of fact" touching the new Inch Ordnance map, Mr. Christie and I are both right. That is, he has a copy to show for his assertion; I have one to show for mine. But the great question is not what is the "matter of fact" as touching maps, but what is the matter of fact in nature; and I assert that Loch-na-Davie has but one outlet, to the south, to Glen Iorsa. My words in the *Athenæum* are—"The water-parting is a few yards to the north of the loch, I should *guess* at the spot where a heap of stones stands, apparently lately thrown up;" and from there there is a slight trickling *inlet* to the loch. I ended my letter thus—"Most gracious reader of the *Athenæum*, go take a tourist ticket to Glasgow from Euston Square. Then a lovely run in a Clyde steamer to Arran, and *judge for yourself*." May I repeat this advice to the "gracious reader" of NATURE, for assuredly there is no *arguing* as to a "matter of fact."

As a matter of opinion, I do not think that any quantity of rain could turn the northern inlet into an outlet. That is, I think that at the southern end there is room to emit any overflow before the northern end could be flooded. Mr. Christie seems to suppose a constant double outlet. Dr. Bryce, more modest, only claims this in "winter and wet summers" (3rd edition, p. 3), or "when it rises about eighteen inches above its level in dry weather" (p. 130).

Alresford, May 1 GEORGE GREENWOOD

I OBSERVE that a correspondence has been going on in the columns of NATURE on the subject of lakes with double outlets. It may interest your readers to learn that some glaciers afford instances of the same phenomenon. One of the most remarkable of these is the Glacier d'Arsine, in the old French province of Dauphiné (now the Département des Hautes Alpes). This glacier is broad and short; its moraines are extraordinarily large. It ends just on the watershed between the Romanche and Guizanne, and consequently streams flow from it in both directions. On one side, the stream forms a branch of the Romanche, which fall into the Drac, the united stream entering the Isère below Grenoble. On the other side, the stream flows down to the Guizanne, which, after receiving the Clairée near Briançon, assumes the name of the Durance, and falls into the Rhone below Avignon. This watershed is a prolongation of that over which the magnificent route impériale (magnificent in point of engineering and of scenery) of the Col du Lautaret has been carried. This glacier is very rarely visited, though the above-mentioned phenomenon has been remarked before. Perhaps some of your readers can supply the names of other glaciers which present a similar phenomenon. I need only add that these observations were made during personal visits to the Glacier d'Arsine on July 15 and 17, 1873.

Exeter College, Oxford W. A. B. COOLIDGE

Trees "Pierced" by other Trees

THE natural phenomenon of one tree within another is very frequently witnessed in India in the case of the "pípal" (vulg. *peepul*) and the palmyra. The first instance which drew my attention to it was one in which a very large specimen of the former with a stem some 4 ft. thick was surmounted by a towering palm which *seemed* to grow out of, and in continuation of, the solid trunk at a height of about 30 ft., and rose to a height of 30 to 40 ft. more. I speak from recollection only. An amicable dispute took place between two natives, of whom I inquired about it—both strangers to the locality—the one declaring that the palm grew up *inside* the tree from the ground, and the other that it grew *upon* it. Subsequently I saw numbers of others in all stages, and recognised the fact that the fig grows up by the side of the palm and gradually *encloses* it, so completely as to defy examination of the resulting trunk. The tree that I speak of was by far the most remarkable specimen of the kind, and therefore I give its locality. It is a little south of the town of Kodangal, in the Hyderabad country, long. 77° 40′ E., lat. 17° 6′ N. J. HERSCHEL

May 5

COLONEL GREENWOOD's solution of the beech-tree pierced by a thorn plant is undoubtedly correct. The New Forest affords many cases of the branches of that tree growing together and forming holes apparently through the trunk. Ivy gives the most striking and familiar examples of its runners crossing and uniting; it is not unusual to find a triangular arrangement of runners which cross each other at intervals of a few inches apart. It may be as well to draw your readers' attention to the spasmodic way in which the leaves of the beech burst in spring: sometimes an entire branch, at others a single twig with less than twenty leaves, will be in full leaf a week or ten days before the buds have generally burst. G. H. H.

IN reference to this subject I many years ago met with an instance of a birch growing out of the fork of an oak.

The trunk of the oak at perhaps 8 ft. or 9 ft. from the ground divided into two large arms from between which a birch sprung. The oak was of very considerable age but apparently was not hollow (of this, however, I am not positive). The birch was perhaps 12 ft. or 14 ft. high. P. P. C.

The Antipathy of Spiders to the Wood of the Spanish Chestnut

CAN any of your readers establish the truth of the following assertion? Spiders' webs are never found upon beams from the Spanish or sweet chestnut tree, even when the timber is several centuries old. The keeper of the ruins of Beaulieu Abbey, in Hampshire, asserts that this is a fact, and the buildings of the Abbey, where beams of Spanish chestnut are used, are free from the invasion of spiders. His attention was drawn to this four years ago, and since then his observations have not thrown any doubt upon its accuracy.

