account of plants introduced from camp fodder. There are lists of additional plants, of Lepidoptera, and of nesting birds, with locality and date of each observation. A golden oriole and a waxwing are among the birds observed. Among papers read at the meetings (which, by the way, are held on Sundays), those by R. F. Lowndes on trout and by J. Comber on ditch plants bear witness to much first-hand knowledge, and are rightly printed at greater length than the others. Although the war has introduced many competing claims on the energy of the school, the membership of this society has not diminished, and all, from its president down to the smallest junior, are to be congratulated on the excellent report that their united efforts have produced. We hope that in this time of stress other schools will do as well in natural history as does this home of the ancient learning.

The Transactions of the Hertfordshire Natural History Society for 1917 contain much interesting matter. Dr. A. H. Foster, a very sound ornithologist, contributes a list of the birds of North Herts; he gives records of 200 species, and, though stray wanderers are included, the list is a remarkable one. Though the county is becoming dotted with small towns and large villages, the birds, being very conservative, still keep to their old haunts and their old lines of migration. Besides this there are a fair number of good observers, so that few rarities pass unnoticed. Among nesting species may be noted especially the grasshopper warbler (scarce and local), the stone curlew, the woodcock, and the quail. Among occasional birds of passage is the common tern. A regular winter visitor is the golden plover; in the south of the county these birds frequently don the black breast before starting for the north. Surely, then, Dr. Foster must be wrong when he says they never do so in the district of which he writes. He has as yet no record of the breeding of the redshank, which nests regularly in Essex, and shows signs of extending its range over the border into Herts. For the common snipe the record is "a few nesting pairs in summer and many individuals in winter." Do these winter and summer birds belong to different sets which keep apart? A paper on "The Response of Plants to Selective Screening," by Col. Rawson, records some valuable experiments that show that variations may be induced in some plants by screening them from the sun when it is at certain altitudes. There is also an interesting paper on Rotifers by T. E. Lones, and a list of the Macro-Lepidoptera of North Herts by Dr. Foster.

The *Vasculum* is an illustrated quarterly magazine devoted to the natural history of Northumberland and Durham, and from the three parts of the current third volume before us it may be seen that it is fulfilling a useful function. The general editor is the Rev. J. E. Hull, whose speciality is the Arachnida, but who also contributes chatty papers on place-names. The other editors are Mr. George Bolam, the author of "Birds of Northumberland and the Eastern Borders," who writes on the coming and going of the birds of the Upper Tyne Valley; Mr. R. S. Bagnall, who records discoveries of spring-tails and their allies new to science and new to the district; and Dr. J. W. H. Harrison, whose recent work in hybridisation has brought him into prominence, who displays in the magazine a wide knowledge of animals and plants and their associations. Other field naturalists of the counties concerned contribute articles, and we note that they represent the other natural history activities of the district—the Natural History Society of Newcastle and Armstrong College. The magazine brings scattered workers in country districts into intimate association, new discoveries are made known, the older workers are stimulated to fresh endeavours, and those who have received the call of natural history are encouraged and guided as to literature and methods. The work of the Northumberland and Durham naturalists is providing material for the presentation of the district from an ecological point of view, and the gathering of the material is fostered by the *Vasculum*.

The Proceedings and Transactions of the Croydon Natural History and Scientific Society for 1916 contain a good deal of detailed information in regard to the intermittent bournes of the district. The late Mr. Baldwin Latham showed that the Croydon Bourne flowed early in 1916, for the fifth year in succession, with a maximum flow of 13,345,920 gallons per day, thus equalling the great flow of 1904. Bournes also flowed at Carshalton, Cheam, Nonsuch Park, Smitham Bottom, and Wickham. With regard to the last-mentioned, Mr. W. Whitaker contributes a paper showing that the Wickham Bourne had not flowed since 1883. On May 28, 1916, it was yielding 1,628,550 gallons per day, at a point where it flowed into and filled up a gravel-pit by the side of the railway near Hayes Station. In Mr. N. F. Robarts's presidential address reference is made to a valuable find of bronze implements made in 1914 in Addington Park, when the golf links were laid out and an enormous destruction of woodland took place. So large was the find that the man who took them away staggered under the weight. Apparently he disappeared, but it was found afterwards that a man had called at the British Museum in the same year and had sold about thirty implements and fragments of bronze from Addington. The find contained six socketed celts, and is thought to be of late Bronze age. The Proceedings contain the usual rainfall returns from more than a hundred stations, compiled monthly by Mr. F. Campbell-Bayard, and these are of great value to water engineers and others. The society may be congratulated on the energy displayed in spite of pressing war vocation.

