in both, whereas myristic, palmitoleic, and oleic acids predominated in the triglycerides and docosahexaenoic acid in the complex lipids. Thus, the complex lipids were much more unsaturated than the triglycerides. In view of this observation and the fact that the complex lipids of antarctic fish do not show a higher degree of unsaturation than the complex lipids of fish living at higher environmental temperatures, the following conclusions were reached: The relatively high degree of unsaturation of the total lipids of fish living at low environmental temperatures (observed previously by many other investigators) is due to a relatively high proportion of complex lipids with respect to triglycerides.

The determination by pancreatic lipase hydrolysis of the fatty-acid distribution in the triglycerides of two fish, *Electrona antarctica* and *Argyropelecus hemigymnus,* showed that stearic acid occupies mainly the 1,3-positions in both triglycerides, and docosahexaenoic acid predominates the 2-position. The distribution of all of the other acids differed from one fish to another. The fatty-acid arrangement in the triglycerides of *Electrona antarctica* resembled that in the *Euphausia* triglycerides.

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Research on Antarctic Isopods, 1966-1967

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Besides discovering several new and known species of antarctic deep-sea isopods in the *Eltanin* collections during the past year, Duke University biologists have made special efforts to achieve an important objective of this continuing project, *i.e.,* determine the origin and the zoogeographic characteristics of abyssal antarctic isopods. A typical deep-sea genus, *Storthyngura,* comprising 38 species (including 12 antarctic species), was chosen for a thorough analysis of species characteristics and affinities to species elsewhere. Close attention to species differentiation was necessitated by the little-known fact that zoogeographic separation at abyssal depth occurs mainly at the species level (George *and* Menzies, 1967a and 1967b). For considerations of phylogenetic relationships, it is essential that "true" affinity between species be established by more sophisticated and less subjective methods. This necessitated a detailed qualitative analysis and a quantitative computer analysis of 158 characteristics by employing the programming of Rogers and Fleming (IBM 7044 and CEC 1604) of the taxometric computer program at Colorado State University, Ft. Collins, Colorado. The results indicate a high-percentage relationship between the computer and qualitative analyses. On the basis of this detailed study, a phylogenetic tree showing the different evolutionary routes has been constructed. Further, the geographical distribution of morphologically allied species indicates that 100 percent of the groups represented in the Antarctic have certain striking patterns. This group analysis suggests that the genus probably evolved in the antarctic and radiated into other world oceans.

Data on *Storthyngura* species collected by *Eltanin* in different months of the year in the Scotia Sea indicate a seasonal or cyclic reproductive activity in abyssal organisms (George *and* Menzies, 1967c). Since there are no known seasonal environmental changes in the deep sea comparable in magnitude to those at the sea surface, the persistent breeding cycle of deep-sea isopods may reflect their derivation from shallow-water organisms.

Based on the isopod material collected on *Anton Bruun*'s Cruise 11 and *Eltanin*'s Cruise 3, a monograph entitled *The systematics, distribution, and origin of marine isopod Crustacea of the Milne-Edwards Trench* has been compiled. The ecological and distributional data gathered over 500-m increments to a depth of 6,200 m have been subjected to a factor analysis in order to determine the salient features correlated with abyssal life. The results led us to question the concept that a hadal or ultra-abyssal fauna is an ecologic or faunistic unit with distinctive characteristics (Menzies *and* George, 1967).

A study was made of the distribution of eye-bearing and blind benthic isopods in relation to depth and latitude. The ocular index, *i.e.,* 50 percent of species blind, is located at a shallow depth (100-500 m) at arctic and antarctic latitudes and in deeper water (1,300 m) at lower latitudes. This equatorial submergence of ocular index 50 can probably be explained by the emergence of typically abyssal genera to shallow water in polar regions.

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Nonetheless, on the basis of the presence or absence of eyes alone, it is a reasonable conclusion that the shallow waters of the polar regions are equivalent to much greater depths in the tropics (Menzies *et al,* submitted).

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Studies of the Mite *Alaskozetes antarcticus* (Michael)

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Alaskozetes antarcticus (Michael) is a large (1,059.0 micron) orbatid mite which is suitable for some physiological and behavioral testing. During 1966, it was studied at Norsel Point on the Antarctic Peninsula by representatives of the Bernice P. Bishop Museum.

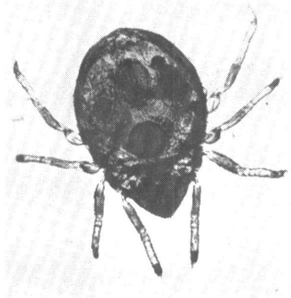
This mite occurs in dense aggregations on the sides and undersurfaces of rock rubble and in small cracks on vertical cliffs. It is associated with soil materials that are rich in phosphorus and potassium, which probably come from animals directly or indirectly associated with the marine environment. For example, conspicuous concentrations of *Alaskozetes* were observed near the wallows of the southern elephant seal, *Mirounga leonia,* where the ammonia and organic nitrogen content of the soil was sufficiently high to limit the growth of chlorophytic algae.

Alaskozetes is found at the periphery of avian roosting and nesting sites, and it occurs within the feather debris left by the giant petrel, *Macronectes giganteus,* which nests at Norsel Point. Often *Alaskozetes* is associated with microalgae, such as *Chlorococcum* sp., and it may be seen on the thallus of the chlorophyte *Prasiola* sp.

Alaskozetes is occasionally found in aggregations that have an internal three-layered stratification. Eggs and larvae form a layer adjacent to the substratum. They are covered by the empty skins and the inactive bodies of larger deutonymph and tritonymph juveniles. The uppermost layer is composed of the resting bodies of newly emerged adults, individuals that have lived through the winter, and gravid females.

In the larger aggregations, accumulations of moulted skins that approach 0.5 cm in thickness form a diversified and protective habitat for small larvae.

Fecal pellets from the adult *Alaskozetes* transmit viable chlorococcoid algae into areas where egg incubation occurs. This fact was demonstrated by the preparation, in the laboratory, of algal cultures from isolated fecal pellets. Also, newly emerged larvae were observed feeding on the algae *Eremo-*



(Photo by author)

Alaskozetes antarcticus *(Michael). The adult mite is about 1 mm in length.*

(Photo by author)

A small portion of an aggregation of Alaskozetes antarcticus *(Michael).*