ ad.; c, d, pullus. [See description at end of catalogue.]
157. Scops flammeola, (Licht.) Flammulated Owl. a, adult. [Boulder, Col., March. *Iris umber brown!*]
158. Nyctale acadica, (Gm.) Saw-whet Owl. a, adult; b, c, juv.
159. Glaucidium gnoma, (Wagl.) Pigmy Owl. a, ♂ ad.; b, ♀ ad.
160. Speotyto cunicularia, γ. hypogæa, (Bonap.) North American Burrowing Owl. a, ♂ ad.; b, ♀ ad.; c, d, pullus.

## Famliy FALCONIDÆ: Falcons, Kites, Hawks and Eagles.

161. Falco saker, γ. polyagrus, Cass. Prairie Falcon. a, "♀" ad.; b, "♂" juv. (2nd yr.); c, "♀" juv. (2nd yr.)
162. Falco richardsoni, Ridgway. Richardson's Merlin. a, ♀ (? ad.)
163. Falco sparverius, Linn. American Kestril. a, ♂ ad.; b, ♀ juv.
164. Pandion haliætus, β. carolinensis, (Gm.) American Osprey. a, b, juv.
165. Circus hudsonius, (Linn.) Marsh Hawk. a, ♂ ad.; b, ♀ juv.
166. Nisus cooperi, (Bonap.) Cooper's Hawk. a, ♂ juv.; b, ♀ juv.
167. Nisus fuscus, (Gm.) Sharp Shinned Hawk. a, ♂ juv.; b, ♀ juv.
168. Astur atricapillus, (Wils.) American Gos-hawk. a, ♂ ad.; b, ♀ ad.; c, juv.; d, e, pullus.
169. Buteo borealis, β. calurus, Cass. Western Red-tailed Buzzard. a, b, ad.; c, d, juv.
170. Buteo swainsoni, Bonap. Swainson's Buzzard. a, ♂ ad.; b, ♀ ad.; c, ♀ juv.
171. Archibuteo lagopus, β. sancti-johannis, (Gmel.) American Rough-legged Buzzard. a, ad.; b, c, juv.
172. Archibuteo ferrugineus, (Licht.) Ferruginous Rough-legged Buzzard; "California Squirrel Hawk." a, ♂ ad.; *melanistic* [see description, on page 212.]; b, ♀ ad.; c, d, pullus.
173. Aquila chrysætos, β. canadensis, (Linn.) American Golden Eagle. a, ad.; b, juv., in 2nd or 3rd year; c, juv. in 1st year.
174. Haliætus leucocephalus, (Linn.) Bald Eagle. a, ad.

## Family CATHARTIDÆ: American Vultures.

175. Rhinogryphus aura, (Linn.) Turkey Vulture. a. ad.

## Family LARIDÆ: Jaegers, Gulls, and Terns.

176. Stercorarius parasiticus, (Brunn.) Parasitic Jaeger. a, juv. [Boulder; December.]
177. Rissa tridactyla, (Linn.) Kittiwake Gull., winter pl. [Boulder; December.]
178. Xema sabinii, (Prev. et Des Murs.) Sabine's Gull. a, juv. [Boulder; December.]
179. Chrœcocephalus philadelphia, (Ord.) Bonaparte's Gull. a, juv., transition pl.
180. Larus delawarensis, (Ord.) Ring billed Gull. a, adult; b, juv., transition pl.; c, juv., first yr.

## Family CHARADRIIDÆ: Plovers.

181. Squatarola helvetica, (Linn.) Black-bellied Plover, a, juv.
182. Ægialitis montanus, (Towns.) Mountain Plover. a, ♂ ad.; b, ♀; c, pullus.
183. Ægialitis vociferus, (Linn.) Killdeer Plover. a, b, adult; c, d, pullus.

## Family RECURVIROSTRIDÆ: Avocets and Stilts.

184. Recurvirostra americana, Gmel. American Avocet. a, adult.
185. Himantopus mexicanus, (Muller.) American Stilt.

## Family PHALAROPODIDÆ: Phalaropes.

186. Steganopus wilsoni, (Sabine.) Wilson's Phalarope. a, ♀ ad.

## Family ARDEIDÆ: Herons.

187. Ardea herodias, Linn. Great Blue Heron. a, ♀ ad.; b, juv.
188. Garzetta candidissima, (Jacq.) Snowy Heron. a, ad., breeding plumage.
189. Nycherodias violaceus, (Linn.) Yellow-crowned Night Heron. a, ad., breeding plumage.
190. Botaurus minor, (Gmel.) American Bittern. a, b, adults; c, juv.

