ABSTRACTS

(Papers read before the Institute but not published in the Proceedings)

HIGH FREQUENCY ELECTRICAL BREAKDOWN IN THE ATMOSPHERES. By A. D. MacDonald, Dalhousie University. (Read November 18, 1963). A knowledge of the power level at which high frequency electrical fields cause the atmosphere to ionize sufficiently is of great importance in communication with, and guidance of, high flying vehicles. This paper reports on an extensive series of measurements of the electric fields required to initiate breakdown in air, in nitrogen, and in oxygen, at frequencies in the L, X, and K bands, in a number of resonant cavities. The size of the cavities varied greatly so that the relative roles of diffusion and attachment in the breakdown process could be studied. The pressures at which measurements were made varied from approximately 0.01 mm-Hg to 100 mm-Hg corresponding to atmospheric breakdown at altitudes from 15 to 80 km. Pulsed power measurements were made at all frequencies and C W measurements were made at X and L bands. A theoretical analysis provides a scheme for predicting pulsed and C W breakdown in air for frequencies from 100 mc/sec to 100 knc/sec for pressures corresponding to altitude variations from 0 to 100 km.

FACTORS AFFECTING THE DISTRIBUTION OF A MARINE WORM ON A MUDDY SHORE. By J. D. George, Dalhousie University (Read December 9, 1963). A survey at Hamble Spit mudflat in Southampton Water showed that the cirratulid polychaete, *Cirriformia tentaculata* (Montagu), was less abundant near the high water mark than further down the shore. The influence of various environmental factors on the worms' distribution was investigated and it was concluded that temperature, salinity, oxygen content, and water content, were of minor importance. Both the particle size of the mud and its carbon content showed some correlation with the abundance of the worm. However, periodic strong wave action seemed to have the most influence on the distribution of the worm.

CYTO-TAXONOMY OF VIOLETS. By M. J. HARVEY, Dalhousie University. (Read January 3, 1964). An attempt to find out the relationships between two very similar violets growing in a wood in England led to the realisation that their connection could only be found by studying other violets outside the British Isles. This larger study of the violets of the Northern Hemisphere has now included all the European, and most of the North American, members of the group and is being extended to the Asiatic species. Many facts concerning the evolution of the violets have been found but the original problem is still unsolved.

ACOUSTIC OBSERVATIONS OF A SCATTERING LAYER OF BIOLOGICAL ORIGIN DEEP IN THE OCEAN. By R. P. CHAPMAN and J. R. MARSHALL, Naval Research Establishment (Read March 9, 1964). The acoustic properties of a deep scattering layer located north of Bermuda were examined over the frequency range from 0.4 to 6.4 kc/s. Octave band scattering strengths were measured in the two octaves from 1.6 to 6.4 kc/s. A broad peak in scattering strength was observed. Its centre frequency decreased over the sunset period from an average daytime value of 5.4 kc/s to an average nighttime value of 4.8 kc/s. The variations in measured scattering strengths, resonant frequencies of scattering strength peaks, and layer depths were consistent with those expected from a migrating layer of bathypelagic fish possessing swim bladders of constant volume.

IDENTIFICATION OF FATTY ACID ESTER PEAKS IN GAS-LIQUID CHROMATOGRAPHY: ANALYSIS OF AN OIL OF THE LEATHERBACK TURTLE. By R. G. ACKMAN and R. D. BURGHER, Fisheries Technological Station. (Read April 13, 1964). The popular polyester substrates normally employed in the analysis of fatty acid methyl esters suffer from one drawback, the

overlapping of chain lengths. This leads to peak superposition and difficulties in identification of component fatty acids. The linear log plot and separation factor procedures permit the identification of most minor components once the identities of a few major components are established. The use of two polyesters of differing polarities then solves the chain length overlap problem. The application of these procedures to the dermal oil from the leatherback turtle indicates, in addition to typical marine lipid fatty acids, high proportions of dodecanoic, of 5, 8, 11, 14-eicosatetraenoic and of 7, 10, 13, 16-docosatetraenoic acids.