

bottom of the U shaped valley, and provide rapid drainage of surface water. Rainfall is heavy and rivers may rise 3-4 feet in a night. Figures given for annual rainfall were 230" at Marion Camp on the Homer side and 250" at Milford at the mouth of the Cleddau, but the Meteorological Office has a record of 380" in one year at Homer itself. Every day avalanches fall from the snow field down the cliff bringing debris to the talus slope below. Near the crest of the range, snow-covered during Dr. Oliver's visit, is the sparse alpine vegetation, at mid-levels, where it is not too steep, tussocks flourish, on the talus slopes there is scrub, and the valley floor carries forest dominated by one sole tree species, silver beech (N. menziesii). The interior of the forest near its upper limit is very wet and mossy with abundance of filmy ferns, Astelia and lichens. Six deer have been known in the Homer valley. Hares are present as well. On the Cleddau side one hare (thought to have gone through the tunnel) was reported. The vegetation is still relatively little damaged.

The slides showed us first the Wilderness in the dry tussock country east of Lake Te Anau. This sharply bounded area, some hundreds of acres in extent, lies within the terrace system of the Mararoa River. Its most striking feature is low growing Dacrydium bidwillii in bushes 6-10 feet high and up to 20 feet across. Dr. Oliver considers that the peculiar vegetation has developed as the result of wet conditions caused by the tributary stream that flows, at some seasons, through the Wilderness to the main river.

At Monkey Flat we had our first taste of real Homer vegetation, in a picture of low globular bushes of Hebe of several species, with flowering Celmisias peeping out between. The tussock plants, the scrub of the talus slopes, Dracophyllum fiordense in the Cleddau valley, and a considerable number of the 13 species of Celmisia were shown in general and detailed pictures. Special mention must be made of one photograph taken by Mr. Salmon, a really satisfying study of Ranunculus lyallii, a plant that has been responsible probably for more wasted film than any other in the flora.

On the flatter top of Key Summit on the Livingston range we saw typical bog plants -- Oreobolus, Donatia, Phyllachne, Drosera, and, on the drier knobs, straggling bushes of Dacrydium bifurcatus.

Notes can be given on a few only of the many species discussed: - Chrysobactron so large that it might be mistaken for the C. rossii of the Sub-antarctic Islands; a gummy Celmisia once confused with the coastal C. lindsayi but now placed in C. bonplandii has a trailing stem a foot or more long; C. hectori with small neat grey leaves was a mass of flowers amongst rocks; Olearia operina from the shores of Milford Sound; a puzzling Olearia hybrid, possibly O. ilicifolia x O. moschata; Hebe subalpina, described as a ball of white flowers; from Milford Sound a fixed form of Coprosma propinqua with very big leaves; from Homer a Coprosma that in forest forms a slender shrub 6' tall, in scrub is prostrate and only reaches 1', and is more scrubby still on rock, would be called C. astoni in the bush form, but perhaps is too near to C. cuneata of the Auckland Is.; Coprosma rugosa at Milford, instead of being a hard shrub becomes a weeping tree 12-15' tall; Anisotome intermedia with its large heads of white flowers is conspicuous at Dale Point, Milford Sound; the little bog plant Actinotus, an aberrant member of the Umbelliferae differs from the Tasmanian A. suffocatus and should be called A. novae-Zelandiae.

#### BACTERIOLOGY AND PUBLIC HEALTH.

Talk by Mr. J. M. Sutherland of the Pathology Laboratory, Wellington Hospital, 19.3.45.

To illustrate the relation of bacteriology to public health Mr. Sutherland chose the Salmonella group of organisms that cause such troubles as typhoid fever and food poisoning.

The Salmonella group is particularly dreaded amongst military forces and is of national importance in India, the Pacific Islands, the Mediterranean, Africa, Turkey, Europe and America. As yet no chemotherapeutic agents, such as the sulpha drugs and penicillin, have been found effective against them on a scale that is practical.

In a typical case the patient consults a physician who diagnoses the trouble and isolates the patient. The bacteriologist has then to isolate and

identify the causative organism. His findings are reported to the Health Department's Medical Officer, whose business it is to trace the source of infection -- it may be another patient, a carrier, food, or water -- and to eliminate the risk of further people being infected.

The *Salmonella* organisms are motile bacilli, each with a body or soma and flagella. By their reactions to standard dyes they are classed as Gram-negative. They are cultured from the faeces, urine, or blood of the patient and are identified not by their size and shape, but by their biochemical and serological reactions.

As a preliminary step in isolating the *Salmonellas* from other organisms a special culture medium is used, an agar jelly containing phenol red as an indicator and sodium taurocholate or ox bile which inhibits the growth of another set of organisms known as cocci. *Salmonellas* are non-lactose fermentors, and after incubation of 24-48 hours develop as clear colonies while the lactose fermentors like *Bacillus coli* give red colonies. From the clear colonies sub-cultures are made, and so the *Salmonellas* are isolated for test.

There are over 160 *Salmonellas* and these can be grouped by testing with different sugars. A table is reproduced showing contrasting reactions of some typical organisms.

		Glucose	Lactose	Saccharose	Mannite
S. Para B.	Acid	/	-	-	/
	Gas	/	-	-	/
S. Typhi	Acid	/	-	-	/
	Gas	-	-	-	-
No Indole					
B. coli	Acid	/	/	/	/
	Gas	/	/	/	/
Indole					

It is seen that *Salmonella Typhi* gives acid but no gas with glucose and mannite while *S. paratyphoid B* and *Bacillus coli* give both acid and gas. *B. coli* alone of these three reacts with lactose and saccharose. Thus by sugar tests alone these three could be distinguished from one another.