## Family TANTALIDÆ: Ibises.

191. Tantalus loculator, Linn. Wood Ibis. a, juv.
192. Falcinellus guarauna, (Linn.) Bronzed Ibis. a, juv.

## Family SCOLOPACIDÆ: Snipe, Sandpipers, etc.

193. Macrorhamphus griseus, (Gmel.) Red-breasted Snipe. a, b, adult, summer pl.
194. Tringa alpina, *β.* americana, Cassin. American Dunlin. a, adult, winter plumage.
195. Tringa maculata, Vieill. Pectoral Sandpiper. a, adult.
196. Tringa bairdi, Coues. Baird's Sandpiper. a, juv.
197. Tringa minutilla, Vieill. Least Sandpiper. a, juv.
198. Ereunetes pusillus, (Linn.) Semipalmated Sandpiper. a, juv.
199. Totanus melanoleucus, Gmel. Greater Tell-tale. a, adult.
200. Totanus flavipes, Gmel. Yellow-legs. a, juv.
201. Totanus solitarius, Wils. Solitary Sandpiper.
202. Tringoides macularius, (Linn.) Spotted Sandpiper. a, b, ad.; c, d, juv.
203. Actiturus bartramius, (Wils.) Bartram's Tattler. a, ♂ ad.; b, ♀ ad.
204. Numenius longirostris, Wils. Long-billed Curlew. a, ♂ ad.

## Family RALLIDÆ: Rails, Gallinules, and Coots.

205. Rallus virginianus, Linn. Virginia Rail. a, ♂ ad.
206. Porzana carolina, (Linn.) Sora Rail. a, ad.
207. Fulica americana, Gmel. American Coot. a, ad.; b, c, pullus.

## Family ANATIDÆ: Swans, Geese and Ducks.

208. Cygnus americanus, Sharpless. Whistler Swan. a, b, adults.
209. Branta canadensis, (Linn.) Canada Goose. a, b, adults.
210. Anser gambeli, Hartl. White-fronted Goose. a, adult.
211. Anser albatus, Cassin. Lesser Snow Goose. a, b, adults.
212. Anas boschas, Linn. Mallard. a, ♂ ad.; b, ♀ ad.; c, d, e, pullus.
213. Chaulelasmus streperus, (Linn.) Gadwall. a, ♂ ad.

214. Mareca americana, (Gmel.) Baldpate. a, b, ♂ adult.
215. Querquedula discors, (Linn.) Blue-wing Teal. a, b, ♂ ad.; c, ♀ ad.
216. Nettion carolinensis, (Gmel.) Green-wing Teal. a, b, ♂ ad.; c, ♀ ad.
217. Dafila acuta, (Linn.) Pin-tail. a, ♂ ad.; b, ♀ ad.
218. Spatula clypeata, (Linn.) Shoveller. a, b, ♂ ad.; c, ♀ ad.
219. Aythya americana, Eyton. Red-head. a, ♂ ad.
220. Aythya vallisneria, (Wils.) Canvas-back. a, ♂ ad.
221. Bucephala clangula, β. americana, Bonap. American Golden-eye. a, ♂ ad.
222. Bucephala albeola, (Linn.) Butter-ball. a, ♀ ad.; b, ♂ ad.
223. Fulix affinis, Eyton. Lesser Black-head. a, ♀ ad.; b, ♂ ad.
224. Fulix collaris, (Donov.) Ring-bill. a, ♀ ad.
225. Œdemia americana, Swains. American Black Scoter. a, ♂ ad.; [*Perfect adult plumage!*]
226. Erismatura rubida, (Wils.) Ruddy Duck. a, ♂ ad.
227. Mergus merganser, β. americanus Cass. American Buff-breasted Sheldrake. a, ♂ ad.
228. Mergus serrator, Linn. Red-breasted Sheldrake. a, ♂ juv.; trasition pl.
229. Lophodytes cucullatus (Linn.) Hooded Sheldrake. a, ♂ ad.; b, ♀ ad.