Birkenhead, April 23 G. H. H.

FLOWERS OF THE PRIMROSE DESTROYED BY BIRDS

WE have received several additional letters on this subject, the important statements in which we have brought together here, in continuation of last week's article (vol. ix. p. 509).

Prof. Newton of Cambridge, in reference to Prof. Thiselton Dyer's letter of last week, writes as follows:—

Allow me to remark that the observation of Gilbert White (quoted by Prof. Dyer in NATURE, vol. ix., p. 509) respecting the bird said to "sip the liquor which stands in the nectarium" of the crown-imperial, has not, so far as I know, been confirmed by anyone else. Yielding to no man in my general trust in White's wonderful accuracy, I think that here we ought to suspend our belief, caution being perhaps the more needed, since, as has been pointed out by several of his editors, it is almost certain that the bird he saw was not the bird he supposed it to be.

Major E. R. Festing writes:—

A month ago I saw a caged hen bullfinch that would treat any quantity of primroses which were given to her in precisely the way described by Mr. Darwin in NATURE, vol. ix. p. 482. She gave one snip only to each flower, not again touching the remains of it, which fell to the floor of the cage.

My experience in trying to keep a small garden in London some years ago was, that the yellow crocus flowers were always destroyed by the sparrows as soon as they come into full bloom, no doubt with the same object as the finches have in destroying primroses. I do not remember that the purple or white flowers suffered in the same way.

A correspondent, dating from Exeter College, Oxford, writes as follows:—

Your article on the destruction of primroses brought to my mind several facts which came under my notice lately in a manse-garden in the south of Scotland. Under a cherry-tree the ground was thickly planted with primroses, all the flowers of which were picked by the sparrows. As not only was this cherry-tree in flower at the time, but there was also a good show of flower on the various other fruit-trees in the garden, in this instance, at least, the flowers of the fruit-trees seem not to have exercised a superior attraction.

Again, I myself saw that the work was done by sparrows.

Another writer in your article asks, if any other birds besides sparrows have been seen to use fresh flowers in nest-building? In this same manse-garden, some weeks ago, I watched some jackdaws busily plucking and carrying to their nests in a neighbouring chimney the leaves, flowers, and stalks of a variegated form of the common *Glechoma hederacea*.

Mr. J. Southwell states that in his garden in the suburbs of Norwich, the yellow crocuses are yearly destroyed by sparrows. He says:—

Formerly I have seen these mischievous birds pulling

the petals in pieces and scattering them on the ground, to enable them to reach the nectary, which is situated about on a level with the soil; but of late they have altered their tactics and simply bruised the perianth tube sufficiently to extract the nectar, leaving the bloom uninjured but fallen over as though killed by severe frost. The primroses have hitherto escaped, but this spring for the first time the sparrows have attacked the blooms of a cherry-tree, bruising the nectary between their mandibles, and generally detaching the blossom from the foot-stalk close to the calyx. That in both cases this is the work of sparrows I have had ample opportunities of observing. Some years ago a border of Virginian stock which was in full bloom appeared mysteriously to be growing thinner every day. I accidentally saw from a window the sparrows vigorously engaged in pulling up the plants, which they could only do by great exertion, and flying off with them to form their nests. This lasted till the whole were carried away. The fact of the sparrows having altered their form of attack on the crocuses, going direct to the nectary instead of pulling the flowers to pieces, would seem to indicate that the habit is acquired, and not inherited; it also appears, so far as I can learn, to be an increasing habit with them.

Mr. A. F. Buxton, of Cambridge, has frequently observed the same fact about primroses in a wood near Ware. He says:—

I could give no satisfactory explanation of the phenomenon, if it were not that I have noticed the propensity of tame bullfinches to act in the same way towards flowers, especially primroses. In the wood I speak of, bullfinches are abundant; but whether or not they are the only birds which act thus I am of course unable to decide.

Mr. W. E. Hart, of Kilderry, co. Donegal, states that the primroses there suffer much every spring in the manner described by Mr. Darwin. The cowslips and oxlips are seldom, if ever, touched. Mr. Hart says:—

The blame is commonly laid upon the chaffinch, though I have only been able to gather circumstantial evidence against it. I have frequently disturbed both chaffinches and greenfinches from primrose-beds, and found the cut-off flowers strewn about. One lady tells me that she once saw a thrush deliberately cut off a number of primrose flowers in her garden, turning each time to stare defiantly at her. Another has frequently seen hedge-sparrows do so. Thus it appears that several different species of birds have acquired the same habit.

