

said to have been pierced three times by a vertical shaft. Yet the coals are not anthracite. The Vobster pits are very fiery. The Radstock pits, where the coal is horizontal, not so; but they are worked in higher beds.

By reference to the Commissioner's report to Parliament, 1871, it will be seen (p. 38) in Mr. Prestwich's report on the Nettlebridge Valley coals, where Vobster is situated, that my recollections are confirmed; "bituminous coal" and "disturbed condition" being alike attributed to these coal beds.

With respect to the general question of the mechanical theory of earth-heat, I would respectfully refer Mr. Lesley to my examination of the theory in the *Philosophical Magazine* for October, 1875.

Harlton, Cambridge

O. FISHER

### On the Origin of Certain Granitoid Rocks

In a paper by me "On the Pre-Cambrian Rocks of Shropshire," read before the Geological Society on the 11th inst., I call attention to certain granitoid and gneissic rocks in Primrose Hill, at the south-west end of the Wrekin. Associated with these metamorphic strata in such an irregular manner as to suggest an eruptive origin is a compact felspathic rock with minute quartz grains, which I at first presumed to be a quartz felsite. On submitting specimens to Prof. Bonney, F.R.S., for microscopic examination, he declared the rock to be clastic, and closely allied to the h  lleflintas, which Dr. Hicks assigns to his Arvonian group. Certain observations recently made in south-west Shropshire, suggested to me a transition between the h  lleflinta and the granitoid types, and, on communicating my suspicions to Prof. Bonney, he stated that a similar connection had been suggested by his microscopic examination. This morning I hammered over Primrose Hill foot by foot, and I have the satisfaction of announcing the fullest confirmation of our suspicions. In the same block, the compact h  lleflinta is frequently mixed up with granitoidite and hornblende gneiss. In some cases, the metamorphism has taken place only near the surface, as if produced by atmospheric agencies; in others the crystallisation occurs in nests, while in others there is a gradual transition in mass from a compact to a granitic structure. This passage of h  lleflinta into granite has obviously important theoretical applications.

Wellington, Salop, June 21

C. CALLAWAY

### Migrations of Birds

I NOTICED some time ago a communication in NATURE respecting this subject, stating that it would be instructive and interesting alike if naturalists would record any data they may have collected on this subject. For years now this matter has had my careful attention, and I therefore forward a few notes for the last two seasons, and also put forward the hope that observers stationed in other parts of the United Kingdom will contribute information of a like nature. I would also say that the weather noted applies to the night—the time, by the way, generally chosen for migratory movements.

#### Vernal Migration, 1878

Dates.	Species.	Remarks.
April 4	Gray Wagtail	... In pairs on the trout streams for nesting season. Weather clear, warm westerly breezes.
" 4	Tree Pipit	... In full song and seen for first time; westerly breezes.
" 15	Redstart	... In full song in Encliffe Wood and Rivelin Valley; warm westerly breezes, clear.
" 15	Willow Warbler	... Numerous, arrived during last night.
" 15	Ring Ousel	... Numerous and full of song.
" 18	Chiffchaff	... In small numbers, westerly breezes, very warm, close.
" 19	Swallow	... One specimen seen; westerly breezes, fine and clear.
" 19	Cuckoo	... Heard and saw flying over the busiest streets of Sheffield at 4.30 A.M.
" 22	Whitethroat	... One heard; dull and misty drizzling rain, W.S.W.
" 22	Martin and Sand	Numerous, in company with swallows in the Derwent Valley.
" 28	Blackcap Warbler	... First seen, but silent; warm breezes, S.E.S.
" 29	Whinchat	... Seen for first time, weather dull, S.E.S.
" 29	Common Sandpiper	... Seen for first time, in pairs, in Rivelin Valley.
May 3	Landrail	... First heard, weather dull and gloomy, W.
" 6	Spotted Flycatcher	... First seen, very wet night, wind direct, S. These birds are still solitary.

#### Vernal Migration, 1879

Dates.	Species.	Remarks.
Feb. 10	Song Thrush	... Arrived in night; dark and cloudy, wind W.
" 10	Blackbird	... Arrived in night; dark and cloudy, wind W.
March 20	Yellow Wagtail	... Numerous.
" 20	Pied Wagtail	... "
" 29	Willow Warbler	... One specimen seen, somewhat feeble, silent; wind W. by S., night dull and showery, snow only left ground day before. Never known this species so early before. Average time being April 5.
" 29	Greenfinch	... Again in usual haunts after being entirely absent during the winter, with the exception of one pair seen in a garden in Sheffield.
April 9	Chiffchaff	... Saw and heard in young fir plantations at Hollow Meadows, S.W. and westerly winds.
" 21	Curlew	... In pairs at breeding grounds on moors.
" 21	Ring Ousel	... Numerous on moors, mostly in pairs; no song.
" 24	Tree Pipit	... Arrived; dull and showery weather, easterly winds.
" 26	Willow Warblers and Chiffchaffs	On the evening of 25th not a bird was seen; on morning of 26th the birds abounded and their cheery notes are heard on every side. The night was dark and showery (new moon), wind S.
" 26	Cuckoo	... Heard in Lees-hall Wood. This bird has arrived during past night, doubtless in same flight as willow warblers, &c.
" 28	Swallow	... Seen in Meersbrook Park; weather showery and dull, wind light from S.W., moonlight.
" 29	Whinchat	... Seen in Meersbrook Park; weather showery and dull, wind light from S.E., moonlight.
May 2	Wheatear	... On moors, full of song.
" 2	Common Sandpiper	... Rivelin and Redmires dams, in pairs. This species has been here some few days.
" 2	Redstart	... This bird has now arrived, but only seen in small numbers. Cold easterly winds, moonlight.
" 5	Wryneck	... Saw on Rivelin moors; solitary and uttering its whistling notes. Cold easterly winds.
" 8	Landrail and White-throat	... Heard in meadows; very scarce; probably came last night with a cold south-westerly breeze.
" 12	Sand Martin	... Skimming over the waters in small numbers. This species is remarkably late; wind N.W. by W.
" 13	Blackcap	... Singing in densest covers, and very shy. This species is very late. South-westerly breeze, clear night.
" 17	Martin	... Saw a pair of these birds; they are very late as compared with previous seasons. Southerly breezes and very showery.
" 24	Swift	... One seen on the borders of the Rivelin Moors. South-westerly breezes and very showery.
" 26	Spotted Flycatcher	... One specimen seen, silent and somewhat wary. N.W. by W., light, and showery moonlight night.

Such are a few extracts, taken *verbatim*, from my note-book; they might have been considerably increased, and the time of departure noted, as well as the arrival of our winter migrants, but I fear I have already trespassed too greatly on your valuable space. I sincerely trust that this interesting subject will be more fully discussed and studied by your correspondents and readers; for in that way many of the difficulties enshrouding the movements of the feathered tribes will be overcome.

Heeley, near Sheffield, June 9

CHARLES DIXON

### Glow-worms v. Snails

YOUR correspondent, Mr. R. S. Newall, has unconsciously reversed the natural condition of affairs in his note (NATURE, vol. xx. p. 197). The heading should have been as above. Glow-worms devour snails, which are their natural food. The particular snail in question had probably been attacked by one of the glow-worms, which had left some of its phosphorescent matter adhering to it, and this occasioned the idea that it was showing through the body of the mollusk. Possibly in this case the snail may have proved too large for the glow-worm. An allied insect, *Drilus flavescens*, somewhat rare in this country, and not luminous, is, so far as the female is concerned, seldom