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SOME SONAR OBSERVATIONS IN LOCH NESS

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Sonars which interrogate complete search sectors in a single scan are becoming available commercially. Creasey and Braithwaite tested one such sonar and showed that, with reservations, it can be used beneficially in an enclosed freshwater volume such as Loch Ness.

In April 1968, some target tests were carried out from R. V. CLUPEA. One of these tests involved lowering a target to the bottom of the loch, pointing the transducer array vertically downwards, and observing the display. When raising the target, the display showed a large group of objects rising with the target. These objects persisted after the removal of the target, and extended downwards for nearly 100 metres. Their nature might falsely be explained in terms of animal life. Probably they were gas bubbles released when the target disturbed the bottom.

The remainder of the observations discussed in this paper were obtained in August 1968 and September 1969. The trials were carried out from Temple Pier in Urquhart Bay, and the equipment was used to scan vertically to present a cross-section through the loch. In deep water, an isothermal surface channel exists where the vertically scanning sonar was able to detect targets in excess of 1,000 metres. Below this surface channel, thermal gradients cause ray paths to bend downwards and produce a shadow zone. An isothermal bottom channel also exists where straight line propagation occurs.

At ranges of up to 200 metres, thermal conditions did not distort the display unduly. For example, at 120 metres range and at depths down to 30 metres, divers were observed. The divers breathing not only produced a vertical stream of targets, but caused an active-target effect.

Thermal gradients make interpretation of the display difficult at medium and long ranges. For example, the bottom can be illuminated via a curved path and strong bottom returns may result along apparent midwater-paths. This can cause the bottom to appear curved upwards on the display. Moving targets near the bottom could appear to follow a similar path. Unless ray paths are known accurately, a display cannot be interpreted with any degree of confidence. Display observations indicate that thermal conditions change from hour to hour, and it is known also that thermal profiles are not constant over an enclosed volume of freshwater. This

makes ray path analysis from thermal or velocity measurements almost impossible. However, by placing targets in known positions, ray paths could be inferred from the resulting display.

Observations of presumed animal movements (reported by Braithwaite and Tucker) in Loch Ness in August 1968 are subject to the reservations set out above. There can be little doubt about the horizontal velocities, which are great enough to rule out the likelihood of the objects being inanimate, but the vertical movements are not so certain.

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