The 1917 issue of the *South-Eastern Naturalist* constitutes the twenty-second volume of Transactions of the South-Eastern Union of Scientific Societies, and includes the proceedings at the annual congress held in London last June. This meeting was reported in our issue for June 28 (vol. xcix., p. 354), when summaries were given of Dr. W. Martin's presidential address and the more important papers read at the meeting. Among the contributions to which limitations of space made any detailed reference impossible on that occasion may be mentioned Dr. B. Daydon Jackson's well-informed directory to the notable trees and old gardens of London, with its references to the gardens of Gray's Inn, planted by Sir Francis Bacon; and those of Syon House, at one time under the superintendence of Dr. W. Turner, physician to the first Duke of Somerset, Lord Protector. Dr. Turner, the "Father of English Botany," published "The Names of Herbes" in 1548, and dedicated it to the Protector. Prof. MacBride's address on "Are Acquired Characters Inherited?"; Dr. J. S. Haldane's on "Abnormal Atmospheres and the Means of Defence against Them"; and Prof. Boulger's on "The Association of the Chelsea Physic Garden with the History of Botany," are all printed *in extenso*.

PARASITIC BIRDS.

THOUGH the singular habits of the parasitic cowbirds (*Molobrus bonariensis* and *M. badius*) are well known to ornithologists, Mr. L. E. Miller has been able to add still further to the records of their eccentricities in a valuable paper published in the Bulletin of the American Museum of Natural History, vol. xxxvii. His observations were made during a recent expedition to Bolivia and north-western Argen-

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tina, where he found these birds in considerable numbers foisting their eggs upon numerous species of small birds, especially finches. But for choice they seem always to prefer the mud nests of the oven-bird (Furnarius). These seem to have an irresistible and fatal attraction for cow-birds, since all the eggs deposited therein appear invariably to be destroyed by the desertion of the intended dupes, which, whenever they discover the trick that has been played upon them, cover up the eggs with a layer of nesting material, refusing to incubate. In some nests layer after layer of eggs were thus found, but no young were ever met with. The numbers of eggs found in such nests ranged from six to as many as thirty-seven! While this stupidity reduces the numbers of the parasites, it at the same time reduces the number of oven-birds, which, in the areas explored by Mr. Miller, failed to produce offspring. Judging from the coloration of the eggs, Mr. Miller estimated that in some cases as many as thirteen birds may use the same nest. The eggs of a third species (*M. rufoaxillaris*) were also occasionally found in these nests.

That the pin-tailed widow-bird has developed the parasitic habits of the cuckoo seems to be established, judging from the evidence of Mr. Austin Roberts in the Annals of the Transvaal Museum, vol. v., part 4. Mr. Roberts tells us that he has known this bird to deposit its eggs in the nests of no fewer than four different species of waxbill, as well as in those of its relative, the red-collared widow-bird. It frequently deposits more than one egg in the nest of its host, and sometimes it replaces the whole clutch. But in no case does the foundling appear to dislodge the rightful occupants of the nest, which is the invariable custom of the cuckoo. Mr. Roberts believes that two other finches are similarly parasitic. These are Rendall's seed-eater (*Anomalospiza imberbis*) and the red-billed weaver (*Quelea sanguinirostris*). But we venture to think that a mistake has been made, at least in the case of the last-named species, which even in capitivity shows no degeneration in the matter of its parental instincts.

