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during your commission?—I am speaking now by my present knowledge.

157. I suppose that these four men were subjected to a medical examination before they started on the travelling expedition that we are now talking about?—Yes, they were reported healthy men; but the men that had been employed at the galley between decks during the winter were naturally sent on the shortest journey.

158. In fact, in your opinion, and in that of the medical gentlemen who examined these men, they were quite able to undertake comparatively short journeys of from five to eight days, and at the time they started there was no suspicion or evidence of the presence of scurvy in them?—They were considered perfectly able to undergo the work, so far as any man ever can be, and there was not the slightest suspicion at that date of any one on board the ship having scorbutic symptoms, with perhaps the exception of the ship's steward, who had been ill a long time.

159. During this travelling, I understand, the dietaries were necessarily changed from that on which the men subsisted on board ship?—Very considerably.

160. We have here the diet list for your sledge parties; may we take it for granted that this list represents the dietary served to these four men during the travelling?—Yes.

161. In your opinion is this diet list a sufficient one for men employed as these four men were employed during five or eight days?—On first starting they could not possibly have eaten it to the full extent; but what is saved in the early part of the journey is used as an extra ration later. But after thirty or forty days' arctic travelling it is difficult to obtain as much food as the travellers could consume.

162. In fact the solid articles of diet were somewhat in excess at first?—For the first two days they were in excess.

163. In your opinion, therefore, the total quantity of food represented by such a dietary is ample for men employed as these four men were during five or eight days?—So far as an arctic ration for consumption, with a temperature of from 30 degrees to 40 degrees below zero can be; if it is sufficient to keep men in health anywhere it would also keep men in health in the arctic regions.

164. In reference to the antiscorbutics represented in this sledge dietary, do you consider that they differ in any important respects from the antiscorbutics represented in the dietary used by the men on board ship?—The diet is totally different. On board ship half the allowance of meat issued is salt meat; on a sledge party the one pound of pemmican allowed daily is fresh preserved meat, and the four ounces of bacon is only slightly salted. On board the ship a ration of lime juice was issued; with the sledge parties working in the cold weather no lime juice was included in the rations, and the other antiscorbutics, such as cabbage and preserved fruits, could not possibly be cooked while travelling. The onion and curry powder is an extra ration used while sledging, which is not used on board the ship, and forms a very important article of diet.

165. Looking at your arctic sledge diet list, can you point out which of the substances mentioned in that list are in your opinion antiscorbutics?—I consider all good food an anti scorbutic, and that no one article of diet can be used separately when men are undergoing severe labour.

166. Although no one article of food will maintain health, you are of course aware that a certain amount of judgment must be exercised as the result of experience in the combination of articles?—That is what I allude to. The present scale of sledging diet has been drawn up after great experience, and after many very successful lengthy journeys had been performed on that diet; and the only outbreak which has ever occurred similar to ours was in the expedition commanded by Sir James Ross, when on the usual ration that was allowed on board ship, namely, salt and

preserved meat alternately, and an allowance of lime juice, the crew returned after an absence of 40 days, just able to struggle on board in the same manner that our men were.

167. Returning again more especially to the cases of these four men, I observe that in the dietary which we have learned was supplied to them during their five or eight days' travelling, one antiscorbutic, namely lime juice, which is represented in the dietary served to the same men on board ship, is absent: does this represent the fact?—They were not supplied with lime juice while absent from the ship, but also they did not consume during that time any salt meat whatever.

168. (*The Chairman.*) With reference to the sledge party belonging to Sir James Ross's expedition, which you state was absent 40 days, did their diet consist of the ordinary ship's rations, or had they a sledge diet?—The ration is not actually published, but I presume it can be obtained.

169. Omitting now the 7th, 8th, 9th and 10th paragraphs, we will proceed to the 11th, the subject of which is connected with that which we have been considering: "The use of lemon juice, when travelling, should be enforced in the same manner as already recommended for the men on board the ship." Was that carried into effect?—No.

170. (*Dr. Fraser*) Can you state to the Committee why it was not carried into effect?—The impossibility of using the lime juice without a total change in the equipment of a sledge party, and knowing that on very many occasions previously no ill effects had arisen from the use of the diet which I chose.

171. Can you tell us what inconvenience to the equipment of the sledging parties it would have caused to carry the necessary quantity of lime juice?—The extra time that would be occupied to thaw the water necessary, and the extra weight of the ration which would necessitate a reduction of three days' provisions out of the forty-two that are generally carried, and also the difficulty that there would be in extracting the frozen lime juice from the bottle in which it would be obliged to be carried.

172. With the heating appliance at the command of the sledging parties, can you give the Committee an idea as to how long would be spent on each occasion that an issue of lime juice was made, in thawing the lime juice?—To melt sufficient snow for each man to have sufficient water to mix with his lime juice, besides the trouble of thawing the lime juice itself, would occupy, when the temperature was -30° , about three-quarters of an hour; that is, without considering the time for trimming the lamp and re-packing the sledge.

173. I suppose the sledge would require to be re-packed at any rate if the issue were made at a time when there was a halt?—Yes; but at those times the tea already issued is sufficient to quench the men's thirst.

174. How long is occupied in trimming the lamp, do you think?—The lamp would certainly take another half-an-hour in trimming and in waiting for the stearine to freeze solid again, which would be necessary before starting the sledge over a rough road. On smooth roads further south, I have frequently melted water on the sledge whilst it was proceeding on the journey.

175. Are these facts the result of observation or your personal experience, or are they inferences?—From my own personal experience.

176. How many lamps were usually carried in a sledge?—Two; a spirit lamp and a stearine lamp.

177. Were they usually both in use together?—No. To keep the weights down as much as possible only one cooking apparatus is carried. The stearine is preferred generally for fuel, but in consequence of its being dangerous to leave it in dépôt at the mercy of animals, the spirit is usually left in dépôt and used during the return journey. But on former arctic journeys some sledge crews had been supplied with two apparatuses; and they had used spirits of wine to