## Family PELECANIDÆ: Pelicans.

230. Pelecanus erythrorhynchus, Gmel. American White Pelican. a, juv.

## Family GRACULIDÆ: Cormorants.

231. Graculus dilophus, (Swains.) Double-crested Cormorant. a, juv.

## Family COLYMBIDÆ: Loons.

232. Colymbus torquatus, Brunn. Great Northern Diver. a, juv.

## Family PODICIPITIDÆ: Grebes.

233. Podiceps auritus, β. californicus, Lawr. California Grebe. a, ad.; b, juv.
234. Podilymbus podiceps, (Linn.) Thick-billed Grebe. a, ad.; b, ♀ ad.; c, d, e, pullus.

## NOTES.

ARCHIBUTEO FERRUGINEUS, (Licht.)—The collection contains a melanistic specimen of this species, which is a fact of very great interest, since this condition is very rarely assumed by the species; indeed, this example is the first I have ever seen, although very numerous specimens in normal plumage have been examined by me. The following is a description of this remarkable specimen:

General color very dark chocolate-brown, nearly uniform above, where faintly relieved by rufous spots, these most conspicuous on the inner lesser wing-coverts; occipital feathers snow-white at the base, those of the nape conspicuously edged with ferruginous; upper tail-coverts irregularly spotted with white and pale rufous; secondaries

crossed by wide but indistinct bands of silvery plumbeous; outer webs of primaries bright silvery-gray, more obscure on the inner quills. Tail, pearl-gray, (the middle portion of each feather whitish, the inner webs chiefly white,) finely sprinkled at the end and toward base with darker gray; the shafts pure white for their whole length. Entire head, throat, jugulum and breast quite uniform dark chocolate-brown, or soot-color, the feathers white at extreme bases; whole abdomen, sides and lining of wings ferruginous-rufous, with shaft-streaks and variously formed spots and bars of dusky; flank-plumes similar, but with the dusky markings prevailing; tibiæ dusky, the longer plumes variegated with ferruginous; tarsal feathers uniform dusky; lower tail-coverts with exposed ends pale ferruginous, the concealed portion whitish. Whole under surface of primaries anterior to the emarginations, pure white, *immaculate;* under surface of tail also uniform white. Wing, 18.80; tail, 10.50; culmen, 1.10; tarsus, 3.25; middle toe, 1.50.

In general aspect, this specimen bears a close resemblance to the rufous-chested examples of melanistic *Buteo borealis (β. calurus,)* the tail being the only very obvious difference so far as colors are concerned, though close inspection soon reveals other marked discrepancies, most important of which are the bright silver-gray of the outer surface and the immaculate snow-white of the under surface of the primaries. There is little resemblance to the melanistic examples of *A. lagopus (β. sancti-johannis,)* the general color being much too rufous, while the tail is conspicuously different. The great breadth of the gape and other peculiarities of structure only recognizable in *A. ferrugineus*, also immediately refer this specimen to that species.

Scops asio, ε. maxwelliæ, Ridgway, MSS.—Mrs. Maxwell's collection contains a number of specimens of what is evidently a local form of the common North American *Scops asio*, representing the opposite extreme from var. *β. kennicotti*, * and quite as strongly marked as that form. These specimens and others that I have since seen, all agree in possessing with unusual uniformity the distinctive characters

* Naming the several marked geographical races of this species in the order of their date of publication, they may be arranged in the following sequence: *a. asio* (*Strix asio*, Linn., S. N., 1758, 92,) *β kennicotti* (*Scops kennicotti*, Elliot, Pr. Phila. Acad. 1867, 69;) *γ. floridanus* (*Scops asio*, var. *floridanus*, Ridgway Bull. Essex Inst. & Dec. 1873, 200;) *γ enano* (*Scops asio*, var. *enano* Lawr., Bull. Essex Inst., Dec. 1873, 200, and ε. *maxwelliæ*, nobis.

of the race, there being apparently much less of individual variation than in other forms of the species. This new race is a mountain bird, and possesses the distinctive features of alpine or boreal races in general, the size being larger and the colors very much paler than in the low-land races, even from much higher latitudes. In the colors, there is in all specimens an entire absence or but faint indication of any rufous tints, while the rufous phase of other forms is never assumed, as indeed, curiously enough, seems to be the case with the species throughout the western half of the continent, even where (as in California) the gray birds cannot be distinguished from individuals in corresponding plumage from the Atlantic States.

