molecule. Dreger and his co-workers (*1*) showed that the activity of detergents increased when the hydrophilic groups were attached near the center of the carbon chain.

Mixing this detergent with milk and heating the combination effects a dispersion of the protein layer around the fat globule, liberating the fat so that it can combine with other fat molecules. However, the separation is not complete. When a quantity of the strongly hydrophilic, nonionic detergent is added to the mixture, a clear solution and complete separation results.

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On the Food Selectivity of Oysters

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The question whether oysters and other closely related mollusks can, in selecting their food, discriminate between the different types of microorganisms has been debated since the end of the last century, but no general agreement has been reached as yet. Among others, Lotsy (*5*) and Grave (*2*) thought that, in their feeding, oysters show a definite selection of particles having food value. Another group, represented by Kellogg (*3*) and Yonge (*7*), maintains that in lamellibranchs the selection of particles is purely quantitative. Yonge (*7*) thinks the main objective of this selection is "the reduction of the quantity of matter passed to the mouth, large particles or many small particles embedded in mucus being rejected and smaller particles or mucus masses passed on to the mouth quite irrespective of their food value."

My observations and experiments make me agree with Lotsy and Grave that oysters (*O. virginica*) do show some selectivity in feeding. In several of our feeding experiments in which yeast cells in very small numbers were added to running sea water many oysters rejected most of the yeast in pseudofeces, while the true feces were composed largely of plankton forms and detritus normally present in our waters (Loosanoff and Engle, *4*). It is significant that the yeast cells were rejected even if their size (about 5 μ diam) was equal or even smaller than that of the many forms ingested by oysters. This clearly indicated that the discrimination against yeast cells was not based upon their size.

Recently I had the opportunity to observe even more striking cases of selectivity shown by oysters in their feeding. In the summer and fall of 1948, during periods when sea water contained relatively little food material, we were adding at a constant rate small quantities of plankton culture to the water flowing into the trays containing experimental oysters. This culture, which was grown outdoors in a 3000-gal wooden tank, contained a variety of different algae, flagellates, and bacteria. The color of the culture was usually light brown or a purple-brown. In feeding this culture to the oysters I noticed that in many cases the pseudofeces formed were purple or pink, while the color of the material that was swallowed by the oysters and passed through the digestive system was greenish-brown.

Microscopic examination showed that the purple pseudofeces consisted principally of a round-shaped form measuring 2 to 3 μ diam. The true feces, on the other hand, consisted of plankton normally present in our water and of relatively small numbers of the purple form. On the basis of morphological examination, this form has been tentatively identified by S. F. Snieszko of our service as being a species of the genus *Chromatium perty*, which contains purple sulfur bacteria.

On several occasions I was able to grow, in flasks, cultures consisting predominantly of chromatia. The cultures developed best if placed near a southern window in strong light. The color of the good cultures was almost purple. When these cultures were added to the greenish-brown cultures fed to the oysters the latter soon formed purple pseudofeces composed largely of chromatia, while the feces remained a normal, greenish-brown color.

I have noticed that the most energetic rejection of the purple form by oysters took place usually during the first few days after it was added to the water. Later on, some of the oysters evidently developed tolerance to this form and ingested it without apparent discrimination. As usual, the oysters showed considerable individual variations in their feeding behavior, i.e., while some of them ingested *Chromatium* within a few hours after it was first added to the water, the others continued to reject it even after several weeks of contact.

Because *Chromatium* is smaller than many other forms ingested by oysters, we cannot ascribe its rejection to its size. It is more probable that as Cobb (*1*) has shown for *Anodonta*, the palps of which responded to a variety of stimuli, including those of a chemical nature, the palps of oysters may possess specialized cells which act as chemoreceptors, and may be sensitive not only to the physical characters of plankton forms, such as their size and shape, but also to their chemical properties. Nelson (*6*) says that feeding of oysters also is a complex process involving the interaction of the muscular, ciliary, secretory, and nervous tissues. Thus, I think, the selection of food may be based in part on the nature of the secretions of different species of microorganisms reaching the palps, and therefore, as the observations on the rejection of chromatia indicate, at least in some instances, oysters can select their food not only quantitatively but also qualitatively.

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