brane bone. The histological picture was similar to that produced in developiug bones by the use of von Kossa's silver nitrate technique for the demonstration of calcium. A related phenomenon has been observed in the long bones of adult rats, which become bright yellow on treatment with acid silver nitrate. In specimens from both these types of bone prepared for histological examination there are seen dark deposits in many of the trabeculæ, quite different in character from the small black granules seen in other tissues treated by this method.

In view of the possibility that the atypical deposits seen might have been produced by the precipitation of a silver salt, followed by photo-decomposition of the salt during the preparation of sections, the following experiment was made. The femurs and frontal bones from twelve chick embryos of various ages were used. One frontal bone and one femur from each embryo was treated in the normal fashion and one frontal bone and one femur was placed in 5 per cent ammonia for 10–15 minutes after fixation in acid silver nitrate and washing in water. Fixation, washing and treatment with ammonia were carried out in brown bottles in each instance. In all instances in which acid silver nitrate produced discoloration of the bone, subsequent treatment with ammonia restored the normal appearance, and atypical deposits were absent in histological preparations. Similar results were obtained with rat bone. Treatment of rat adrenals with ammonia after fixation in acid silver nitrate had no effect on the histological picture.

These results indicate that in some tissues the histological picture produced by the reduction of silver nitrate in acid solution by ascorbic acid may be complicated by a process which is probably due to the precipitation of silver salts followed by photo-decomposition; this complication can be obviated by treatment of the specimen with 5 per cent ammonia. It is suggested that this treatment with ammonia after fixation in acid silver nitrate constitutes an improvement in the technique for the histochemical demonstration of ascorbic acid, in that it increases its specificity.

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[1] Bourne, G., NATURE, 131, 874 (1933); *Austr. J. Exp. Biol. Med.*, 11, 261 (1933); *Anat. Rec.*, 66, 369 (1936); Giroud, A., and Leblond, C. P., NATURE, 138, 247 (1936); Giroud, A., "L'acide ascorbique dans la Cellule et les Tissues" (Paris, 1938).
[2] Barnett, S. A., and Bourne, G., *J. Anat.*, 75, 251 (1941); *Quart J. Micr. Sci.* (in the press).

Dependence of the Direction of Rectification in Copper Pyrites on Voltage, Temperature and Time of Measurement

THE reversal of rectification by heat in molybdenite[1] led to the study of the rectifying properties of copper – copper pyrites contacts. In most cases, it has been found that below 1 steady volt the normal direction of easy flow is from the metal, but it reversed between 20° and 200° C. For voltages of the order of several volts, the conductive direction is from the crystal, but it reversed between 20° and − 78° C. The relation between the transition voltage and the transition temperature indicates that above a critical temperature of about 500° K., or above a critical P.D. in the neighbourhood of 20 volts extrapolated at the absolute zero, the direction of rectification is always the same. A similar phenomenon occurs in thermocouples when the cold junction is above the neutral point, or when the temperature difference between the two junctions exceeds twice the neutral temperature.

On changing from D.C. to A.C., it is occasionally observed that the direction of the rectified current is opposite to the direction of the larger current. This is explained by a time lag in the current, arising from the contribution of some integrative action related to the direction of the applied voltage.

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[1] El-Sherbini and Yousef, *Proc. Phys. Soc.*, 51, 449 (1939).

Sense of Hearing in Fishes

IN his review of our knowledge of the sense of hearing in fishes, von Frisch[1] only quotes one observation in the field, and in his summary says, "spontaneous reactions to musical tones are not to be expected, since the sound signals used by us have no biological significance for fishes. Reliable reactions can therefore only be obtained by conditioning to tones."

It may therefore be of interest to put on record an observation that I made some years ago in British Guiana on the response of fishes to sound under natural conditions. I was at the time visiting at frequent intervals Plantation Ogle, a sugar estate in the low-lying coastal area south-east of Georgetown. The estates are drained by a number of shallow canals along which the sugar-cane is towed in barges to the factories, and there are many low humpbacked bridges over these canals.

I find in my note-book the following, dated September 16, 1916. "In crossing a bridge over one of the trenches I noticed that numerous small fish were surface feeding in small groups in the water, but at an accidental noise they all dived deep. I tried waving my arms suddenly without noise but this had no effect. Clapping my hands or ringing my bicycle bell, on the other hand, caused them to dive so suddenly that the whole surface of the water was disturbed." I repeated the observations on several days and distinctly remember one experiment in which I laid my cycle on the ground and crouched low so that I could only just see the surface of the water. When I rang the bicycle bell, the only movement being that of my thumb which was in any event quite out of sight of the fishes, the response was immediate and striking.

There is no doubt in my mind that these fishes heard and reacted to a sound which, according to von Frisch, should have "no biological significance" to them; but what natural warning sound, if any, it simulated I am unable to suggest.

Perhaps some resident of British Guiana could repeat my experiment and get some of the fish identified.

I may add that I have recently tried the effect of a bicycle bell on goldfish in a pond here at Rothamsted but cannot see that the fish respond in any way.

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[1] *Biol. Rev.*, 11, 210 (1936); see also NATURE, 141, 8 (1938).