From its allies, *Scops maxwelliæ*, may be distinguished as follows:—Ch.—Ground-color above pale gray or grayish brown, relieved by the usual ragged mesial streaks of black, and irregular mottlings or vermiculations of lighter and darker shades; the ground-color, however, never inclining strongly to reddish, and no darker in shade than a *very light* ash-gray or brown. The white spots on the outer webs of the primaries frequently confluent along the edge of the feathers, the darker spots being in extreme cases hardly visible on the basal portion of the quills when the wing is closed. Face grayish white, with faint vermiculations of darker grayish. No rusty gular collar, but in its stead, sparse, narrow bars of brown or rusty, on a white ground. Lower parts with white very largely predominating. Wing, 6.80–6.90; tail, 3.90–4.10; culmen, .60; tarsus, 1.45–1.50; middle toe, .80–.85. * Hab.–Mountains of Colorado (Mus. Mrs. Maxwell; also collection of R. Ridgway.) I name this new form in honor of Mrs. M. A. Maxwell, not only as a compliment to an accomplished and amiable lady, but also as a deserved tribute to her high attainments in the study of natural history.

ROBERT RIDGWAY.

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* Before me are three specimens of the typical form (*a. asio*) in gray plumage which are so much alike that if the labels were removed they could scarcely be distinguished. Two of these, a pair, are from the coast of California; the other, an adult ♀, is from Virginia. Their measurements compare as follows:

| | | | |
|---|---|---|---|
| ♀ | Fairfax Co., Va. | 6.50. | 3.70. |
| ♂ | Nicasio, Cal. | 6.30. | 3.50. |
| ♀ | " " | 6.60. | 3.65. |

## FIELD RECORD.

**Blue-birds Besieged by Martins.**—It is a fact well known to every observing person whose privilege it is to reside in the country, that a martin-box is a hereditary establishment. These birds consider their right to their home as valid as that of the landed proprietor.

At one time very few old Maryland homesteads were without several martin-boxes—in fact it was considered an act of humanity to place one near a farm yard, as the birds feed upon the larvæ of the flies, and thus save the dumb beasts much suffering. It was to gain possession of one of these hereditary homes that gave rise to the following amusing circumstance. The blue birds came very early in the season and took possession of a martin-box—fixed up the nests, laid their eggs, and some of them were incubating when the martins arrived. Considerable excitement was evinced by both parties; they held a long parley, when war was declared, and a terrible fight ensued, in which the blue-birds were victorious. It was hard to tell which were the loudest, both parties are noisy at the best of times, but upon this occasion the clatter was so great and so long continued that it drew attention.

After the defeat the martins drew off to an adjacent tree and held a council. They then made another attack upon the blue-birds, and had a desperate fight, but were again repulsed. After a short rest they collected their scattered forces, surrounded the box and went to work in good earnest. This was a fearful head to head fight, followed by a total defeat to the martins. Feathers floated about in profusion, and not a few martins had bald scalps and scratched eyes. A long parley now took place, and there was a truce for two days, during which time perfect silence prevailed, though the martins in small detached companies were going to and fro. Such sudden and continued quiet after so much noise and fighting, coupled with strange movements on the part of the martins, aroused curiosity and led to investigation. The mystery was soon unraveled, they had effectually besieged the blue-birds. Every hole in the box was filled up and covered with mud as tightly and smoothly as if it had been done with a plasterer's trowel. As soon as the mud was cleared away, the poor half starved blue-birds evacuated and never returned. The martins moved in at once and proclaimed themselves lords of the manor.

This was carried on with all the strategy that one might expect to be exhibited by creatures possessing a higher brain power. In the last battle the martins gave no quarter; but instinct or something more than instinct gave them to understand that the box served the bluebirds as a sort of fortress, and therefore it was impossible to make them surrender except by resorting to stratagem.—M. E. B.

[This seems to be a not uncommon habit of martins when they consider their rights are being infringed upon by other birds, as there are many incidents on record of precisely the same action as described by our correspodent. At present, however, we can only refer to a case related in the habits of the house-martin, in Wood's Natural History.—Ed.]

