second is spared. But it has been shown that all the cutaneous senses show this increasing delay in perception under these circumstances (*8, 9*).

A third argument has been based on reaction time: presumably, the reaction time to "delayed" pain in the extremities corresponds to the conduction time for the C fibers. In a recent study involving a larger number of trials, coupled with statistical analysis of results, reaction time could not be related to distance from the central nervous system, probably because of the large number of uncontrolled variables (*10*).

Several other lines of recent evidence (conduction rates of fibers subserving slowly adapting touch versus hair touch fibers, strength-duration curves for pain) are also negative. The best evidence of all varieties points to double pain as an artifact. Positive reports appear to be due to inadequate experimental control, particularly with regard to control of the stimulus and psychophysical methods, and to lack of statistical analysis.

MARGARET HUBBARD JONES
Department of Psychology,
University of California, Los Angeles

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Marine Borer Attack on Lead Cable Sheath

The activity of molluscan borers on such materials as wood, cellulose fibers, rocks, and shells is extensively documented. However, reports in the literature regarding their attack on metals are uncommon. Only two references (*1, 2*) on this subject have come to our attention. Both of these refer to the penetration of lead—one (*1*) by *Martesia* (*Diploplax*) *funisicola*, a member of the family Pholadidae and the other (*2*) by one of the Teredinidae, *Teredo navalis*. In view of this limited information, it seems desirable to document a recent case in which a mollusk penetrated a lead-sheathed submarine telephone cable.

The cable which was attacked belongs to the Southern Bell Telephone and Telegraph Company and lies in the Ortega River at Jacksonville, Florida. The sheath of the cable is composed of a solid lead covering approximately 4 mm thick. Over the lead sheath are two layers of asphalt-impregnated jute which serve as bedding for a single layer of galvanized steel armor wires.

The cable was placed in service in 1927, and the present trouble occurred in 1955. Attack occurred at a point approximately 350 ft from the shore, at a depth of about 3.5 ft. The river bottom at that location was muddy.

At the point where penetration occurred, the armor wire had rusted away, leaving the lead sheath exposed. Two holes had been bored in the sample of damaged sheath received at Bell Laboratories. One hole completely penetrated the lead, while the other had barely punctured the inside face of the sheath. The general appearance and detail of the damaged area are illustrated in Fig. 1 (*3*).

The dimensions of the holes suggest that they were caused by a member of the family Pholadidae. At the point of entry, both holes are slightly elliptical. In one case, the diameter is 3.5 mm at the widest point and 3.0 mm at the narrowest. In the second case, the dimensions are 3.0 and 2.5 mm, respectively. As the tunnels progress inward, the diameters increase until, at a depth of about 2 mm, they are each approximately 5 or 6 mm. In the case of the hole which completely penetrates the sheath, it is doubtful that the organism progressed through the inside surface, since the greatest diameter at that point is only 2.5 mm.

In Fig. 2, a photomicrograph of the interior of the shallower hole, striations in the lead resulting from boring action are readily apparent. In some cases, minute lead shavings were observed, where the rocking action of the shells had peeled off the substrate. The closely cross-hatched pattern of the striations is illustrative of the rocking and heaving motion described by Turner (*4*) as characteristic of the valves of *Barnea truncata* and *Martesia striata*. Although it is not readily apparent in the photomicrograph, small bits of mineral that resemble quartz crystals in appearance are imbedded in the lead, particularly in the wall of the hole. As suggested by Turner (*4*), the presence of such hard particles around the anterior portion of the valves may be of material aid in boring. No information is available concerning whether the jute that underlies the armor wires was present in the damaged area when the attack occurred. It is conceivable that the organisms obtained their start in the jute and progressed into the lead.

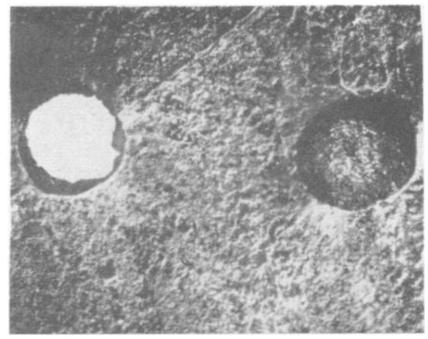

Fig. 1. Holes made in sheath of submarine telephone cable by marine borers. The hole on the right has barely broken the inside surface of the sheath (×5).

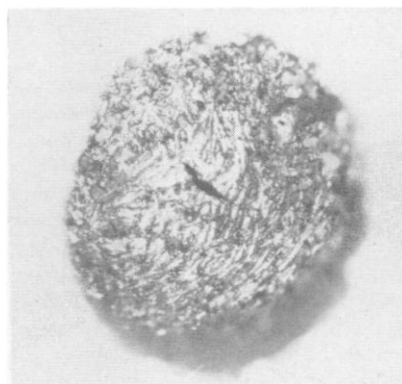

Fig. 2. Striations on the face of the hole in lead sheath caused by rocking action of the shells of the borer (×12).

Although the attack of metals by mollusks is indicated by existing data to be unusual, it is evident that penetration may occur in lead.

L. R. SNOKE
Bell Telephone Laboratories, Inc.,
Murray Hill, New Jersey
A. P. RICHARDS
William F. Clapp Laboratories, Inc.
Duxbury, Massachusetts

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3. We are indebted to F. G. Foster of Bell Laboratories for Figs. 1 and 2.
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In defense of accuracy we must be zealous, as it were, even to slaying.—P. G. TAIT.