J. M. M. has cultivated polyanthuses at Sidmouth, South Devon, for seven or eight years, and each year they have been more or less destroyed by birds, as described by Mr. Darwin. She does not remember to have noticed it till she came to Sidmouth. The wild primroses suffer also, but not, she thinks, to any great extent, though they are abundant in the neighbourhood.

Another correspondent, writing from Poplar, informs us that many years ago he became aware of the fact that flowers containing nectar are attacked by some small animal; having had a bed of crocuses in his garden, the flowers of which were morning after morning destroyed by, he believes, the sharp bills of the sparrows. He, however, suggests that mice frequently might have been the depredators, "as last year," he says, "they destroyed all the grapes in my greenhouse. They are just able to reach such flowers as the crocus and primrose, and they are very hard up at the early season when these delights appear."

M. T. M. mentions, "on the authority of a good observer," that the flowers of the laburnum are sometimes utilised in nest-building by suburban sparrows, "whose destructive habits in the matter of crocuses," he says, "are only too well known to suburban gardeners."

Mr. C. H. Beasley, of Liverpool, writes, that he had a canary some years ago which was particularly fond of primroses, and always bit them in the manner described by Mr. Darwin, usually leaving everything but the part containing the honey untouched. As this peculiarity was exhibited by a domesticated bird, he thinks it highly probable that it was inherited.

THE LECTURES AT THE ZOOLOGICAL SOCIETY'S GARDENS

III.

MR. SCLATER commenced his fifth and concluding lecture on the geographical distribution of the mammalia, by impressing the importance of precise definition of the exact localities from which zoological specimens are obtained. He showed that by further careful collecting, new animals, even of considerable size, most probably remain to be discovered, considering that a previously unknown rhinoceros and a fresh genus of deer had been made known within the last three years.

The importance of the geographical distribution of the larger divisions of the mammalia is well illustrated in the case of the *Bassaris* of Mexico, an animal supposed for a long time to belong to the civet cats, which are peculiar to the Ethiopian and Indian regions, but now known in its internal structure to agree with the racoons, which are typically American forms. So also the so-called musk deer are often said to inhabit northern Asia, India, and Africa, but there is only a single species of the true musk deer, which is from northern Asia, whilst the Tragulidæ (with which it has been erroneously united) form quite an independent group, found in India and Africa.

The facts given in the preceding lectures suggest the question as to how the world may be most naturally divided according to the distribution of the animal life upon it, which is part of the great problem of the distribution of organic life generally; and it is evident that all great deductions made from any one group must in the long run correspond with those from other groups.

At the outset it is evident that the ordinary geographical divisions of the world do not hold. Europe must be combined with the northern part of Asia, and also with Africa north of the Atlas Mountains. In the same way central America and part of Mexico have to be included with South America. Taking the division of the mammalia into Monodelphs, Didelphs, and Ornithodelphs, the peculiarities of their distribution are very instructive: dividing the surface of the earth into four major divisions —1. *Arctogæa*, or North Land; 2. *Dendrogæa*, or Tree Land; 3. *Antarctogæa*, or South Land; and *Ornithogæa*, or Bird Land.

Arctogæa is divisible into four minor regions—(α) the Palæarctic, (β) the Ethiopian, with the Lemurian subregion of Madagascar, (γ) the Indian, and (δ) the Nearctic. The Palæarctic region possesses few characteristic families and genera. Its boundaries, as are those of all regions except when sea-bound, are ill-defined; Palestine, for example, is doubtful. Quadrumana are almost entirely absent; *Rhinopithecus*, a Thibetan form, belonging, apparently, to the region. The genera *Ælurus* and *Cæra* are characteristic forms. Bears are mostly confined to it, some being, however, found in North America and one in South America. Among the Ungulata, the genus *Equus* is more truly Palæarctic than otherwise, and *Cervi* are abundant.

The Ethiopian region embraces Africa south of the Sahara. The genera Troglodytes, Colobus, Cercopithecus, and Cynocephalus are characteristic, as are Hyæna, Proteles, Lycaon, Hippopotamus, Camelopardus, and others. Madagascar forms a well-marked sub-region, containing no antelopes nor cats, but Lemur, Chiromys, and Cryptoprocta. It is the true home of the lion.

The Indian region extends along Southern Asia to Wallace's line in the Malay Archipelago. The only ruminant animal in the Indian Archipelago is the peculiar *Anoa depressicornis*.

The Nearctic region is very much like the Palæarctic. Castor, Gulo, and Lynx are common to the two. Taxidea, Procyon, and Antilocapra are characteristic, whilst Didelphys has entered from the south.

The Neotropical region (*Dendrogæa*) possesses great individuality, Cebus, Hepale, Icticyon, Nasua, and