**Concussion Theory.**—Mr. Hardee, of Florida, in a recent number of this journal stated that he believed that one hundred pounds of gunpowder exploded four feet under ground would destroy the eggs of the grasshopper for a distance of twelve miles in every direction from the point of explosion. Some of the gentlemen of this locality seeing the article referred to, concluded to test the theory. They placed a twenty-five pound keg of gunpowder four feet under ground and packed the earth thoroughly around it, and on the top of the ground above the blast they placed a large water-wheel, weighing about one thousand pounds, so as to confine the force of the powder as much as possible. I am happy to state that the experiment was eminently successful. The powder was exploded. The water-wheel was hurled one hnndred feet into the air, and the concussion resulting from the striking of the wheel against the ground killed all the grasshoppers' eggs that it struck when it fell. I did not notice that the eggs were affected anywhere else, as they are hatching in immense numbers within fifty feet of the place of explosion; but it is positively certain that those where the wheel *lit* were badly demoralized. I notice also that Mr. Hardee has his plan before the Senate Committee of Agriculture. I would suggest to that committee, that if in connection with this gunpowder theory the government would furnish water-wheels enough the grasshopper question might be permanently settled. The only trouble would be that the plan might be considered slightly expensive.—Geo. Welles, *in Nebraska Farmer.*

**Singular "Insect Injury."**—We recently received a singular specimen of insect injury in the shape of a "minnie" ball which had been gnawed through by a wood boring larva. The ball had been fired into a red oak tree, probably during war, and when split out of the log, a few days ago, was found in the track of a full grown larva—probably of an *Orthosoma*—the burrow leading directly through the bullet. This the grub had evidently struck at its concave end, boring two-thirds its length and coming out at one side somewhat below the apex. The larva was found in the burrow, alive, only a short distance above the bullet, the latter nearly retaining its normal shape, the end only having been slightly flattened. The specimen was found by Dr. W. O. Eversfield, near the Agricultural College, Maryland, and both bullet and larva preserved together.—CHAS. R. DODGE.

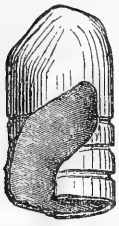

Fig. 5.

I have just received from Prof. E. D. Cope intelligence of the capture of the second specimen of *Dromicus flavilatus* Cope, in the United States, the particular locality being near Lake George, Florida; the first having been discovered by the writer near Fort Macon, N. C., in 1871. Prof. Cope in his original paper describing the specimen states as follows: "This species is of especial interest as the first representative of a West Indian and Mexican genus found in the Nearctic Region. No species of *Dromicus* has been known in North America, and the occurrence of this one on the extreme coast, and its very close affininity to a species (*D. callilæmus* Gosse) common in Jamaica, are circumstances suggestive of origin by carriage in floating drift-wood in the gulf stream."—H. C. YARROW.

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## GLEANINGS IN FOREIGN FIELDS.

**Commensalism among Catapillars.**—In a recent number of *Nature* there is a communication on an interesting case of commensalism, from Fritz Muller, Itajahy, Brazil, accompanied by an illustration of a large spiney caterpiller upon a leaf, having a smaller caterpillar upon it. He says; "The larger caterpillar, protected by long

branchy stinging-hairs, or thorns, lives on mulberry and other trees. Like other caterpillars protected from ememies by odor, stinging-hairs, or otherwise, it sits upon the upperside of the leaves; it is light-colored, the head red, the hairs white. Across its back, between its thorns, there sits a small blackish caterpillar, protecting itself by the thorns of the large companion. I took off the small caterpillar from the large one, but it soon occupied the same place. In order to take a photograph of it the larger caterpillar was anæsthetised with ether; it recovered again somewhat but after two days it died. The smaller caterpillar has now left its place, and taken refuge on another caterpillar in the same box; on this it sits, somewhat further forward, on the base of the abdomen. In its former host, the place where the smaller caterpillar sat looks pale, as if it had been scoured. The small caterpillar from above eats holes in the leaf on which the larger one is sitting. As far as I know, no similar case has hitherto "been observed."

**Ingenious microscopic adjustment.**—M. Govi in a paper read before the French Academy, February 19th, 1877, describes a very ingenious method of altering the focus of a microscope by interposing between the object and objective a transparent tank that admits of being filled to varying depths with a liquid more refractive than air. By this means a stage micrometer may be used for the measurement of objects without risk of errors arising from imperfect collimation of the various parts of the microscope. It is evident however, that is can only be used with low powers.

**Intelligence of Ants.**—The same journal notices a paper lately read by Sir John Lubbock before the Linnaen Society, in which it is stated that the researches of this gentleman do not lead him to think so highly of the intellegence of ants. He states that they had not sense enough to drop from a height of only three-tenths of an inch from the ground, but went a long way round, owing to their want of power of calculating distance. In other respects, however they are intellegent enough, thus they soon recognize their friends, even after a year's separation. Slavery in certain genera is a regular institution. The Amazon ants *(Polyergus rufescens)* absolutely require a slave to clean, dress and feed them! Repeated experiments prove that they will rather die then help themselves.

