cation. New laws safe-guarding health will, each year be added to our statutes, but they will be dead letters unless we, who are expected to be leaders in the prevention as well as cure of disease, are enthusiastic in friendly suggestions regarding them.

In Massachusetts we are justly proud of our record regarding the effectiveness with which the laws pertaining to ophthalmia are enforced. In the 1915 report of the Commission for the Blind, Mr. Henry Copley Green, field agent for conservation of sight, points out that in 1908, 7 children, or 5% of all the newly blind in this state, were so from ophthalmia neonatorum, while in 1915 the number was reduced to one, or to one-half of 1%. He adds that even if the state inspectors had done nothing else, their work against this disease has saved more than the total of their salaries.

The effect of nation-wide work in this disease is shown by the reduction in the number of blind children entering schools, from 25% in 1912 to 15% in 1915. The reporting by number, to the state boards of health, of syphilis and gonorrhea, the free examination of blood for the Wassermann reaction, and the free distributing of salvarsan, are forward steps which to some extent will lessen the number of ophthalmia cases.

It should be remembered that local boards of health have absolute power regarding the care of these cases; this should be an added reason for the appointment to these boards of men alive to their responsibilities.

In conclusion the writer would state that this paper does not in any way pretend to be an exhaustive study of this subject. In his private practice of 17 years he has had opportunity to treat 30 such cases. His observation of the treatment used and results obtained in this disease in other hospitals leads him to believe that in the Gardner Ward of the Massachusetts Eye and Ear Infirmary infants so afflicted are ideally cared for, and he believes that all cases occurring in this district should be sent there.

Much of the material for this paper has been taken from Dr. Stephenson's Middlemore prize essay on ophthalmia neonatorum, his article in the *Practitioner*, September, 1914; Dr. Derby's article in the *American Medical Journal*, October, 1915; standard text-books on ophthalmology, the reports from different state boards of health and commissions for the blind, as well as personal communications from several oculists. To all of these I wish to express my indebtedness and thanks.

THE PROBLEM OF RINGWORM IN CHILDREN.*

By E. L. OLIVER, M.D., BOSTON.

In considering the problem of ringworm in children, I am going to confine myself to ringworm of the scalp, because ringworm elsewhere on the body is usually of short duration and easily treated by simple methods.

Ringworm of the scalp, with rare exceptions, is a disease seen only in children, therefore its proper treatment and control should be of interest to this society. Ringworm of the scalp is caused by the growth of certain moulds or fungi in or around the hairs. It is a highly contagious disease, so that it is not uncommon to find several cases in one family.

There are two main varieties of fungus causing ringworm of the scalp, the small spored, *Microsporon Audouini*, and the large spored, *Megalosporon Endothrix*.

Each of these two varieties has its own characteristic growth on artificial culture media. Furthermore, ringworm produced by the microsporon can usually be differentiated clinically from that produced by the megalosporon. In the former the patches are usually single or few in number. Each patch is round or oval, rather sharply defined at the borders, and covered with short, broken-off hairs, covered with small grayish scales, so that the hairs themselves, as well as the skin, appear gray. In ringworm produced by the megalosporon endothrix, the patches are apt to be multiple, much more irregular in outline, less sharply defined at the borders, and often there are a few apparently normal hairs persisting throughout the patches.

As the principles of treatment of these two varieties of the disease are the same, I shall consider them together. Not infrequently cases are seen in which the diagnosis of ringworm can be made only with the aid of the microscope.

The older methods of treating this disease consist of:

1. The application of antiseptic fungicidal drugs in ointment or liquid form.
2. The use of irritating applications, such as croton oil, to cause inflammation and suppuration about the hair follicles, so as to loosen the hairs.
3. The extraction of the diseased hairs with forceps, or by other means.

The use of fungicidal drugs is, of course, an attempt to cure the disease by removing its cause.

The use of irritating applications was suggested by the observation that the more inflammatory type of the disease was usually of shorter duration than the type with but little inflammation.

The extraction of the diseased hairs is an at-

* Read before the New England Pediatric Society, January 7, 1916.

tempt to remove as much as possible of the infective agent.

