

Remarks

ON

THE RED-LIGHT TREATMENT OF SMALL-POX.

IS THE TREATMENT OF SMALL-POX PATIENTS IN BROAD DAYLIGHT WARRANTABLE?

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TEN years have elapsed since I first advocated red light in the treatment of small-pox. During my investigations on the effect of various rays of light my attention was directed to some old reports, especially American and English, on the injurious influence of light in small-pox, which coincided with my own observations as to the effect of light upon the skin. Knowing full well, if this were so, that the injury was due to the chemical rays of light, I recommended that the patients be protected against these rays by placing them in red light, exactly in the same way that photographers protect their plates from the chemical rays. In the course of years this treatment was tried in many places, meeting everywhere with unquestionable success. At the present time about twenty physicians in various countries, mostly, however, in Scandinavia, have given this treatment a trial, and all of them, have obtained most favourable results when the treatment has been properly conducted.

From numerous trials, together with various simultaneous controlling experiments, it may be considered as an irrefutable fact that daylight and especially the chemical rays have a most injurious effect on the course of small-pox, as the suppuration of the vesicles is due to the effect of light, and that, accordingly, it is possible to avoid the suppuration and its consequences by protecting the patients from the action of light. On the other hand, light seems to have no action on the small-pox infection itself, and death caused by the latter cannot be prevented by excluding the chemical rays. But even the avoidance of suppuration is in itself of the greatest importance, for it is a well-known fact that the suppuration stage is the most dangerous of the various stages of small-pox. Moreover it may be stated that the greatest number of deaths are due to suppuration, which *ceteris paribus* would be prevented if no suppuration were present. Further, the numerous complications and sequelae due to suppuration may be avoided, as well as the disfiguring pitting, which is no small consideration. Small-pox is one of the most terrible diseases known, but the appalling feature which makes it so much dreaded is mainly due to the suppuration and its consequent sequelae. When after the teaching we have received one hears for the first time that suppuration is due to light, especially to the blue, violet, and ultra-violet rays, and may with certainty be avoided if these rays are kept off, one is naturally somewhat sceptical. When it is demonstrated, however, that this observation rests on a fact established by practical experience, which fully agrees with scientific theoretical investigations, this scepticism must gradually give way to what is both rational and scientific.

The action of light on the course of small-pox is astonishing, and the effect of the red-light treatment is one of the most striking results known in medicine. Even in cases of confluent small-pox or in unvaccinated persons the method very rarely fails, supposing, of course, that the patient comes under treatment early enough. If suppuration has begun or is on the point of beginning the red-light treatment will not stop it.

As stated above, it is now ten years since I first proposed this treatment. At that time I wrote several papers on the subject, which were published in English, French, and German, my object being to have it as widely known as possible. It has been difficult, of course, to get the method generally accepted or even tried; it was too marvellous and gave rise to scepticism. I do not know to what an extent it is used at the present time, but I am under the impression that it is far from being used to the extent it ought to be or that it will be. This apparent tardiness is greatly to be regretted when the results are so excellent. Is it not a pity that so many should die from small-pox and so many others

be disfigured for life because medical men are sceptical of a method that is too strange even to be given a trial?

The reason why I take up this subject again is from an article I read a few days ago in an American paper, which, quoting an article published in some magazine about my investigations of light, added that it was remarkable to see the great number of people pitted by small-pox during the epidemic which had so largely prevailed in America during the past four years, when pitting might have been done away with altogether by keeping the patients in red light. About the same time I saw a copy of the *Lancet* (February 14th, 1903), wherein were given some statistics of the mortality in London during 1902. It may be seen here that there were 7,798 cases of small-pox with 1,314 deaths, or about 16 per cent. From the figures I am convinced that the red-light treatment was not resorted to, or that at least it was not properly applied. I may add as my opinion that, unless this epidemic was of an *exceptionally fatal character*, at least one-half of these deaths might have been avoided by the treatment I have suggested.