SCIENCE AND ITS FUNCTIONS.[1]

SINCE the earliest times, man, like his poor relation the monkey, has always been of a curious disposition, and has wanted to know the why and wherefore, as well as the mechanism, of all the phenomena that he sees about him. No doubt much early science, especially in the fields of astronomy and alchemy, was practised as a cult, with the view of impressing and mystifying the common people, but at the back of it all there can be little question that the great force that impelled inquiry into Nature, both in ancient times and in the modern world, was curiosity, which in itself is probably of all human emotions the one that has been most conducive both to intellectual and to material progress.

With the appearance in history of that wonderful people the Greeks, we come for the first time in personal contact with the scientific thoughts and the scientific theories of individual philosophers. Prior to that period there must have been scientific thinkers, but we have no distinct record of what their scientific ideas were. All that remains are portions of some of their material constructions, and some accounts of others that time and decay have destroyed. Thales of Miletus, one of the seven wise men of the Grecian golden age, though he lived some 600 years before our area, is no mere name. He was the founder of the physical school of Greek philosophy, who first began to consider the nature of things, and was the first to observe electrical action. To Democritus, a Greek of the fourth century B.C., we owe the earliest ideas about matter, while to Hippocrates, another early Greek, are due the beginnings of medicine and biology. To him is ascribed the immortal and pregnant phrase that while "Life is short, Art is long, Opportunity fleeting, Experiment uncertain, Judgment difficult"—an aphorism in which is summed up for all time the difficulties with which the scientific investigator has to contend. And so we pass on to that most famous of classical philosophers, Aristotle, whose writings have done more than those of any other man to influence the progress of science, and whose authority was so great that it bound the scientific world in iron fetters for centuries. In the great library and museum which was founded in the third century B.C. by Ptolemy at Alexandria, then the intellectual and commercial capital of the Grecian world, we find the apotheosis of Greek scientific activity. Here were preserved all the scientific writings and records that a world-wide search had enabled the founder to collect. Here were taught the philosophy of Aristotle and the geometry of Euclid. Here Claudius Ptolemy experimented in optics, and wrote his great work on the construction of the heavens. Here Eratosthenes measured the earth. Here Ctesibius invented the fire-engine, and Hero the first steam-engine, which, it is interesting to note, was a simple form of steam turbine. Here worked Archimedes, the most famous mathematician and physicist of the ancient world, who laid the foundation of hydrostatics, elucidated the theory of the lever, and invented the burning-glass and the screw-pump which still bears his name. As a man of science the world produced no equal to him for nearly two thousand years. But the days of the great library were numbered, and within those marble halls the drip of the water-clocks of Apollonius were counting drop by drop, and second by second, the approach of the catastrophe. During the siege of Alexandria by Julius Cæsar the library and all its contents were burnt—a fitting funeral pyre to the glory that was Greece.

The Romans made no contributions to pure science at all to be compared with those of the Greeks. They were a practical rather than a speculative people, and were great builders, engineers, and road-makers. Size, solidity, and quantity rather than novelty were the outstanding features of their scientific work. They were not like the Greeks, ever seeking after some new thing.

When Rome fell into decay, and the gloom of the Dark Ages settled down upon Europe, there was for a time an almost complete halt in the progress of science. True, some vestige of learning still struggled to maintain itself in what was left of the Alexandrian library, but this was finally extinguished by the latter's second destruction by order of the Arabian Khalif, Omar. After this it is somewhat surprising that the next revival in scientific investigation took place amongst the Arabians themselves, now become a highly cultured people. To this revival we owe the invention of algebra, the beginning of systematic chemistry, and much new work in astronomy, medicine, mechanics, and metallurgy. One of the most famous of the Arabian experimental philosophers was Alhazan, who lived shortly before the Norman Conquest of England.

When there began in Europe that great revival of learning known as the Renaissance, it was the printing press that became its principal coadjutor, and caused things to move at a rate much faster and on a scale much larger than ever before. It was with fundamental concepts that the new learning had first of all to contend, particularly with the geocentric theory of the universe, which gave to the earth and

[1] From an address delivered before the Royal Society of Arts on November 21 by A. A. Campbell Swinton, F.R.S., Chairman of the Council.

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