

Arthropods of Southern Victoria Land

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Owing to the illness of Dr. Russell Strandtmann, the Principal Investigator, work planned for the Fossil Mountains in Marie Byrd Land in the 1968–1969 summer could not be carried out. A program under the direction of William Voss, assisted by Spurgeon Strandtmann, was carried out in the dry valleys of southern Victoria Land, on Ross Island, and on several smaller islands in McMurdo Sound. These activities consisted of becoming acquainted with the conditions and methods of collecting in the Antarctic and surveying and making collections from new as well as previously studied areas. Since moisture sources and populations of arthropods vary from year to year, it is not always possible to re-collect in exactly the same spots every year. However, several sites were selected as close as possible to previous ones.

The main impetus of the work last season was directed toward collecting large samples, consisting of 250 or more individuals of each species at each site, from fewer areas. These mites will be prepared, measured, and subjected to statistical analysis. Populations of arthropods from different areas on Ross Island will be compared, and these in turn will be collated with specimens collected in the dry valleys. One study, made with specimens of the mite *Stereotydeus mollis* collected during the 1967–1968 season, has provided some interesting results on variations within the populations as well as consistent characteristics of the species compared.

The areas in which sites were selected for re-collecting included Cape Royds, Cape Crozier, The Strand Moraines, and Observation Hill in the McMurdo Station region. In addition, searches were conducted at sites in several previously uncollected areas of Taylor Valley, Garwood Valley, and the Dailey Islands. Large collections were made from all of these areas except on Observation Hill, which has been greatly disturbed by construction activities.

Though attempts to rear several groups of mites in the McMurdo biology laboratory were, for the most part, unsuccessful, one very large group of mites was collected in a mummified seal eyeball and maintained within it for over 12 weeks. It was not determined whether the mites were feeding on the dried flesh or on a protistan growing within the eye.

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At most collection sites, the spatial distribution of mites and springtails was rather uniform and the numbers present somewhat sparse under those rocks damp enough to support them. At almost all collection sites, the mites were more numerous than the Collembola. However, on December 21, 1968, at The Strand Moraines, approximately 77°44'S. 164°31'E., a small pool of water surrounded by rocks and pebbles was observed. We found that almost every rock within the immediate proximity sheltered a vast population of the springtail *Gomphiocephalus hodgsoni*. It was possible to pick up two rocks, knock them together, and dislodge several dozen specimens at a time. Very few mites were evident, and an hour-long search turned up only a small number. The reasons for this unusually large number of springtails is not known.

Biological Weathering in Antarctica

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Two major factors may govern biological weathering in Antarctica: (1) the amount, type, rate of accumulation, and composition of the biological material; and (2) the mechanism by which biological material and mineral substrata are brought into sufficiently close contact that chemical interactions can occur.

The first factor may be evaluated by examination, characterization, and analysis of those soils having a biological component, whereas the second factor is primarily a function of the moisture status of the soil or weathering surface. The field study of the 1968–1969 austral summer consisted of a series of observations and experiments to evaluate these two factors.

Antarctic soils which have a significant biological component are the Ornithogenic soils (guano soils) of penguin rookeries and the Protoranker (moss-covered) soils. Lichens also contribute to soil formation through chemical weathering by organic exudates.

The Ornithogenic soils were sampled at Cape Royds (Ross Island) in the Adélie penguin rookery. The samples were taken along a sequence from sites presently occupied by penguins to sites abandoned for some time. Ahumic soils (Tedrow and Ugolini, 1966) from the same area, uncontaminated by penguin excreta, were also sampled as a control. Samples were also taken from a rookery at "Blacksand Beach" near Cape Royds which had been reported by the *Terra Nova* expedition of 1910 as abandoned at that time.