

The following quotation demonstrates the effectiveness of the sun as an auxiliary to the furnace. "Some of those who bewail the high cost of coal would do well to consider the low cost of sunlight for heating purposes. Some observations in a house which had been vacant for a month (in winter) may be cited by way of advertising the heating power of spring sunlight. When the house was opened about three P. M. on a clear day, the temperature outdoors was 46; in the first floor rooms, somewhat sunny, 50; while in a small conservatory the temperature was comfortably high, about 70."<sup>10</sup>

People building houses on the north side of a street often take advantage of this free heat, and design their houses so that the living room will be on the sunny back, the kitchen and stairway on the sunless front.

In mountain districts human settlements are usually found at greater elevations on the sunnier slopes. "It is reported that in the Oetz Valley in the Alps, considerably more than 75 per cent of the population live on the sunny side of the valley. In fact a certain distinction of classes results from this difference. There is developed an aristocracy of the sun, so to speak. The people on the sunny side are, on the whole, more prosperous and better educated, and look with some contempt upon the people of the shady side."<sup>11</sup>

Furthermore in the matter of city planning, solar radiation is an important factor. Dr. Brooks, in his discussion of city planning for Worcester, Mass., says.<sup>12</sup> "Sunshine (in winter) is of the greatest value for house heating in the morning. Therefore the best locations have SE. slopes, such that the exposure of the house is greatest in that direction and least in the sunless direction. Sunshine in summer as well as in winter is most welcome in the cool of the morning, but since the sun rides high in the sky at this season the advantage of the SE. slope is relatively less than in winter. The afternoon sunning on SW. and W. slopes, however, offsets appreciably the cooling by the wind. Best residential conditions should be found on the SE. and S. slopes—above the reach of the cold air accumulations of the valley bottoms. Second best residential locations may be designated as those on SW. and E. slopes, and in the narrow strip comprising one-third of the slope below the best areas."

<sup>10</sup> Brooks, C. F.: *Why the Weather?* No. 295, 1924. A Science Service Feature.

<sup>11</sup> Ward, loc. cit., pp. 304-305.

<sup>12</sup> Brooks, C. F.: *Local Climates of Worcester, Mass., as a Factor in City Zoning: Bull. Amer. Met'l. Society*, June-July, 1923, pp. 83-86.

## HELIO THERAPY <sup>1</sup>

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Heliotherapy, in the words of Dr. Rollier, is as old as the sun itself. Throughout the ages man has exposed to the sun objects he wished to cleanse. Disease and death have always been most frequent in the narrow, sunless, poverty filled alleys of city slums. It was not until well into the twentieth century, however, that heliotherapy began to be applied extensively and in a systematic way to cases of rickets in chil-

<sup>1</sup> This discussion is based on A. C. Rollier's *Heliotherapy*, London, 1923, ch. 7.

dren and to the so-called cases of surgical tuberculosis. Since that time remarkable results have been achieved by exposing the body to the direct rays of the sun, or to the quartz-screened mercury vapor lamp. The ultra-violet rays used in this treatment have a potent bactericidal power; exposed to them the tubercle bacillus dies quickly. Furthermore they stimulate metabolism in children who are suffering from rickets, and cause an increase of calcium and phosphorous necessary for bone building in them.

Heliotherapy is best practiced at a high altitude in a region which is not cyclonically controlled, since bright sunlight rich in ultra-violet rays is vital in this cure. A study of the solar spectrum shows that although the intensity of different portions is approximately the same in summer, the differences between these partial intensities increase as winter is approached. The shorter the wave lengths the more marked is this seasonal variation. At any elevation winter sun is poor in ultra-violet rays. Their value, however, diminishes to a much less extent at a high altitude than in a low country. The intensity of solar radiation is, then, more equable in high locations, and heliotherapy may be practiced there throughout the year. Moreover, in summer the patient who is to be exposed for a sun bath finds the relatively cool and dry air of mountains more stimulating and agreeable than the warm, moist air of the lowlands since the combination of sunlight and hot damp air give the enervating effect of a Turkish bath.

In winter when the duration of maximal intensity of sunlight is relatively brief, the patients are able to make full use of the short hours provided by Nature; in summer, on the other hand, the treatment can be carried out at any time between 6.30 A. M. and 6 P. M. Although early hours are often chosen, especially at low altitudes, because of the high temperatures later in the day, the period between 10 and 2, especially 11-12, is best for sun treatment, because between those hours solar radiation is most intense, and the energy values of ultra-violet rays are greatest. Discontinuous treatments are found most effective when it is hot, since they allow the patient to cool down between exposures. Physicians have found that better results are obtained by giving the patients doses of sunlight with periods of rest in between, than by allowing them to receive their total amounts of radiation at one continuous exposure.

In regions where the out-of-door treatment cannot be indulged in during the entire year, artificial heliotherapy, or the mercury vapor quartz lamp may be used. The advantages of the natural sunlight are: the open air life in the colony, the optimal composition of the spectrum, and the increased resistance of the body to "colds." Artificial light has the advantage of cheapness of treatment ("the poor man's sun") and of time saving. Then, too, it is always ready for use, its energy can be regulated to suit the case and it can be applied to the natural cavities.<sup>2</sup> Under either method the light absorbed by the skin gives rise to numerous and useful reflexes, the energy supplied to the blood is stored and carried to every part of the body; the general health is improved and the body is equipped to resist disease both present and threatened.

<sup>2</sup> *Journ. A. M. A.*, Feb. 7, 1925, p. 476.