## CORRESPONDENCE.

EDITOR FIELD AND FOREST:

In your April issue we "*note*" that a Mr. Ragsdale of Gainesville, Texas, is inclined to doubt the truth of our statement (in February number of your journal) regarding the occurrence of *Archibuteo lagopus* in numbers in the Indian Territory. We did not intend that our observations, made during a hurried passage, and over a narrow belt of country, should apply to any other locality, or season, than the time and place at which we took our notes. A person might even have a different experience on the same route, another year; at the same time, that would not neccessarily imply that our observations were incorrect. What we said about this hawk can be corroborated by intelligent and reliable gentlemen that were of the party.

We did not mean the "nation" at large, but that portion through which we passed, viz. along the M. K. and T. R. R. From the Neosho valley * to the southward of San Bois Mountains, this hawk *was* very common, We were unfortunate enough to cross the line in the night, and cannot with certainty say that they were found *quite* to the Texan border, but we *did* meet them as far south as Brazoria Co., Texas, at Austin, and Hempstead; at the latter point they were far from rare, and we can furnish Mr. Ragsdale with proof of our assertions, from prominent Texan gentlemen. Mr. Ragsdale has not found this hawk common at Gainesville, Texas, which place is only seven miles from the line, and from this fact infers that our statements were wild.

We are not acquainted with the region in which Mr. R. resides, but it is more than probable that the locality is not such as this hawk frequents; as a natural consequence few would be found.

We might take for example *Graculus dilophus*, which is very common every spring at Lake Koshkonong, Wis., so much so that we have killed six at a single discharge; at the same time at Racine, fifty miles east, Dr. Hoy has not met a single specimen during a residence of over thirty years in that vicinity. *Ægialitis meloda* is a common bird along Lake Michigan, and breeds as far south as Waukegan, Illinois. At Madison, Wisconsin, it is rare and migratory.

* Prof. Snow gives *A. lagopus*, as abundant in Kansas in winter.

Or, take the instance of a person living in the heavy timber of Wisconsin, he would hardly ever see *Plectrophanes nivalis*, or *lapponicus*, still they may be found any day in winter, not twenty-five miles away, if the locality be suitable.

Regarding *Elanoides forficatus*, and *Ictinta mississippiensis*, we agree with Mr. Ragsdale that the occurrence of those birds in Texas in December, (7th) was rather out of season. We would also add *D. maculosa*. In our opinion these, as well as others, *were migrating* and would probably have gone much further south. However, at that time, they had any abundance of food and the weather was warm, so we see no reason why they should hurry their migrations.

We have often noticed parallel instances in Wisconsin. *Gallinago wilsoni* is sometimes found every month in the year. *D. coronata* will linger until driven southward by snow falls, or severe cold. Many of our Hawks will remain so long as they are able to secure a supply of food. The same with many other kinds; the main body will migrate at the usual season, but there will often be individuals that will lag behind as long as possible.

*University of Wisconsin,* LUDWIG KUMLEIN.
*Madison, Wis., April 29, 1877.*

DEAR SIR:

In an article entitled "Earthworms on the Pavements," published in the late issue of *Field and Forest*, is found a statement to the effect that while the earthworms were found in large numbers on the brick pavements and stone flagging after the heavy rain of the morning of March 15; "singularly enough none were to be found on the asphalt pavements of the streets or even on the walks of that material passing through the parks," and the writer suggests the probable reason for it. I remember perfectly having noticed on that morning large numbers on the asphalt walks of the Executive grounds, and of discussing with a friend accompanying me the cause of their presence there. On the same morning the asphalt roads and walks through the grounds of the Department of Agriculture were so completely covered with the worms that one could scarcely place his foot on the pavement without crushing some of them. On several other occasions since then I have noticed them on the walks, and more especially since reading the article on the subject.—WM. MCMURTRIE.

VOL. II. NO. 1.

JULY, 1876

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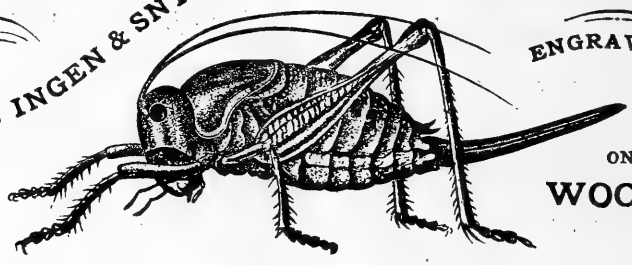

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VOL. II. NO. 2.