The American article and the statistics in the *Lancet* having prompted my writing further on the injurious influence of light on small-pox, I think it better at this time to present what I have to say in a popular and less technical manner. In this way I may succeed at last in giving to the public the great boon resulting from this treatment.

After all, what we are dealing with here is not, properly speaking, medical treatment; it is more a preventive measure against the injurious effect of light. In the case of a disease where it is open to the patient to choose his doctor it may be said that he has himself to blame if he chooses a physician who does not know how to protect him from the dangers that threaten him. But when the disease in question is one in which the public health authorities oblige the patient to go into a particular hospital, he has a right to ask that he shall not there be unnecessarily exposed to dangers that may be fatal or at least are liable to disfigure him for life.

It seems to me expedient to present the subject from this standpoint. From the foregoing I believe that the question put as the title of this paper must be answered peremptorily in the negative. Furthermore, from a modern scientific point of view it must be considered absolutely unwarrantable on the part of the public health authorities to treat serious cases of small-pox, in which suppuration might be expected, in hospitals where patients are exposed to daylight. As to the private physician it must be considered a gross shortcoming if, as soon as he diagnoses small-pox, he does not make preparations to prevent the patient from being exposed to daylight. It is a most simple measure, which may be carried out everywhere, for everywhere it is possible to darken the windows, hanging up something before them. A candle will supply all the necessary light. The incompetency shown by the physician who allows the patient to lie in daylight is no less stupendous than if he neglected the ordinary aseptic measures in performing a capital operation.

I take the liberty of dedicating this article particularly to Public Health Authorities and to the Local Government Board. My various former papers on light and small-pox—which may be found in the annexed list and to which I beg to refer—are all of a technical scientific nature. But the subject has, after all, a popular side, and the red-light treatment will be much quicker and more effectively brought into general use, if the necessary measures are taken in hand by the sanitary authorities instead of attempting to win over each single small-pox doctor, one after the other, by means of scientific papers. What would have happened, I wonder, if vaccination had been entirely left to the discretion and care of each medical man? For one cannot help comparing the red-light treatment with vaccination. Both of them are of great importance to small-pox, but one of them is applied to the sound, the other to the sick only. If vaccination can be enjoined upon every healthy person, it should be still more easy to make obligatory the red-light treatment, as suggested by some authors. In Denmark and in several other places the public hospitals for infectious diseases are provided with permanent red light wards for small-pox patients. But whilst in this country small-pox is very rare, it is in England now and then an epidemic disease. If the method was officially accepted in England it would prove an enormous gain, as it would, no doubt, be spread to the colonies and countries far beyond the seas, where small-pox is of still more common occurrence.

If this method were introduced it would not only be of the greatest advantage to the patients, but it would be to the benefit of the taxpayers generally. In fact, as might have

been expected as a matter of course, the disease has proved to be of much shorter duration when the red-light treatment has been carefully adopted; as a consequence the stay in the hospital is shorter, and this renders an epidemic less expensive to the taxpayers. Some authors are even of opinion that the danger of infection is lessened when suppuration is prevented.

It may perhaps be thought that I have been using too many words in endeavouring to prove the advantage in the management of small pox of avoiding the suppuration of the vesicles. The essential point is therefore as to the correctness of the statement that light is of such great influence and that suppuration may be prevented—a statement many do not accept. But even if there is no belief in scientific investigation and proofs which are now before the world and which, in my opinion, are absolutely convincing, the matter, I think, is of sufficient importance to be inquired into. The evidence given by so many men of science from all countries who have tried the method is, no doubt, of sufficient weight to justify an inquiry.

I should greet with the greatest pleasure the appointment of a Commission to make a thorough investigation of the matter, and I should be very happy to place myself at its disposal with all information at my command. If this proposal meets with approval, may I suggest that the Commission should consist, besides small-pox physicians, of dermatologists who are acquainted with the action of light on the skin?

