has been used with good results for the treatment of tri-geminal neuralgia.

V. Improvement in the general state of health is evinced by the patient's sleeping better and showing a better appetite.

From the foregoing list of the effects of ultra-violet radiation it is permissible to assume that sufferers from a fairly large number of diseases may be benefited by it. The skin diseases which have been found to improve under this treatment are so numerous that there is not space to name them all here. In some cases a very strong dose of ultra-violet radiation is given, sufficient to produce not only erythema, but even blistering and necrosis of the epithelial cells. Lupus and acne vulgaris are treated in this manner. In addition to this severe local treatment a general light bath is found to be of great value in cases of lupus. Wounds exposed to the light of the quartz mercury vapour lamp often show rapid granulation at first, but when this is well established some authorities declare that a blue filter should be used for subsequent irradiation, as this cuts out the shorter ultra-violet rays which are said to be harmful to new cells. Ultra-violet therapy is now considered a specific treatment for rickets; indeed some doctors advocate the irradiation of all children under a year old in an endeavour to stamp out this disease which predisposes to deformity and many acute ailments both in infancy and adult life. It is usual to avoid producing an erythema in rachitic children, as any deep degree of pigmentation will effectively prevent subsequent irradiation from penetrating the skin. In many clinics where the children come every day the treatment is stopped at once should any erythema appear. Where heliotherapy is not available ultra-violet radiation is very beneficial to patients suffering from tuberculosis of the bones and joints. Respiratory disorders can be treated with ultra-violet rays when the febrile symptoms have abated, but care must be taken that only small doses are given. Some cases of asthma and hay fever answer well, but not by any means all. Several chronic diseases of the ear, nose or throat have been found to be greatly improved by focal irradiation by means of the special applicators, the patient being at the same time given general ultra-violet light baths. Ultra-violet rays are not specific except in the treatment of rickets, but as an auxiliary measure they can do much to alleviate other diseases.

THE THERMAL RAYS.

Infra-red radiation in different forms has been used in the treatment of disease from time immemorial. All hot bodies emit these rays, and the hotter they are, the nearer do the rays approach to the light rays. It will be remembered that those infra-red rays which lie nearest to the luminous spectrum have a shorter wave-length than the "far" infra-red. Only the infra-red rays which have a wave-length between 7,700 and 60,000 A.U. are used therapeutically. Radiant heat lamps emit a large quantity of the luminous red and yellow rays which seem to have a similar effect to the infra-red rays, although some authorities declare that they interfere with the function of the latter. The type of pure infra-red generator often consists of a nickel chrome wire which conducts an electric current round a mica former, the whole being enclosed in a black metal box which cuts out all but the purely thermal rays.

Infra-red rays have a great penetrating power, but longer rays than 10,000 A.U. are strongly absorbed by water; therefore the "far" variety cannot pass through living tissues which contain a fair percentage of water nearly so well as do the "near" variety. The "far" rays tend to produce a relatively greater rise in the temperature of the skin than do the "near" ones. It does not follow, however, that because they do not penetrate well they can have no use. Ultra-violet rays do not penetrate deeply, yet they exercise a potent influence on tuberculous joints and other lesions far removed from the skin.

The infra-red, like the ultra-violet rays, can be used for general or local treatment. The first result apparent when a patient is exposed to the radiation is a sudden erythema which is due to the vaso-dilatation of the surface blood vessels. There is also an increased exudation of lymph, with diapedesis, which has a very good effect upon wounds and skin lesions. Owing to the increased local blood supply produced, boils, abscesses, chronic ulcerations and bed-sores show marked improvement; and, where there has been local extravasation of blood due to trauma, infra-red radiation assists the absorption of the exudate. Sprains answer well to this treatment, and it is claimed that the union of fractures is accelerated. Heat has always been used to relieve the pain which is caused by pressure upon the nerve endings, or by some inflammation affecting the peripheral nervous system, such as neuritis and lumbago, and it has been found that the deep-penetrating infra-red radiation sometimes produces amazing and lasting relief. Other diseases which are very painful and which can be relieved by this type of radiation are toothache, muscular rheumatism, sciatica, various forms of neuralgia and tic douloureux. One of the most sensational claims for infra-red radiation is that it can produce great improvement in patients suffering from muscular wasting following anterior poliomyelitis and Bell's palsy. It is said also to reduce the size of the spleen and, therefore, to be of value in treating leukæmia. It has been stated by surgeons in America that infra-red irradiation of the abdomen following operation greatly relieves flatulence and prevents ileus, besides assisting the rapid healing of the wound. The use of radiant heat and infra-red radiation in conjunction with ultra-violet rays is not simply to warm the patient. It has been found that, if the radiant heat is applied for a little while before the ultra-violet, the vaso-dilatation which it produces seems to assist the patient to obtain the full benefit of the ultra-violet treatment.

In this article no mention has been made of the length of exposure or the strength of the radiation of different types. Only experience can teach what is necessary in these respects, and, in any case, it is the duty of the nurse to carry out the orders of the physician in all their detail. We hope that this account of the modern "djinns in the bottle"—the ultra-violet and radiant heat lamps and the infra-red generator—will have proved of interest to some nurses who like to know a little more about some of the new forms of treatment which they may not have seen in practice.

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