I. INTRODUCTION

For some years it has been a subject of investigation at the Zoological Station, Den Helder, to determine the distribution and growth of cockles in the Waddensea in order to obtain an insight into the factors controlling them. These investigations have shown that the cockles in this region are limited to flats which emerge at low tide, and that the animals are not distributed at random over these flats, but rather in a way which will be described below.

KREGER (1940) assumed that this unequal distribution was mainly due to unequal spatfall. He made most of his observations on flats near the Zoological Station, where, according to him, more spat fell on the lower than on the higher parts. He assumed that the highest parts received little spat because the water would have given off the latter to the lower parts covered earlier. Also the smaller head of water and the shorter time of submersion over the higher parts would cause a smaller spatfall. According to KREGER these factors, considered to-
gether, would account for the large amounts of spat he found on the lower parts of the flats.

It was remarkable, however, that the largest numbers of adult cockles found by Kreger on the Zuidwal-flats were present on the higher parts and not on the lower ones. This phenomenon also held for two other areas studied by him, and he attempted to explain this by assuming that on the lower parts spat would disappear in larger quantities, so that, ultimately, more cockles would remain on the higher parts. All other areas examined by Kreger showed the smallest numbers of adult cockles on the higher parts, an observation which was well in agreement with his view.

The weak point in Kreger’s investigations was that the youngest cockles found by him measured 1–2 mm, these being the smallest specimens retained by his sieve. It has long been known that the larvae of Cardium disappear from the plankton at a size of about 300 μ (Thorson, 1946). Therefore, the possibility cannot be excluded that the animals, during the period necessary for growth from 300 to 1,000 or 2,000 μ, were carried to the area in question from other places. In that case, the place where Kreger found his youngest cockles need not necessarily be the place where the spat settled immediately after metamorphosis.

The purpose of my investigation, therefore, was to separate the direct spatfall after metamorphosis from the settling of somewhat older spat, which had been transported for some time. This objective was not fully realized, since, owing to practical difficulties, I, too, did not succeed in obtaining the youngest spat. But the importance of transport of older spat by the current was shown with great certainty, and this transport forms the chief subject of my paper.

My investigations (which were carried out in 1950) not only formed the continuation of Kreger’s studies in the years 1937, ’38 and ’39, but also of work carried out by the Zoological Station in the period of 1947–50. The latter investigations started after the severe winter of ’46–47, when most cockles in the Waddensea died from exposure. The fine, warm weather of the summer of 1947 favoured the development of a new population, and in the autumn of that year the whole area abounded in animals of one single yearclass. It then seemed worth while to follow the growth and density changes of these animals during the following years. This was done by taking samples along a number of traverses. The purpose of my observations was, at the same time, to determine the spatfall along one of these traverses, where the life-history of an older population was known.

The traverse chosen was one which crossed a flat in the middle of the Waddensea, known as Zeehondenplaat (seal shoal) (fig. 1). It is