

furrow in the ground, in plan shaped like a horse shoe, but curved at both ends. Its entire length is 44 metres: its breadth varies from 7 to 24 centimetres and its depth 4 to 12 centimetres. In the path of the furrow is a large granite boulder from which two respectable-sized lumps have been cut off; one I could just lift, the other (thrown 5 metres from the boulder) I could just move but could not lift. The furrow then skirts round the edge of the boulder for a long distance, in places being completely underground. It becomes visible again farther on, passing under the roots of a small shrub, and shortly after meets the face of another rock 3 metres high. The discharge must have passed up this face, for it has left a track on the top of the rock, where moss has been torn off; but just beyond the bare rock falls into the lake and nothing more is visible."

I have some "snap-shot" photographs of parts of the track of the furrow; they are not large enough to show much detail, but I shall be glad to forward them for inspection to any one interested.

ARTHUR W. CROSSLEY.

Shirley Institute,  
Didsbury, Manchester.

#### The Spiders of the Madeira Islands.

WHEN in the Madeira Islands a few years ago I collected some spiders, which have now been kindly determined by Dr. N. Banks. Although the collection is small and relatively unimportant, it suggests some problems of general interest. At and about Funchal, Madeira, I obtained *Cyrtophora citricola* Forsk., *Epeira crucifera* Lucas, *Mangora acalypha* Walck., *Teutana grossa* Koch, *Lepthyphantes tenuis* Blk., *Xysticus insulanus* Thor., *Clubionadecora* Blk., and *Chiracanthium albidulum* Blk. In the island of Porto Santo I collected *Lycosa maderiana* Walck. (abundant under stones), *Pholcus phalangioides* Fuessl. (in an outhouse), *Argiope trifasciata* Forsk. (this African species also abounds in Madeira), *Ariadne portosancti* Kulcz., *Dysdera crocata* Koch, *Dictyna (Ergatis) puella* Sim., *Epeira crucifera* Lucas, *Ero aphana* Walck., *Xysticus insulanus* Thor., *Thanatus vulgaris* Sim., *Teutana grossa* Koch, and *Zilla x-notata* Clerck.

The spiders of Madeira have been discussed by several authors, comparatively recent papers being those of Warburton (1892), Van Hasselt (1891), Bösenberg (1895), Schmitz (1895) and Kulcznski (1899). I have not seen Kulcznski's account of the Schmitz collection, though I saw the spiders themselves in the Seminario at Funchal. Warburton lists the 64 species then known from the Madeiras, 35 being supposedly endemic. As the islands are of the oceanic type, a careful study of the spider fauna should give interesting results. The means by which spiders might reach the islands are probably four: (1) Young spiders on gossamer threads floating through the air, (2) introduction by man, (3) on the plumage of birds, (4) on floating objects. The first two may be presumed to be far the most important. Such forms as the *Argiope* and *Pholcus* may be safely put down as introduced. *Epeira crucifera* seems to be a recent introduction; it is not mentioned (at least under that name) by Warburton. It would be interesting to determine whether the species likely to be carried on gossamer threads are prevalent in the islands, and whether some species frequently so carried are absent.

The differences between the spider fauna of Madeira and that of Porto Santo have not been clearly made out, and it is not known whether there are any special forms on the islets off Porto Santo. According to J. Y. Johnson (1863) there are three species of the large snail-eating wolf-spiders, *Lycosa maderiana* con-

fined to Porto Santo, *L. blackwallii* Johns. to Madeira, and *L. ingens* Blk. to the Desertas. The snails on which they prey, representing endemic genera, are presumably much older inhabitants of the islands. Possibly there are endemic genera of spiders surviving in remote places. The collecting done so far has been mainly in the vicinity of the towns, or in the towns, and it may be that it does not fairly represent the fauna of the Madeiras.

T. D. A. COCKERELL.

University of Colorado, Boulder,

May 29.

#### The Scotoscope.

CAN any of your readers explain the principle of the scotoscope which Pepys defines in his diary (Aug. 13, 1664) as an instrument enabling objects to be viewed "in a dark room"? It seems scarcely credible that in the seventeenth century any such instrument could have existed, and bearing in mind the lack of science which Pepys evinced, one is tempted to wonder whether he had misunderstood the instrument-maker's "camera obscura," which would account for his speaking of a "dark room" instead of saying "in darkness" or "in the dark."

Only one other reference (without definition) to the scotoscope is given in the Oxford Dictionary, and the word is generally defined in the dictionaries, through reliance on Pepys, as being what it suggests—an instrument for revealing objects in the dark. If it was merely a synonym for the camera obscura, such a definition is misleading.

CHARLES E. BENHAM.

Colchester, June 18.

#### Chimæras Dire.

DR. FINKLER'S experiments on the transplantation of the heads of insects have attracted both scientific and popular attention to a degree which was marked on the one hand by an exhibit last year at a Royal Society soirée and, on the other, by mention in the pages of *Punch*. It is desirable, therefore, to direct attention to an emphatic repudiation of his claims which has just been published in the *Zeitschrift für wissenschaftliche Zoologie* (vol. cxxiii, pp. 157-208) by Hans Blunck and Walter Speyer.

It will be recalled that Finkler stated that the heads of adult insects could be successfully grafted on to bodies of the other sex, and even on to bodies of distinct species belonging to widely different genera. He inferred, rather than observed, the union of tissues following the operation and hastened on to describe its remarkable results, physiological and psychological. The head of an herbivorous water-beetle persuaded a carnivorous body to be content with, and seemingly to digest, a vegetable diet; a male head led a female body into unwonted perversities; and a *Dytiscus* strove to moderate the colouring of its wing-cases to suit the sober tastes of its new *Hydrophilus* brain. Experiment was added to experiment, and water-boatmen abnormally coloured by inverted illumination transferred the abnormal coloration with their heads to other individuals not so illuminated.

It was to be expected that a field of work offering such remarkable possibilities would speedily be occupied by other investigators. The living material is easy to obtain, the technique is simple ("an Roheit schwerlich zu übertreffen," say Blunck and Speyer), and the results are got in a brief space of time; and yet no one, with the solitary exception of Dr. Kammerer, appears to have claimed success in repeating even the less startling of Dr. Finkler's experiments.

Now Dr. Blunck and Dr. Speyer (already known by a long series of anatomical and biological researches