

some definite knowledge of their origin and so throw fresh light on the whole problem.

C. T. WHITMELL.

Leeds, November 23.

P.S.—For sunrise (in accordance with p. 57) I take the tip of the visible sun to be 2' above the local horizon.

#### Change of Pitch in certain Sounds with Distance.

SEVERAL years ago the late Prebendary Simpson, of Fittleworth, Sussex, told me of an interesting observation he had made, which some of your readers may be able to explain. While walking up and down the platform of a railway station, he noticed a peculiarity in the sound of a steam jet from an engine standing on the lines. The pitch of the sound appeared to rise as he retreated from the engine and to fall as he drew near to it. Some time after, Mr. Simpson observed the same thing again, but in this instance the noise was made by a gas flare in the open air, about which some men were at work. Since then I have found that this alteration of pitch with distance occurs with any fizzing noise of the kind, such as that of air jets, burning logs, frying fat, pouring rice or coffee beans, waterfalls, or even the rustling leaves of a single tree; with all those noises, in fact, whose sources are sufficiently localised to admit of observations of the kind being made. I found, also, on withdrawing from such a source that a point is reached at which the pitch ceases to rise, and remains practically stationary as far onward as the sound continues audible. This point is sometimes pretty definitely marked, and varies in distance from the source with different sounds, and the pitch of the stationary portion also varies in the same way. I do not think, however, that the pitch of the whole volume of sound changes, though it often appears to do so, for a similar impression is created by moving a fizzing air jet to and fro close to a wall. As it nears the wall, the whole sound seems gradually to rise in pitch and to sink again as the jet is withdrawn. But here the effect is clearly due to successive reinforcement of one part of the noise after another in the order of their wave-lengths. It is only a shifting of the point of greatest intensity, and not an actual change of pitch at all. Assuming, then, that the effect noticed by Mr. Simpson is of the same nature, that is to say, caused by a readjustment of the relative intensity of the parts, how is it to be accounted for? Is it simply a process of *sifting* by distance, the weaker groups of small noises, of which the fizzing sound is composed, dropping out of earshot in succession, as the observer retires from the source, till only the largest and loudest group is left, which last continues to be heard for the remainder of the distance without sensible change of pitch? If that is so, then the deeper tones of such noises would seem to have a proportionally shorter range of audibility than the higher ones; for, so far as I have observed, the pitch always sinks on approach to the source and rises on withdrawal from it, never the reverse way, as might be expected in the case of very bass roaring sounds. Perhaps, however, others may have noticed instances of the latter sort. The behaviour of the air-jet fizz at the wall illustrates a kind of reciprocal action, which no doubt plays an important part in the adjustment of the pitch. The tone which is loudest for the moment appears to dominate and obscure the rest, so that, near the source, where the deeper tones are most powerful, these latter, to some extent, subdue and lower the principal one, while further off, where they become enfeebled by distance, they are in their turn still more diminished by the presence of the principal far-reaching tone.

Downshire Square, Reading.      FREDERICK M. WEST.

#### Pine Grosbeak in Berkshire.

Is it not of rare occurrence that a pine grosbeak (*Pyrhula enucleator*) has been seen here, not on one day, but on two? I was informed this morning that Mr. O. T. Perkins had seen this handsome bird out of his window, apparently either eating beech buds or else hunting for insects on them. During this the bird was attacked by three sparrows, who began making a great noise and eventually drove him off. This morning I saw the same grosbeak, or another one, in a like manner feeding on beech. And what is more strange he was again attacked by sparrows and had to beat a hasty retreat. I may add that the bird, to all appearances, was in excellent condition, its plumage being brilliant. I wonder if any other of your readers have noticed any of these handsome but rare birds?

C. M. ROGERS.

Blucher, Wellington College, Berks.

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#### THE "ARMOR" ELECTRO-CAPILLARY RELAY.

WE commented in our notes columns a short time ago upon the announcement that a new system of wireless telegraphy had been worked out by Messrs. Orling and Armstrong. From what could be gathered from the information at that time available we judged that the method made use of earth conduction; we have since learned that this is the case and that the inventors rely upon the novel design of their transmitting and receiving apparatus for the efficiency of their results. We have had an opportunity of inspecting drawings of the receiving apparatus, and are enabled to give a description of it, though we have not seen the actual apparatus itself, but only a working model. We understand that it is proposed to read a paper shortly on the transmitter before one of the scientific societies and that in consequence it is not desired to publish the details of its construction as yet. It is to be hoped that

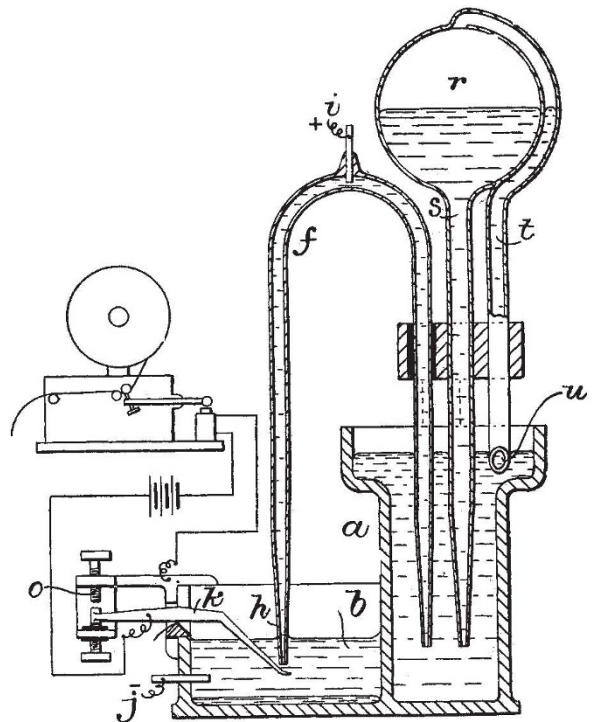


FIG. 1.—"Armor" Electro-capillary Relay. Syphon form.

at the same time an account will be given of the experimental results obtained, with trustworthy data from which the probable value of the invention may be gauged, for as yet there is nothing to go upon but the statements of the inventors.

In the meantime we must content ourselves with giving a description of the receiver, which is of interest independently of its use with the Orling-Armstrong or any other wireless telegraph, as it could be used for the detection of any sort of electrical current. The instrument consists essentially of a capillary electrometer which is arranged so that it can actuate a relay. The extreme sensitiveness of the capillary electrometer for very small currents and low electromotive forces is well known, and the instrument is used considerably, especially for physiological work. The arrangement adopted in the present instance is shown in Fig. 1. A syphon, *f*, is