been taken in the high mountain regions. For example the Linnaean species Podura aquatica, of world-wide distribution, found commonly near sea level, was collected at elevations ranging from 6,500 to 10,000 feet.

Another interesting discovery was the almost complete absence of species of two of four subfamilies of the single family that constitutes the suborder Symphypleona, one of the two suborders of Collembola. Although numerous species of the other two subfamilies of this suborder were collected, only one species of the third subfamily and none of the fourth were discovered. Altitude directly may not be the determining factor in this instance; a short period of warm summer temperatures may not permit completion of the life cycles of the species in these subfamilies, probably the most highly specialized members of the suborder. Further investigation of this question seems warranted.

A small amount of collecting was done in areas earlier scourged by forest fires. An interesting and important study would involve the determination of the rate of repopulation of such burned areas by the Collembola which constitute a major part of the fauna of the soil and play an important role in the breakdown of organic materials in the biological cycle of soil formation.

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Rodent Population Studies in Jackson Hole, Wyoming

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Collections were made during a period of about a month during the summer. Results of these collections are not yet available.

Stress as a Factor in Parasitism

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Research during the summer of 1961 was a continuation of a study which was started in June, 1959. The overall purpose was to investigate the relationships between stress on an animal and its parasites. This problem not only involves the internal environment of a host, which is the habitat of parasites, but also is related to population pressures and behavior.

As in previous studies, the host animal was the Uinta ground squirrel, Citellus armatus. These animals were live-trapped, examined immediately for parasites to get a field count, taken to the laboratory, weighed and caged. They were fed dandelions in the morning and rabbit pellets in the afternoon. Water was present at all times. Fifty-three squirrels were captured but a few soon died of unknown causes.

The operating unit was 20 cages each with two animals. Periodically one animal from each cage was stressed while the other was left as a control. The squirrels were plainly marked with fur dye and a record was kept of parasite population and animal weight. Stress consisted of placing the same half of the squirrels about every day in a large wooden box for approximately two hours. Here they would fight vigorously. Frequent examinations, using a standardized smear technique, were made of fecal pellets to get a protozoa count. Blood smears were made of each animal but only one was found to be infected with Trypanosoma. After 36 days of stressing, the stressed group was left alone while the original control group was stressed. This exchange of treatment lasted 11 days.

The parasite counts indicated that coccidia decreased in numbers in the control animals as compared to the field count and increased significantly in these same animals when they were stressed later on in the summer. Coccidia in the original stressed group increased 260 per cent in numbers as compared to the field count and when these animals were released from stress the coccidial count decreased 30 per cent.

Trichomonas showed a significant increase in numbers in both controls and stressed squirrels but, curiously, the increase was greater in the control group. This reaction illustrates that caging alone is an important stress factor. When stressful conditions were reversed for the two groups, the Trichomonas count came down in both groups.

Interpretation of the results will require considerable study. It appears, however, that the stress of crowding and fighting favors parasitic infection. The increase in numbers of Trichomonas in both groups of squirrels when they were placed in the stress box leads to this conclusion. The pronounced increase in coccidial oöcysts in the original stressed animals and subsequent decrease when the squirrels were removed from stress is also highly suggestive. Some of the increase in parasite number might be due to greater opportunity for transfer of organisms under crowded conditions. The stress box, however, was kept thoroughly dry and clean between stress sessions so opportunity for coccidial oöcysts to mature was negligible.

Further work is planned which should clarify the relationships between these protozoa and the squirrels and includes a study of intestinal worms and blood parasites.

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