I can hardly believe that scepticism in regard to this method is so great that the idea of a careful scientific investigation would be flatly refused at a moment when the therapeutic importance of light—as a means of treating lupus and other diseases of the skin—must be said to be generally admitted everywhere.

BIBLIOGRAPHY.

- Picton, On the Exclusion of Light as a Means of Preventing the Pitting in Small-pox, *American Journal of Med. Science*, 1832, p. 119. Black, How to Prevent Pitting of the Face by Small-pox in Persons Unprotected by Vaccination, *Lancet*, 1867, vol. i, p. 792. Niels R. Finsen, Om Lysets Indvirkninger paa Huden, *Hospitalstidende*, July 5th, 1895. Niels R. Finsen, Om Behandlingen af Kopper, *Hospitalstidende*, September 6th, 1893. Lindholm, Om Behandlingen af Kopper, *Hospitalstidende*, September 6th, 1893. Svendsen, Den sidste Koppepidemi, *Medicinsk Revu*, October, 1893. Niels R. Finsen, Om de kemiske Straalers skadelige Virkning paa den dyriske Organisme, *Hospitalstidende*, November 1st, 1893. Juhel-Rénoy, Sur le Traitement de la Variole par l'Obscurité, *Semaine Méd.*, 1893, p. 557, and *Bull. et Mém. de la Soc. Méd. des Hôp. de Paris*, December 14th, 1893. Niels R. Finsen, Endnu et Par Ord om Koppebehandling, *Hospitalstidende*, December 27th, 1893. Fejlbjerg, Behandling af Kopper med Udelukkelse af Dagslyset, *Hospitalstidende*, July 4th, 1894. Niels R. Finsen, Koppebehandling med Udelukkelse, af de kemiske Straaler, *Hospitalstidende*, March 7th, 1894. Niels R. Finsen, Les Rayons Chimiques et la Variole, *Semaine Méd.*, June 30th, 1894. Benckert, Om Smittkoppers Behandling med Uteslutande af Ljusets kemiske Straaler, *Hygiea*, lvi 7, p. 11, 1894. Ostfänger, Traitement de la Variole par le Procédé dit la Chambre Rouge, *Sem. Méd.*, 1894. Krohn, 3 Tilfælde af Kopper behandlet rødt Lys, *Hospitalstidende*, October, 1894. Niels R. Finsen, Om Koppebehandling, *Hospitalstidende*, August 22nd, 1894. Niels R. Finsen, Die Behandlung der Variola in rothem Licht, *Neisser's Stereoscop. med. Atlas*, 2 Lief, 1894. Moore, A Case of Small-pox and its Lessons, *Dublin Journ. of Med. Sci.* December, 1894. Niels R. Finsen, The Red Light Treatment of Small-Pox, *BRITISH MEDICAL JOURNAL*, December 7th, 1895. Péronnet, Le Traitement de la Variole par la Méthode de Finsen, *Thèse de Paris*, 1897. Abel, Om Dr. Finsen's Behandling af Variola med Udelukkelse af Lysets kemiske Straaler, *Med. Rev.*, August, 1897. Backmann, Om Variola Vera och de kemiska Straalerna (Sur la Variole Vrai et sur les Rayons Chimiques), *Finska Läkaresällskapets Handlingar*, I, xl, No. 5, May, 1898, p. 486. Ortel, Traitement de la Variole, *Thèse de Toulouse*, 1897. Schouli, *Soc. de Thérapeutique de Paris*, October, 1899. Valdemar Bie, Finsen's Phototherapy, *BRITISH MEDICAL JOURNAL*, September 30th, 1899. Niels R. Finsen, Phototherapy, translated by James H. Sequeira (Edward Arnold, London, 1901). Egel, Zur Behandlung der Pocken mit rothem Licht nebst einigen Bemerkungen über forcirte Vaccination, *Therapie der Gegenwart*, March, 1901. *Bulletin de la Société de Thérapeutique*, January 23rd, 1901, p. 29 (Discussion), Tome vi, Série 4. Debray, Contribution au Traitement de la Variole, *Journal Méd. de Brux.*, No. 5, February 5th, 1903. Adolfo Carassa, Über einige nach Finsen's phototherapeutischen Methode behandelte Pockenfälle, *Il Morgagni*, Teil i, No. 4. Referat, *Monats. für prakt. Dermat.*, Bd. xxxvi, No. 6, March 15th, 1903, p. 336.

