FISKE FUND PRIZE DISSERTATION. NO. XLVII: THE ACTION OF LIGHT AS A THERAPEUTIC AGENT

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649278374

Fiske Fund Prize Dissertation. No. XLVII: The Action of light as a therapeutic agent by Leonard K. Hirshberg

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

www.triestepublishing.com

LEONARD K. HIRSHBERG

FISKE FUND PRIZE DISSERTATION. NO. XLVII: THE ACTION OF LIGHT AS A THERAPEUTIC AGENT

Trieste

FISKE FUND PRIZE DISSERTATION. NO. XLVII.

The Action of Light

AS A

THERAPEUTIC AGENT.

MOTTO:

"Lux vos Liberabit."

BY

LEONARD K. HIRSHBERG,

BALTIMORE, MD.

PROVIDENCE:
SNOW & FARNHAM, PRINTERS,
1904.

B

SYNOPSIS.

The Action of Light as a Therapeutic Agent.

(Lux vos Liberabit.)

Although Hippocrates mentions sunlight as an important means of treating certain affections, and Herophilus of torcular fame gives a word or two concerning the effects of light upon disease, yet it was Erasistratus, famous for healing Antiochus of a secret ailment (which was no more than a feverish love-affair with his step-mother, Stratonice), who first emphasized sunlight, exercise, and baths before all other therapeutic measures. His death occurred about 280 B. C.

Cornelius Celsus, a reverent follower of Hippocrates, naturally enough suggested fresh air and light as remedies. Galen, persuaded in a dream by Apollo to undertake the study of medicine, mentions the importance of light in conjunction with other measures as a treatment for chronic diseases.

Of the Arabic school Rhazes was the first to speak of light as a help in disease. He died 932 A. D. Avicenna, who followed him in the eleventh century, and Albucasis in the twelfth, touch but slightly upon light as a therapeutic measure.

John of Milan, in his famous poem *Regimen Sanitatis Salerni*, written for Robert of Normandy (which passed through two hundred and eighty editions), wrote passages advising against the "avoidance of light," and always "to shun noonday slumbers."

John Gaddesden, whose volume, *Rosa Anglica*, was made up of superstition, charlatanry and mysticism, also indicates that he held bright light, both artificial and natural, at least to have a suggestive value upon his patients. His book appeared in 1310 and first proposed a cure for scrofula by the king "laying on hands." Hence the name of "king's evil." Guy de Chaubác, quoting the Greek, Latin and Arabic physicians, in his *Inventory* of 1363, included sunlight in his therapeutics.

Thomas Linacre of Canterbury, founder of the College of London in 1500, Jacobus Sylvius, Andreas Vesalius, Ambroise Paré, Astru, and others of the same period, make no mention of light in their writings. With the advent, however, of the scientific physicians of the seventeenth century, just as the simple microscrope was coming into use, Hooke (about 1667) invented the term "cell," destined to play such a significant part in modern medicine. Maphighi a few years later evolved the distinct cell doctrine. At the same time, Copernicus and Kepler revolutionized man's ideas of the heavenly bodies, and a truly scientific attitude was directed towards the study of light and its effects. In 1642 Galileo was martyred for discoving the motion of Jupiter, and inventing the thermometer and telescope. In 1665 Sir Isaac Newton promulgated the laws of gravitation, and ten years later Rïmer calculated the velocity of light, while Huygens discovered the polarization of light. All knowledge was being analyzed into its simplest and truest terms. It was but natural, therefore, living in such an atmosphere of science and simplicity that Thomas Sydenham, the real father of modern medicine, should advocate more simple methods for treating disease, insisting upon the "healing power of nature," as he called light, rest, fresh air and water.

It was not, however, until bacteria and their relation to disease became known, that the treatment of disease by light was really put to a scientific test. Dounes and Blunt in 1877 proved that the continuous and vigorous application of light was fatal to many micro-organisms. William Koch showed that the growths of others were either killed or inhibited when exposed to sunlight. Ten years later Von Sachs showed the effects of light on various plants and lower organisms, and Loeb in 1890 demonstrated that certain lower forms of life when exposed to blue and violet light arranged themselves parallel with and moved in the direction of the rays of light, such as fly larvae, caterpillars, hydroids and beetle larvae; even when their heads and brains were removed, showing the effects of real actinic powers of light on muscular tissue. Many other organisms moved away from the rays. Loeb, therefore, made a division of light into positive and negative heliotropism.

In 1893 Benedict Friedlander proved by careful controls that the pigmentation and dermatitis produced by sunlight and the arc electric light is brought about exclusively by the blue-violet rays. He was the first to suggest that the arc-lamp had therapeutic properties, a suggestion which Finsen quickly investigated and proved in a practical manner. Unna, Widmark, Hammer, Charcot and Wilde, all contributed to the proof that the dermatitis and pigmentation produced by the sun were due to the chemical (ultra-violet) portion of the spectrum.

Although John of Gaddesden, as part of his charlatanry, treated smallpox with red shades, red curtains and red paper windows, it was really Dr. Trudeau of our own land who first employed light in any elaborate and methodical manner for the treatment of disease. At his Saranac Cottage Sanitarium for more than thirty years, patients suffering with tuberculosis have been subjected to daily sun baths, without the interposition of any glass. Where glass-enclosed sun parlors are employed to obtain sun baths, little real value is obtained from the treatment, because many of the ultra-violet rays are cut off by glass. The treatment is, therefore, imperfect, and good results cannot be expected.

Energy from the sun reaches the earth in the form of waves, according to the prevailing theory of light. These waves vary both in length and velocity. The longest waves are quite invisible, and unappreciable by our special senses. These are known to us as heat rays. Shorter waves stimulate the retina and visual organs and are spoken of as light. The shortest waves produce chemical changes, for example reducing silver salts; they are called actinic rays.

Under most natural conditions all of these are mingled as white light, but they can be decomposed and differentiated by a prism. Each wave-length appears then with its own special color, but only the coarser colors are recognized by us, such as red, orange, yellow, green, blue, and violet.

The shortest waves are beyond the violet end of the spectrum, but are not classified as light. The principal characteristic of these waves are their power of inducing actinic or chemical changes, exciting fluorescence and phosphorescence.