CLOTHES AND FUEL SAVING

BY

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If when France fell and her coal supply ceased our miners had all been kept in the pits and none enlisted, through foresight of future demands of new munition factories, no shortage of fuel would have resulted. The shortage has now come at a time when there is rationing of food, and particularly of fats, which have the highest heat-producing value, and of clothes by means of which body heat is conserved. If no fires are lit and people feel cold they can keep warm by greater activity, some 80% of the energy spent in muscular work appearing as heat. In consequence, however, there will be greater need of food, and if this is not available, loss of body weight. The alternative is to put on more clothes, and this is the most economical plan. Eskimos, Arctic travellers, and airmen keep warm by suitable garments enclosing all the body except the face in wind-proof manner. An Eskimo clad in furs will watch by a seal hole for hours, and even days, when there may be 50 degrees or more of frost and Arctic winds blow. Roman Catholic priests nurtured in Europe live in the far north in like manner with the Eskimos, whose diet of fat fish and seal meat and blubber is of high energy value. The greatest saving of fuel will be made if people will clothe themselves so that the temperature of factories and rooms can be kept at a lower level than usual. For those adequately clothed only enough artificial heat is needed to keep the hands warm enough for doing skilled work. To effect this great saving the clothing ordinarily worn out of doors for travelling can be brought into use, an overcoat, cloak, or raincoat being worn over the underclothes. The factory workers can wear their warmest underclothing under the trousered overalls supplied for their work.

Conservation of Body Heat

The northern Chinese withstand months of rigorous cold weather, using little fuel, by wearing long-sleeved wadded gowns, and wadded trousers bound round the ankles. The thin "undies" and skimpy dresses of women require warm rooms in winter; to save fuel they must be amplified as set out above. It is not the fibre of a garment which protects from heat loss, but the air which—a bad conductor of heat—is entangled in the woven mesh and between the layers of clothing. This air, if kept stationary in the meshes of the garments, becomes warmed up nearly to body temperature. Draught or wind must be prevented from blowing this air away, and replacing it continually by fresh cool air. A given volume of fur contains about 2% of solid and 98% of air, and an animal orientates to wind so as to keep its fur from being disordered. Fur and feathers have very great heat-retaining power combined with lightness and flexibility. The water bird by greasing its feathers keeps the water out. A penguin maintains a body temperature some degrees higher than ours when exposed to blizzards and 50 or more degrees of frost. Sedentary workers can keep warm at their desks, as they do when travelling in a car, by wearing an overcoat, a rug round the knees, and, if needed, a hot-water bottle at the feet. So protected, with no fire and window open, work can be done with improvement in health, as in the case of patients given open-air treatment.

While children taken from city tenements are benefited by exposure to open air and sun, this must not be beyond their power of assimilating food and increasing body heat production. Open-air workers suffer little from so-called "colds." These affections are spread by infection in shut-up artificially heated rooms. In sanatoria it is the nurses, who use such rooms when off duty, and not the patients exposed to open-air conditions, who catch "colds." "Colds" only affect Arctic settlements when ships visit them and bring in infection. It will be far better for health to wear more clothes than to cut down ventilation of factories in order to save fuel.

Protective Value of Fabrics

The heat capacity of water is more than 3,000 times, and its thermal conductivity at least 240 times, that of air. The cooling power of water is thus very great. The effect of cold

wind is also great. The heat loss of a naked man in a room at 40° F., with the air moving at a rate of 6½ ft. per second, was twice as great as when clothed. The cooling power of the environment and the protective effect of clothes can be measured by the katathermometer—a large-bulbed spirit thermometer—which is warmed above 100° F., the time to cool from 100° to 95° F. being then taken with a stop-watch. Three knitted gloves put on the "kata" reduced the cooling power to about one-third of that of the naked instrument when suspended in air. The cooling power of water exerted on the naked "kata" was fourteen times that of air at the same temperature. If a thin rubber glove be put on over a thick woollen glove and the "kata" put in water its cooling is very greatly lessened compared with a naked "kata." The protection becomes considerably less when the under-glove is wet, but is still noteworthy, some air being entangled in the wet glove and evaporative loss impeded by the rubber glove. Wool is the best material to wear when clothes are wet, for it does not cling to the skin owing to its elastic fabric. Otherwise, so far as concerns warmth, it is the weaving and not the nature of the fibre which matters. Smooth-woven linings to coats increase their wind-proofness. Water-proofed garments are also wind-proof. Some years ago on inquiry of the Board of Trade concerning the maintenance of life in shipwrecked people, Argyll Campbell and I carried out tests on the heat loss of man when exposed to wind and splashing of waves, and found that a one-piece suit of water-proofed material, designed for them by Sir Robert Davis, lessened such loss by about one-half—that is, when worn over ordinary clothing.

I drew the attention of the Minister of Transport to this research, with the result that our merchant seamen are now all provided with a two-piece dress, designed by the Ministry, made of light oilskin material, and coloured yellow to be visible to air pilots. The dress packs into its hood and can be always carried in the same way as is a gas-mask. This dress adds greatly to their powers to resist exposure when the sailors, after wrecking of their ships, are in boats or on rafts. Given warmth and enough water to drink, they can survive with little or no food for many days.

Physiological Common Sense in Hot Climates

Black or dark garments are worn in cold climates, because the dark colour absorbs the radiant heat of sun and sky, while white is worn in the Tropics because it reflects much of the rays. The black skin of the negro, absorbing the rays, is excited to transpire water vapour and sweat; the glistening moist skin then reflects the rays. Protected by pigment the negro skin can be thin and heat loss is thus made easy from shaded parts. Convention should not keep white children clothed in the Tropics; they should go nearly naked and tan in the sun. Heatstroke is favoured by tight clothes, crowding, hot ground, high humidity of the air, and little wind. It results when the sweat glands cease to be effective, and can be warded off by a wet sheet placed over the patient and a fan set to blow on this and cause evaporative cooling. To secure efficiency of work in hot surroundings clothes must be mostly discarded, ventilation made adequate, and enough water for drinking supplied to keep up sweating. This is best slightly salted to balance the loss of salt in the sweat. The diet must be a light one so as to reduce heat production in the body.

At a quarterly court of the directors of the Society for Relief of Widows and Orphans of Medical Men, held on Oct. 7, the chairman, Dr. R. A. Young, senior vice-president, reported the death of the president, Mr. V. Warren Low, who had held office for thirteen years, and whose death will be a great loss to the society, as he had always taken the greatest interest in its work and was rarely absent from meetings. One new member was elected, and the audited accounts for the half-year ended June 30 were presented and approved. The receipts amounted to £3,611; the half-yearly grants to widows came to £1,937; and £2,090 had been invested in Defence and Saving Bonds. After being in abeyance for some years it was decided to make a Christmas present of £7 10s. this year to each widow in receipt of grants. Membership of the society is open to any registered medical man who, at the time of his election, is residing within a twenty-mile radius of Charing Cross. Relief is granted only to the widows and orphans of deceased members. Full particulars may be obtained from the Secretary, 11, Chandos Street, W.1.