AMERICAN CONGRESS OF TUBERCULOSIS.—An American Congress of Tuberculosis is to be held in St. Louis in July, 1904. There will be about sixty delegates from each State and Territory in the United States making an aggregate of about three thousand official representatives. It is expected that in addition to these hundreds of students and others, interested in tuberculosis will be present.

RECENT ELECTROTHERAPEUTICS,

WITH SPECIAL REFERENCE TO MALIGNANT DISEASE.

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MANY of the recent discoveries in physical science have attracted great attention of late in the medical profession because of the possibility of applying them in the region of therapeutics. Long before the Roentgen rays had attained a permanent place in diagnosis the accidental dermatitis which occasionally took place suggested the possibility of their being used in the treatment of certain affections. The results of experiment came somewhat slowly at first, but of late the utmost activity has prevailed in many schools at home and abroad and in consequence a considerable amount of hope has been raised as to their therapeutic value in a number of affections, but most of all in malignant disease. While it might be fair to say that just as in the department of physics Roentgen's original paper has stimulated unexpected and serious research in other branches of science, so in medicine the result has been to create profound interest not only in the newer forces but also in others which had been previously known to the profession. For example, Tesla's great work was followed by the now historical physiological researches of D'Arsonval, and in view of the great interest taken in high-frequency currents of late it is difficult to understand how they failed to stimulate thought to a greater extent previous to the year 1896. Again, in the year 1893 Finsen gave us his researches in phototherapy in small-pox to be followed by another important paper in 1895 upon light as a stimulant. Two years later came his still best known work upon the treatment of lupus by concentrated chemical rays. Downes, Blunt, Duclaux, Arloing, Roux, Geissler, and Buchner had previously claimed for light a bactericidal influence, Thayer had submitted patients to the influence of sunlight by means of a convex lens, Mehl had in addition to the layman tried the effect of a burning glass in lupus, and Ziegler and Lehmann had also used the electric light—facts which Finsen himself fully acknowledges—but the credit of the great development of this special agent is due to Finsen. Clearly, therefore, these two examples may be quoted as showing the direction of men's minds in therapeutics previous to Roentgen's discovery, although research in this branch of science has by comparison of results caused greater interest in both since 1895.

RELATIONSHIP BETWEEN THESE FORCES.

In the first part of this paper I shall group the different forces in order to show that they bear some relationship to each other, that some of them at least possess properties in common, although each may possess some thing or things not found in others. This statement will be found to apply to the different forces, whether studied from the standpoint of the student of physical science or that of the clinical observer. For example, some can be polarized but others cannot. On the other hand, many of them act on the photographic plate, such as light, radiant matter (Crookes), and even heat (Abney). In the same way, in therapeutics we find that radiant heat, light, natural and artificial, and x rays possess certain properties common in different degrees, but they differ in other respects. Great power of penetration is possessed by the x rays, and the tendency to flow over large and extensive surfaces as is characteristic of high-frequency and high-potential currents.

In Fig. 1 a diagrammatic spectrum is represented based upon the familiar one of the spectrum of light. On the left there are first the electric waves, next heat waves, then follow the usual light waves divided into the red, yellow, blue, violet, and ultra-violet. Further, to the right, are groups of waves which have only recently become familiar to us in the studies of fluorescence, such as Becquerel rays, and some of the rays recently described as emanating from radium and polonium. Lastly, we have on the extreme right the x rays, that is, granting they are transverse vibrations in