An antigen used in serological tests is defined as a suspension of living or dead organisms in water or saline. Such antigens are T A B injections and those for whooping cough and diphtheria. After injection of an antigen (e.g. into a rabbit or a man) the blood develops antibodies in the serum, and an antiserum can be prepared from it. In practice at first an antigen of the killed *salmonella* is injected, and the living organisms are used only after resistance has been built up. The antiserum from this blood then will give complete agglutination if mixed with its own antigen. With any other antigen it may give partial agglutination or none at all, according to the relationships of the organisms in the two antigens. The whole thing is a matter of complicated protein chemistry.

In the soma there are various factors, called somatic factors, while the flagella carry both specific and non-specific factors. By mixing an antigen of an organism with an antiserum produced by a nearly related organism, common factors are eliminated in the agglutination and are leached out leaving the unlike factors still in suspension. Thus if an antiserum from *S. paratyphoid B* with factors 4.5.b.1.2. is mixed with an antigen of *S. aerotrycke* with factors 4.5.i.1.2, the common factors 4.5 and 1.2 are eliminated by agglutination and b and i are left. By reinjection and repeated elimination specific sera for single factors can be developed. To identify any one of the 160 odd *Salmonellas* the unknown antigen is tested against known antisera. Complete agglutination establishes identity. If agglutination is incomplete against tested antisera, the factors present can be recognized and the constitution of the organism is established step by step.

Once the organism from the patient is identified, possible sources of infection can be tested for the same organism. In the case of ptomaine poisoning, e.g. from ham, this must be done quickly, to prevent, if possible, other purchasers

of the same man from collecting the infection. All meat for consumption in the U.S. Army is tested for Salmonella as routine.

In the case of typhoid, the infection may be traced to a carrier, i.e. a person who, though showing no fever, may have typhoid organisms in the normal flora of the intestine for many years and be capable of passing on infection to others. Typhoid can be carried by water so it must be established that all reservoir personnel are non-carriers. A carrier, once located, must be prevented from spreading infection, and must usually be isolated for a shorter or longer period.

Some Salmonellas are very wide-spread, e.g. the same ones have been found in Wellington, in Germany and in Japan. Those from New Guinea have had to be carefully typed so that the right T A B injections could be provided.

In Wellington, typhoid is confined to 2 or 3 cases a year, but in India for instance, where the trouble is more prevalent, interesting efforts have been made to use bacteriophage to kill Salmonellas in drinking water -- chlorination is not sufficient to do this.

It was clear from Mr. Sutherland's talk that it is due to the constant vigilance of public health officers that any threatened epidemic from Salmonella organisms is checked at its source, and this represents only one group out of the many that are kept under control through the painstaking work of the bacteriologist.

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#### THE GARDENING CIRCLE.

Inspiring news has come to hand to growers of our native alpine plants in the form of a small and beautifully illustrated booklet "New Zealand Alpines in Field and Garden" by Mr. W.B. Brockie N.D.E. (N.Z.).

Mr. Brockie has given full and very simple instructions how to grow our alpine. With this advice, every grower of native plants should try to give over a small suitable patch of open ground in the garden to mountain species.

Mr. J.A. McPherson, writing as Director of the Botanic Gardens, Christchurch, says in a foreword to Mr. Brockie's book "An awakening to a more intensive study of our native plants is slowly but steadily taking place, and every New Zealander will take pride in the thought that the spirit of Leonard Cockayne still lives".

So let us see if we can persuade *Celmisias* to grow in the lowlands (as exotic alpine consent to grow) not just in ones and twos, but hundreds of them. This we feel sure could be accomplished, if we spent the time on our *Celmisias* that so many people give ungrudgingly to their exotics. Certain species of *Celmisia* germinate freely in pots and seed boxes, and the Gardening Circle has these seeds for sale, also seed of other alpine plants. *Celmisias* are really most intriguing, unique and handsome even when not in flower, with their diverse and unusual foliage. Three members of the Gardening Circle have already set out to grow *Celmisias* by the hundred from seed, and are having quite successful results.

Mr. Brockie says "Nearly all of our mountain plants can be successfully grown in a rock garden and they need only the same attention in providing suitable soil, drainage, moisture and shade that is required by the many types of alpine found the world over. In the warmer and sunnier parts of the country a southern aspect for the New Zealand alpine garden is desirable, but a perfectly level bed attractively studded with well placed rocks is quite suitable. Good drainage is essential in every case". This useful and attractive booklet may be purchased for the small price of 3/6 and every lover of New Zealand alpine should possess a copy.

As already detailed in the Annual Report, the Gardening Circle has during the past year added more than five pounds to the Bulletin Fund, which is being built up to provide for a bigger and better Bulletin to tell us of the latest doings in our own botanical world. Grateful thanks go to Mrs. Sinclair for sending in cut flowers for sale at evening meetings, and to all those who contribute seed, especially Mr. Potts of Opatiki, Mr. and Mrs. Parsons and Mr. Smith of Levin, and Mr. Beddie of Petone. The Circle has hopes of supplying almost any native seed, so send in for what you want and every endeavour will be made to get it for you -- and of course we are anxious for you to try our *Celmisia* seed!

Mrs. W.W. Samson, 54 Dundas St., Seatoun.