

THE HORIZONTAL DISTRIBUTION OF ZOOPLANKTON

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## INTRODUCTION

The non-randomness in the distribution of the zooplankton is one of the least understood and yet most widely discussed subjects in the field of biological oceanography. Haeckel (1890) first suggested that the assumptions of random distribution of zooplankton made by previous investigators were false. These criticisms were overlooked until Hardy (1936) presented convincing evidence that oceanic plankton were aggregated on scales of several or hundreds of miles. Barnes (1949) suggested that it was desirable to re-examine the assumptions that the zooplankton were randomly distributed after finding variations in zooplankton captures in a series of carefully controlled volumes of water.

There has been little study of the patterns of distributions of zooplankton on a scale smaller than several miles. Studies with plankton pumps (Barnes and Marshall, 1951; Cassie, 1959a, 1960) have indicated that on a scale of about 100 m. the zooplankton are clumped or aggregated far more often than they are evenly or randomly distributed. However, these studies with the plankton pump were in effect studying horizontal columns of water five to ten centimeters in diameter and one hundred or more meters long. Samples of this size and shape can give little information as to what types of distributions are present on a scale of ten to fifty meters. The only studies of distributions on a scale smaller than one hundred meters have been by Cassie (1959b), who sampled phytoplankton with glass jars spaced ten centimeters apart, and a recent study by Wiebe (1968), who used a Longhurst-Hardy sampler to study the distribution of zooplankton on a scale of about ten meters. Both these studies showed considerable patchiness of planktonic organisms on a small scale.

The purpose of this study was to sample the zooplankton of selected regions of Kaneohe Bay using a Longhurst-Hardy sampler and sampling on a scale of fifteen to forty-five meters. The results of this sampling program were used to determine what animals exhibited patchy distributions and to what extent correlation between species abundances was related to patchiness; and to compare the patterns of patchiness between the different regions.