These methods of treatment have been used for many years. Let us see with what success. In Paris, where all children with ringworm of the scalp are segregated in a hospital school and kept there until cured, up to 1903, the average duration of the disease was two years. In London the disease is generally supposed to be of shorter duration, but this belief is probably due to less care in determining whether or not the disease is cured, for in 1909, mark this statement, 186 children were given medical certificates stating that they were cured of ringworm, and in 179 of these, the microscope revealed ringworm fungus.¹ *In other words, less than 4% of these children presenting medical certificates of cure, were in reality cured.* Could any evidence be more conclusive as to the inefficacy of the usual methods of treating ringworm?

An editorial in the *Journal of Cutaneous Diseases*,² states that Sabouraud, in 1896, after four years of exhaustive research upon the ringworm fungus in its clinical aspect, as well as in the laboratory, came to the conclusion that no known treatment would cure ringworm of the scalp, because "even if the chemical nature of the antiseptics be varied, their physical power of penetration is scarcely altered. Whether in solid, liquid or gaseous form, the same mechanical obstacle is encountered, which no one of these agents is able to overcome. *The root of the hair is inaccessible to external antiseptics.*"

You may ask why it is that removing the diseased hairs with forceps does not cure the disease? The answer lies in the fact that many of these hairs are made so brittle by the disease that, with slight traction, they break off, leaving their infected roots behind.

MacKee and Remer,³ in a recent article, emphasize the inefficacy of the older methods of treatment. They believe that in New York City, in affected children, the disease usually remains more or less active until puberty, when it disappears spontaneously.

These statements certainly seem to show that the older methods of treating this disease were far from ideal. What, then, is the new method of treatment, and what results have been obtained by it in recent years?

The new method is treatment by means of x-rays. In truth, it is not very new, having been used in Paris as a routine measure for the past 12 years.

To go back, it was after Sabouraud's pessimistic statement, quoted above, that he made a wide search for some agent capable of causing temporary baldness. He experimented with both chemical and bacterial toxins, and in 1904, after much experimentation, he began to use the x-ray as a means of causing complete temporary alopecia, and his results from the beginning were brilliant beyond expectation.⁴ The average stay of each child in the hospital, for-

merly two years, was soon reduced to three months, and this alone meant a saving of \$80,000 a year to the City of Paris.⁵ Furthermore, as Sabouraud had predicted, the number of cases of ringworm in Paris has greatly decreased.¹

Probably the most difficult problem connected with the use of x-rays that Sabouraud had to solve was the measurement of the amount of rays the patient received. This difficulty was overcome by the invention of a new radiometer.⁶

This radiometer consists of a paper disc coated with an emulsion of platino-cyanide of barium in a collodion of amylacetate. This preparation has the property of changing color under the action of x-rays in proportion to the quantity of the rays absorbed. Consequently when an exposed disc of this sort is compared with a scale of colors the amount of radiation given may be measured.

Sabouraud places the patch to be treated at a distance of 15 cm. from the centre of the focus tube, and at the same time places the paper disc 8 cm. from the centre of the tube. When the disc has taken the color corresponding to tint B. on the color scale the operation is finished.

In a patch treated in this way, no change is visible until the seventh day, when a slight erythema appears, lasting a few days. On the fifteenth day the hair becomes loosened and falls out.

As the x-ray is not destructive to the fungus, shampoos and the use of antiseptics are kept up to prevent possible reinfection of other parts of the scalp. Two months after the x-rays have been applied, the hair begins to grow again on the treated patch.

Sabouraud's successful treatment of ringworm with x-rays was soon appreciated all over Europe, and it was not many years before most of the European clinics adopted this method as a routine method of treatment, with the result that in several European cities, ringworm of the scalp has become much less frequent. However, it is only within the past few years that this treatment has been used to any extent in hospitals in the United States, and, when used, the results have often been unsatisfactory on account of improper technic. The most frequent error is under-exposure, resulting in the failure of the hair to fall out. This error is caused by improper methods of measuring the rays and the consequent fear of over-dosage. There have also been cases of permanent alopecia resulting from over-exposure, also due to faulty technic.

Furthermore, Sabouraud's pastilles, to measure the rays, when used in this country, do not seem to have given satisfaction in every case, many operators feeling that their use requires too delicate perception of color changes. At the present time the Corbett radiometer, a modification of Sabouraud's radiometer, is used in Dr. Fordyce's clinic in New York.³

In the early days of x-ray treatment of ringworm of the scalp, accidents such as permanent

alopecia were not uncommon, but at present, with a skilled operator, reliable apparatus and a technique which has been perfected, there is little reason to fear bad results. It has been abundantly demonstrated that there is nothing to fear as to possible injury to the brain or to the general health.

