

Baker Lake. The weather programme at Baker Lake is actually performed by Royal Canadian Corps of Signals personnel of the Department of National Defence. There are three Canadians at Eureka Sound and five at Baker Lake. The *New York Herald-Tribune* reported on 13 April that the Eureka Sound station had sent its first wireless weather report on 12 April 1947.

### RECORD LOW TEMPERATURE IN YUKON TERRITORY

[Based on notes in *The Times*, 1 February 1947, and *St John's Evening Telegram*, 4 and 24 March 1947.]

Early this year the lowest known temperature on the North American continent was recorded at Snag Royal Canadian Air Force station in the Yukon. The published figure, in *The Times*, was  $-78.7^{\circ}$  F. ( $-61.5^{\circ}$  C.), and in the Newfoundland paper,  $-81^{\circ}$  F. ( $-62.7^{\circ}$  C.); that is to say approximately  $111^{\circ}$  of frost on the Fahrenheit scale. Snag is about 200 miles north-west of Whitehorse and a little east of the Alaskan border. According to *The Times* report the new record at Snag was one-fifth of a degree lower than the previous minimum recorded at Good Hope, Northwest Territories, in 1910. For comparison, the minimum recorded in Siberia is  $-94^{\circ}$  F. ( $-70^{\circ}$  C.), at Verkhoyansk, about fifty miles north of the Arctic Circle.

One of the interesting features of the occasion at Snag was greatly increased audibility, both along the surface and from distant aircraft. Another was that the freezing of human breath produced a continuous hissing sound. The breath of a man walking left a trail of vapour several hundred yards in length and lasting several minutes. The breath of a group of dogs produced, at tree-top level, a little cloud which remained until the temperature rose to  $-60^{\circ}$  F. ( $-51.1^{\circ}$  C.).

### EXCHANGES OF HEAT AND TOLERANCE TO COLD IN MEN EXPOSED TO OUTDOOR WEATHER

[Review of paper by E. F. Adolph and G. W. Molnar in *American Journal of Physiology*, Vol. 146, No. 4, July 1946, pp. 507-37.]

The authors give an account of a series of experiments in which men were exposed to temperatures varying from warm to bitterly cold. The usual length of exposure was for four hours and the subjects were almost naked. The work was done during the months of September, October and November 1946 on the roof of a five-storey laboratory building in Rochester, New York. Records were kept of the wet and dry bulb temperatures of the external air: wind velocity, cloudiness and the height of the sun above the horizon were measured. Various physiological estimations were made, the more important being pulse rate, blood pressure, skin and internal body temperatures, rate of breathing and oxygen consumption, and the effects of exposure on the concentration of the blood.

In general, the results of these experiments followed closely those already obtained by other workers from exposing clothed men to more severe conditions of cold. The writers wisely emphasise the fact that the sensation of feeling cold is the result of a fall in skin temperature, and not necessarily of a drop in body temperature. The important part played by wind velocity in chilling the body is stressed. It is well known by those living in cold climates that a temperature of 40° below zero with no wind is preferable to 10° below with a thirty miles an hour wind. The wind removes the layer of warm air surrounding the body and its clothing, thereby increasing the amount of heat lost.

The body consumes more oxygen in a given time if its internal temperature falls, and this may partly be explained by the shivering which occurs after exposure to a temperature of 13° C. (55° F.) for about a quarter of an hour. It is possible that shivering may affect the endurance of the individual and his tolerance to cold. Shivering is hard work, and the muscular exercise involved is followed by fatigue. Men who approach their limits of endurance become numb and indifferent. Fatigue makes them sleepy just at a time when survival depends upon wakefulness and physical activity. This is because few people continue to shiver when they sleep and, therefore, deprived of the heat produced by the muscular effort of shivering, the temperature of the body falls progressively during sleep and, in these circumstances, consciousness may never be regained.

These experiments confirm previous observations that exposure to severe cold makes men unable to concentrate, and may be accompanied by mental confusion. In a few cases of extreme exposure, the subjects were only partially aware of their surroundings and could not be relied upon to count their own pulse rates. In some cases there was difficulty in remembering what had been said or done during the experiment.

The effects of exposure to cold for periods up to four hours were, in some instances, noted for at least twenty-four hours afterwards. Soon after coming indoors, "chills" were experienced. These might be regarded as continuations of shivering that persist during the warming-up period. As the skin became warm, numbness was replaced by an increased sensitivity and pain was felt, even if the skin was not touched. The desire to get warm persisted for one to three hours, and the subjects found that a warm shower bath, lasting about an hour, was needed before the hands and feet felt warm again. Most of them felt sleepy and exhausted after the hot bath, and, as a rule, they did not wish for food until they had been to sleep. It is interesting to note that no signs of acclimatisation to cold were observed during the course of the intermittent exposures to cold which the subjects endured.

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