

and from winter to summer. Any one who has examined the quantity of organisms obtainable in silk nets at different seasons in boreal waters will know the magnitude of these changes. I may cite some of my own results from the coast waters of Norway.

During my winter cruises in the sea between northern Norway and Spitzbergen and 240 miles west of Tromsö, the sea was everywhere found to be so poor in organisms from the surface down to 100 fathoms that we had to drag our nets for $1\frac{1}{2}$ or 2 hours before we perceived any organisms at all on the silk cloth of the nets. In February I made a haul in the Westfjord (Lofoten) with an 8-foot hoop-net from 200 metres to the surface, and caught only 380 specimens of *Calanus finmarchicus*, although perhaps 1000 tons of water were filtered by the net. On the 10th of April a haul was made on the bank off Tromsö (Svendsgrund), with the same net and from 100 metres to the surface, when 2356 specimens of *Calanus* were taken. Another haul yielded 16,420 specimens of *Calanus*, and a third about one litre of *Calanus*. This obvious increase in their numbers continued during spring, and on the 1st of June in the Altenfjord a 10-minutes' haul with a 1-metre net at the surface yielded so many individuals of *Calanus*, that their weight, after squeezing off the water, amounted to 0.8 kilogram,—a weight corresponding to at least two millions of individuals. In July some hauls with the 8-foot net were made in the Norwegian Sea, generally from 200 metres to the surface, and as a rule 200 or 250 c.c. of *Calanus* were taken, mainly consisting of *Calanus finmarchicus*. These hauls indicate the characteristic features of the occurrence of minute crustaceans in boreal waters: the poverty of winter, the abundance of summer.

Gran and Damas have continued these investigations during the cruises of the "Michael Sars," at the same time taking up the study of the life-history of *Calanus finmarchicus*. Gran arrived at the conclusion, now confirmed by more recent investigations, that the life-cycle of this species is annual. During winter only adult animals are met with. They breed in spring, and the young pass through five larval stages; in the sixth stage they assume the shape of the adults. From a detailed study of the material collected in the nets Damas attempted to draw a chart showing the spawning places, arriving at the conclusion that spawning does not take place to any important extent in the fjords, nor on the coast banks, but principally above the