With the Coolidge tube now coming into use, far more accurate measurement of the rays is possible, and it seems as if there were no further excuse for us if we do not give our ringworm patients the benefit of x-ray treatment.

You may well ask whether ringworm is a disease common enough in America to demand the establishment of special means of treatment. It is exceedingly common in New York City,³ according to MacKee. In Boston, the average annual number of cases for the past ten years, in the Massachusetts General Hospital Skin Out-Patient Department, was 63; at the Boston City Hospital Skin Out-Patient Department, 40. This makes an average of 103 cases of ringworm of the scalp, each year, in these two hospitals alone, an ample number to justify the demand for modern treatment. During the past few years a beginning has been made at the Massachusetts General Hospital, and it is hoped that before long our larger hospitals, at least, will be equipped to treat all patients referred to them for treatment of ringworm of the scalp. As far as I am aware, no other hospital in New England has as yet adopted the x-ray treatment of this intractable disease.

SUMMARY AND CONCLUSIONS.

1. Ringworm of the scalp is a highly contagious disease.
2. The older methods of treating ringworm of the scalp are inefficient.
3. The treatment of this disease with x-rays, placed upon a practical basis by Sabouraud and Noiré, has proved to be highly efficient. In Paris it has shortened the course of the disease from two years to three months.
4. The objection to the use of x-rays in ringworm, on account of the possibility of producing permanent baldness, owing to inability to measure the rays properly, seems to be answered by the introduction of the Coolidge tube, with which the amount of rays absorbed can be measured with great accuracy.
5. Radiologists as well as dermatologists, in the United States, have been slow to grasp the importance of the x-ray treatment of this disease, but it is to be hoped that, before long, all cases will be treated by this method, which, while it probably will never eradicate the disease, should make it much less frequent in the future than in the past.

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RESULTS OF OPEN-AIR TREATMENT OF PNEUMONIA IN CHILDREN.*

AN ANALYSIS OF 1500 CASES OF LOBAR PNEUMONIA FROM THE RECORDS OF THE CHILDREN'S HOSPITAL, BOSTON.

By A. R. CUNNINGHAM, M.D., BOSTON.

FOLLOWING the suggestion of Dr. J. L. Morse an endeavor has been made in this article to analyze a large series of cases of lobar pneumonia, and to compare the results of treatment of lobar pneumonia in infants and children before and after the introduction of the open-air method. In doing this we had at our disposal, in the records of the Children's Hospital, Boston, over 1500 cases beginning in November, 1870, and ending in July, 1915, the diagnoses being all made by competent men on the visiting staff. As nearly as we could determine, the open-air treatment at this hospital was begun in the latter part of 1905. At the old hospital, where all but about 200 cases were treated, the open-air treatment was given in a room made over from a small dining-room, where there was one very large window reaching to the floor and opening by sashes sliding up and down. There was a transom in the door, and the room accommodated two beds. There was a good deal of sunlight as the window faced southeast, and in the winter months, when most of the cases occurred, the air was apt to be pretty cold during some part of the treatment. When there were more than two such patients they were kept in the large ward with their beds arranged beside an open window, but previous to 1906, when pneumonias were kept in the large ward, there was always a great deal of air space. In the new hospital, lobar pneumonia patients have been out doors practically all the time until after the febrile period.

The treatment in the old series prior to 1906 was apparently very similar to what it is today, except for the addition of free ventilation; brandy and strychnine were the favorite stimulants, baths and sponges were frequently mentioned and morphine and heroin were used as sedatives. In one or two instances patients were put in cotton jackets, swatches were used when the pain was severe, no poultices or such applications were mentioned as being used.

Coolidge and Townsend,¹ in their analysis of one thousand cases at the Massachusetts General Hospital, published in 1889, wrote a very interesting paper and criticism of the use of hospital records for statistics without further analysis of cases, and in this report we have endeavored to avoid, as far as possible, the influence of such factors as might lead to false impressions. The brief notes written on some of the earlier cases made it harder to avoid these factors. Tempera-

* Read at a meeting of the New England Pediatric Society, January 7, 1916.