AUGUST, 1876.

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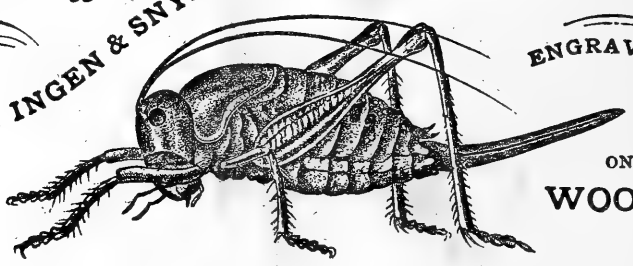

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VOL. II. NO. 3.

SEPTEMBER, 1876.

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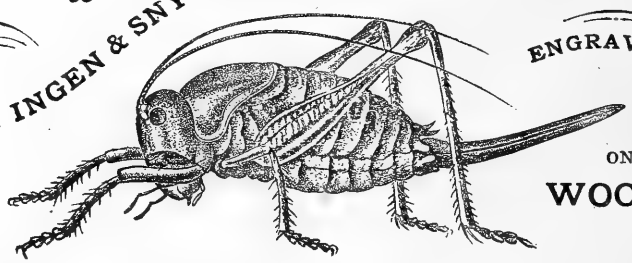

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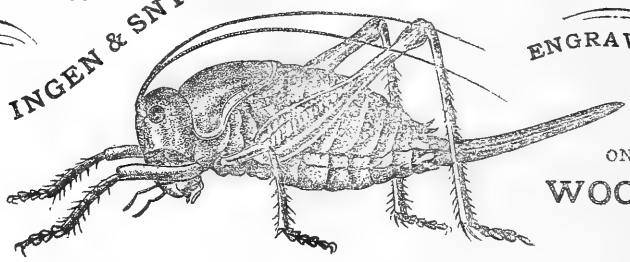

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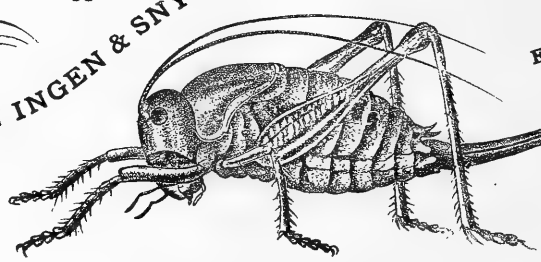

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CHARLES R. DODGE, Editor.

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We think the field is new, and can be made a useful one, and that our little journal—with the hearty co-operation of all who are interested in the objects for which it was established—may prove a complete success.

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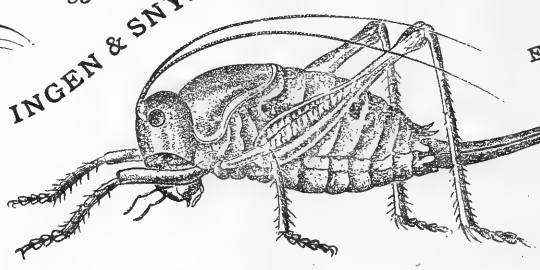

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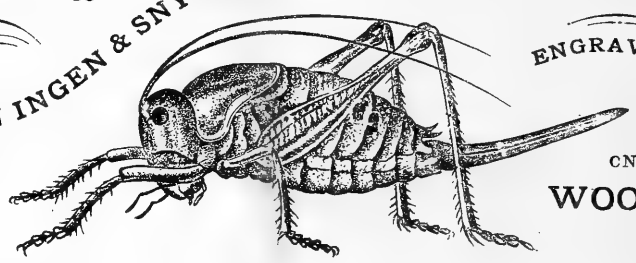

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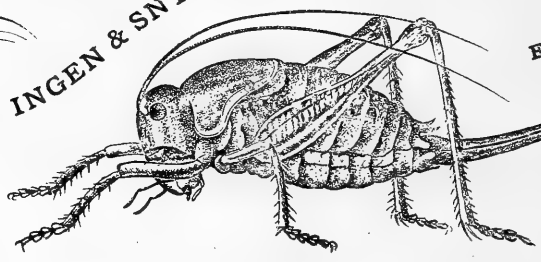

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