

been necessarily also deprived of the vegetable food for which it serves as a convenient substitute. At the same time, these men had not been subjected to any other condition that is known to cause scurvy, nor, indeed, had they all been brought equally under the influence of conditions indirectly favourable to the development of this disease.

Although lime juice was not represented in the sledge dietary, it was carried and used by some of the minor sledge parties, and especially by those which started from the ships towards the latter part of the sledging season or visited the depôts where lime juice was stored. The sledge parties which suffered most severely from scurvy were not provided with it.

That the disease appeared in some of the sledge parties at an unusually early period after the first operation of the *vera causa* is no doubt due to the influence of the several conditions prejudicial to health which existed in their most intense degree among the men who composed these parties. These conditions all tended to impair nutrition, but that this impairment should have assumed the character of scorbutic disease was manifestly the effect of the *vera causa*. Nor is this circumstance so remarkable as it might otherwise appear to be when the nature of the conditions and their influence upon nutrition are taken into account. The men had for several months been subjected to comparative inaction on board ship and to the influence there of many causes known to be unfavourable to healthy nutrition; they were then, without any preparation that can be regarded as adequate, placed in circumstances necessarily demanding a most active performance of the function of nutrition, while the nature of these circumstances alone rendered such nutrition difficult, if not impossible. Coincidentally with these changed circumstances, they were deprived of a diet which contained, in quantity sufficient at any rate for ordinary circumstances, that kind of food shown by experience to be the most serviceable in preventing scurvy, and in its place received a diet in which this food was undoubtedly deficient.

II. CASES OF IMMUNITY FROM SCURVY.

The instances of immunity from scurvy which have been recorded in evidence among sledging parties, whose journeys extended over several weeks, and in some instances over several months, seem, *prima facie*, to have injured the value of the authoritative precedents which the history of scurvy has established.

The evidence, however, upon the subject of this immunity is not conclusive. Some of the witnesses attributed it to the physical condition of the men before starting—a condition which they believed was due to the hygienic precautions observed during the winter months,—and likewise to the special conditions existing during sledging. Others again were of opinion that the amount of meat consumed by these sledge parties was a sufficient cause for the immunity they enjoyed; that the pemmican in some way supplied the element which the system demanded, and proved the means of better fortifying the constitution against the disease.

Though the work, to which these sledge parties were subjected, was often hard, it was apparently not sufficiently so to develop the disease during the time in which the *vera causa*, if existing, was in operation.

With the present information there is not sufficient evidence to appreciate the importance of these exceptional and isolated instances, and something more conclusive is required before a decided opinion can be offered regarding them.

Whenever any immunity was enjoyed by the officers over the men of the same ship, there was convincing proof in evidence that the food of the former was more varied and in greater abundance, and the operation of the predisposing causes less continuous or powerful. Whenever it happened that the diet and the conditions were the same for both officers and men, scurvy made no difference, but attacked them equally.

In the recent expedition only 5 officers, out of the total of 26, appear to have suffered from scurvy, whereas 55 men out of 96 suffered. The explanation of this immunity may be found in the circumstances that have been referred to. The officers subsisted on a more varied diet than the men while on board the ships, and this variety, besides, was to some extent constituted by the use of several substances, and notably of milk, wine and preserved fruits, which are probably themselves antiscorbutic (41, 284, 985). When employed in sledge journeys, the officers no doubt subsisted on the same diet as the men; but the other conditions to which they were subjected were not usually in all respects the same as those to which the men were subjected. One of those conditions, and probably one of the most potent in developing the disease in the recent expedition, was severe physical labour; and the evidence shows that the officers were not subjected to this condition in an equal degree with the men, nor, indeed, would it have been compatible with their special duties that they should have been (1452, 2973, also "Report of Proceedings," by Captain Nares, Arctic Expedition, 1875-6 (C.—1636), p. 27).