

so frequently as was requisite. The Medical Officers of the two ships from time to time examined the air of the men's sleeping quarters in the lower decks, by the test usually employed for determining the amount of impurity; and assuming, as all the circumstances warrant, that the air in the arctic regions does not contain any marked excess of carbonic acid, the air in the lower decks was shown to be very impure. The average of these analyses of the amount of carbonic acid, which indicates also the amount of organic and other impurity, was, in the "Alert," 0.3314 *per cent.* of carbonic acid (Appendix No. 20), or more than five times as much as the maximum quantity in a sufficiently pure air; and in the "Discovery," 0.415 *per cent.* (Appendix No. 21), or nearly seven times as much as this maximum quantity.

3. *Dampness.*—The insufficient renewal of the air in the lower decks was necessarily accompanied with accumulation of vapour, derived to some extent from the exhaled breath, but also from steam issuing from the food served and consumed on these decks. The removal of this vapour by the existing means of ventilation was impossible, and, accordingly, the atmosphere was generally damp; moisture condensed on all the cold surfaces, and at times, bedding and clothing became damp notwithstanding every care and attention (119, 1654, 383, 2535).

4. *Exposure to extreme Changes of Temperature.*—The mean temperature of the "Alert" during winter of the lower deck—

|                                                  |   |    |   |         |
|--------------------------------------------------|---|----|---|---------|
| At the height of 49 inches above deck, was 49°·8 |   |    |   |         |
| At                                               | " | 71 | " | " 53°·7 |
| At                                               | " | 59 | " | " 52°·8 |
| At                                               | " | 17 | " | " 43°·1 |

The mean temperature of the outer air during the month of March—the month which proved the coldest in the late expedition—was stated to have been  $-40^{\circ}$  in the neighbourhood of the "Alert," and  $-41^{\circ}$  in the neighbourhood of the "Discovery."

5. *Deficiency of Fresh Meat in the Dietary.*—In the Report of the Admiralty Arctic Committee, which related to the equipment and fitting out of the Arctic Expedition of 1875, attention is drawn to the existence of animal life in the highest latitudes yet reached in Smith's Sound. The experience of the recent expedition seems to show that animal life decreased the higher the latitude attained, until it became scarce in the winter quarters taken up by the ships; for whilst the crew of the "Discovery" was able to obtain a sufficient supply of large game to permit of fresh meat being issued on 53 days, the crew of the "Alert" was restricted during the same period to an issue of fresh meat on only 14 days.

6. *Confinement in the Lower Deck during the greater part of the twenty-four hours.*—The injurious effects resulting from a vitiated atmosphere, and, indeed, from nearly all the other conditions that have been referred to, would no doubt be intensified by prolonged daily confinement in the lower deck. There is evidence also to show that some relationship exists between confinement and the development of scurvy, for the liability to scurvy would appear to increase in proportion to the duration of the confinement (5448). This evidence is derived from investigations of scurvy among prisoners in gaols, and notably in the Penitentiaries at Perth\* and Milbank†.

To these various conditions, the men had been subjected during the time they were confined in winter quarters. They nevertheless remained free from scurvy, with the single exception of one case on board the "Discovery." The exceptional case, however, was that of a cooper, who became ill early in January, 1876, and who, according to Dr. Ninnis, "has been accustomed to drinking to excess, dislikes preserved meat and "vegetables," and, further, is said to have "surreptitiously abstained from the fresh "beef, preserved meat and vegetables whenever he found the opportunity."‡

It would, at the same time, be contrary to all experience to suppose that men subjected for many months to the conditions existing during this winter were not injuriously affected. To what extent they were affected, and whether any causal relationship can be traced between these conditions and the numerous cases of scurvy represented in the following tables, will now be considered.

\* On Scurvy, Sir Robert Christison, Bart., "The Monthly Journal of Medical Science," June and July, 1847.

† On the Treatment and Pathology of Scurvy, "The British and Foreign Medico-Chirurgical Review," October, 1848, p. 447.

‡ Remarks accompanying the Nosological Return of H.M.S. "Discovery," for the quarters ending 31st March and 30th June, 1876.