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U. S. NAVY UNDERWATER SOUND LABORATORY
FORT TRUMBULL, NEW LONDON, CONNECTICUT

FURTHER COMMENTS ON BIOLOGICAL BACKSCATTER

By

B. F. Cole and T. G. Bell

USL Technical Memorandum No. 905-094-64

Technical Memo,

5 November 1964

3p.

INTRODUCTION

On 27 May 1964 Dr. R. P. Chapman of the Naval Research Establishment discussed surface and biological backscatter with T. G. Bell. The results of that discussion were presented in reference (a). Dr. Chapman's more recent work ~~(reference (b))~~ necessitates a reassessment of the effect of biological backscatter on the SQS-26.

DISCUSSION

Dr. Chapman previously pointed out that the deep scattering layer is always highly frequency dependent, peaking at 5.5 kc in the daytime and at 4 to 5 kc at night (reference (a)). His recent results indicate that it is not unlikely for this scattering peak to shift to the 3 - 4 kc region at night. In one case where the peak shifted to 3.5 kc, the day-night variation was 18 db. The typical DSL surface scattering strength per square yard (integrated over the volume of the layer) was - 41 at night and - 59 in the day. Considering the 4 paths involved ~~(reference (a))~~, the nighttime level would be equivalent to a sea-surface scattering strength of - 35, that produced by a 20-knot wind for a typical SQS-26 search angle of 15 degrees. This is 8 db higher than previously estimated in

reference (a) for the nighttime level.

Since the scattering strength peak frequency depends on the depth of the scatterers, which in turn is believed to correlate with the intensity of light, attempts should be made to correlate the nighttime reverberation background levels with nighttime light intensities. The 3.5 kc resonance which produces the unusually high nighttime levels is probably caused by the scattering layer coming to very shallow depths on dark nights.

RECOMMENDATIONS

It is recommended that light intensity measurements be made during any nighttime reverberation measurements made with the SQS-26 to see if the nighttime reverberation levels are actually dependent on the amount of light. This would be especially important during low wind periods, when the biological scatter is likely to be dominant.

B. F. COLE

T. G. BELL

REFERENCES

(a) Bell, T. G., "Discussion with R. P. Chapman of NRE on Surface and Biological Backscattering" (U), USL Technical Memorandum No. 905-058-64, 29 September 1964 (~~Confidential~~ UNCLASSIFIED)

(b) Chapman, R. P., and Marshall, J.R., "Low Frequency Reverberation from Deep Scattering Layers in the Western North Atlantic", Paper G-6, 22nd U. S. Navy Symposium of Underwater Acoustics, October 1964

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