at large, I do not believe he is averse from employing crucial tests. His difficulty in the manifold processes of life is to formulate tests that really are crucial. Sir Archdall Reid thinks it an easy matter, and he takes recapitulation as an instance. At the moment when his letter was published some of us were discussing that very question at the Linnean Society, and Sir Archdall Reid, had he been present, would have seen that the issue was far from being the simple one that he imagines. F. A. BATHER.

June 4.

A New Acoustical Phenomenon.

WHEN living near Croydon aerodrome during the earlier part of the war, I noticed that the higher-pitched sounds apparently given out from an aeroplane flying nearly overhead varied with the height of my ear above the ground; thus, by bending down to one-half one's normal height, the pitch of this higher note rose an octave. I have on many recent occasions confirmed this result. This phenomenon is most noticeable when standing on a smooth road or lawn, and is scarcely distinguishable on a rougher surface, such as a hayfield; the logical conclusion is therefore that it is due in some manner to reflection from the ground. The pitch of the note varies also with the angle of elevation of the aeroplane, and is not generally audible unless this is more than about 45°. Since the pitch rises continuously as the head is lowered, the apparent explanation is that the note is due to the interval between the arrival of the direct and reflected waves from impulses radiated from the aeroplane—that is to say, no note of this definite pitch comes through the air from the aeroplane, only a regular, or irregular, succession of impulses, the time periods of which have no relation to the observed note, for it is obvious that merely bowing to the aeroplane could not alter the pitch of any note it might be giving out. (It is well known that a note of much lower pitch, due to the engine, is always present, but it is not in this sound that the variation takes place, although it is possible that these are the waves from which the variable high note is produced by reflection.) The pitch of the sound with which we are concerned is thus due to the fixed interval between the arrival of the direct and reflected impulses, and thus depends upon the height of the observer and the angle of elevation of the aeroplane. An interesting deduction from the discovery is that the ear is able to appreciate pitch from a succession of double impulses, if the interval between the elements of each double impulse is constant.

The phenomenon is not in any way peculiar to aeroplane noises; I have observed it with equal distinctness, though the sound was fainter, when standing under an aspen tree in a light breeze. Through the rustle of the leaves could be distinguished a note of quite definite pitch, which, as before, rose to its octave on lowering the head to half one's height.

In support of the explanation I have given, it may be remarked that the pitch of the note observed seems to correspond with the interval of time between the arrival at the ear of the direct and reflected impulses as calculated from the velocity of sound in air.

From the physiological point of view it would be interesting to make a laboratory test, using a disc siren with the holes pierced in groups of two, all pairs being similar to one another, but grouped at unequal spaces on the circumference; thus the passage of each pair would give a double puff, but the double puffs would be in an irregular succession. This would, no doubt, give a definite note corresponding in pitch to the interval between members of a pair of holes, and would be a further confirmation of my explanation.

That two impulses alone appear to give a sense of definite pitch is interesting, and seems to indicate the existence of a resonating system in the ear. Experiments such as I have suggested, with a disc siren, might therefore help in the solution of the much-discussed problem of the function of Corti's organ. Another and more general series of experiments would have the object of finding whether, as is indicated by my observations, all sounds when heard by an observer near a reflecting surface have, in addition to the incoming fundamental note, a note of a pitch depending on the distance of the observer from the reflector. This phenomenon is known to have occurred, as regards electric waves, in Hertz's classical experiments. Unfortunately press of other research work prevents me from carrying out tests in this fascinating subject, but perhaps someone more directly interested may find time to develop it further.

J. ERSKINE-MURRAY.

Directorate of Research,
Air Ministry, Kingsway, London, W.C.2.
June 7.

Herons and Fish.

IT was commonly believed and asserted by old-time writers on natural history that from the feet and legs of the common heron exuded an oil with a peculiar odour which attracted fish within striking distance of the bird's powerful beak. Anglers used to mix the fat of a heron with flour and other matter and anoint their baits with it, whereby, says John Jonston in his "Historia Naturalis" (1657), "mirifice pisces illiciuntur."

I have never regarded this theory as of greater value than many others propounded by medieval empirics, but it was recently brought vividly to mind by what has taken place in the garden of one of my country neighbours. In this garden there is a rectangular pond measuring about 30 ft. by 20 ft. The sides are of dressed masonry, which extends under 9 in. of water so as to form a continuous ledge a yard broad, beyond which the depth drops suddenly to between 3–4 ft., wherein some of Marliac's water-lilies are grown. The pond was stocked with goldfish, which throve well until a heron found its way there, and has succeeded in exterminating them. The owner of the garden, a good observer upon whose statement I can rely, tells me that the bird always took its stand in one corner of the pond, on the ledge covered by the shallow water, and that the goldfish moved out of the deep water into the centre and congregated round the heron, who picked them up at leisure. Had the fish remained in the deep water which they usually inhabited, of course the heron could not have reached them.

Although I draw no inference from this incident, it seems worth mentioning. It would be interesting to hear of an authentic parallel case.

HERBERT MAXWELL.

Monreith, Wigtownshire.

Why do Worms Die?

MANY times during the last twenty years I have been tempted to make the following communication. My house backs on to, and is partly built into, the old cliff at St. Leonards-on-Sea, and my back door opens on to a road cut into the face of the cliff. The road is well tar-macadamed and watertight. The esplanade at St. Leonards is wide, tar-gritted, and