A GRAPHIC ACCOUNT OF THE BERLIN-ZOSSEN RECORD RUN.

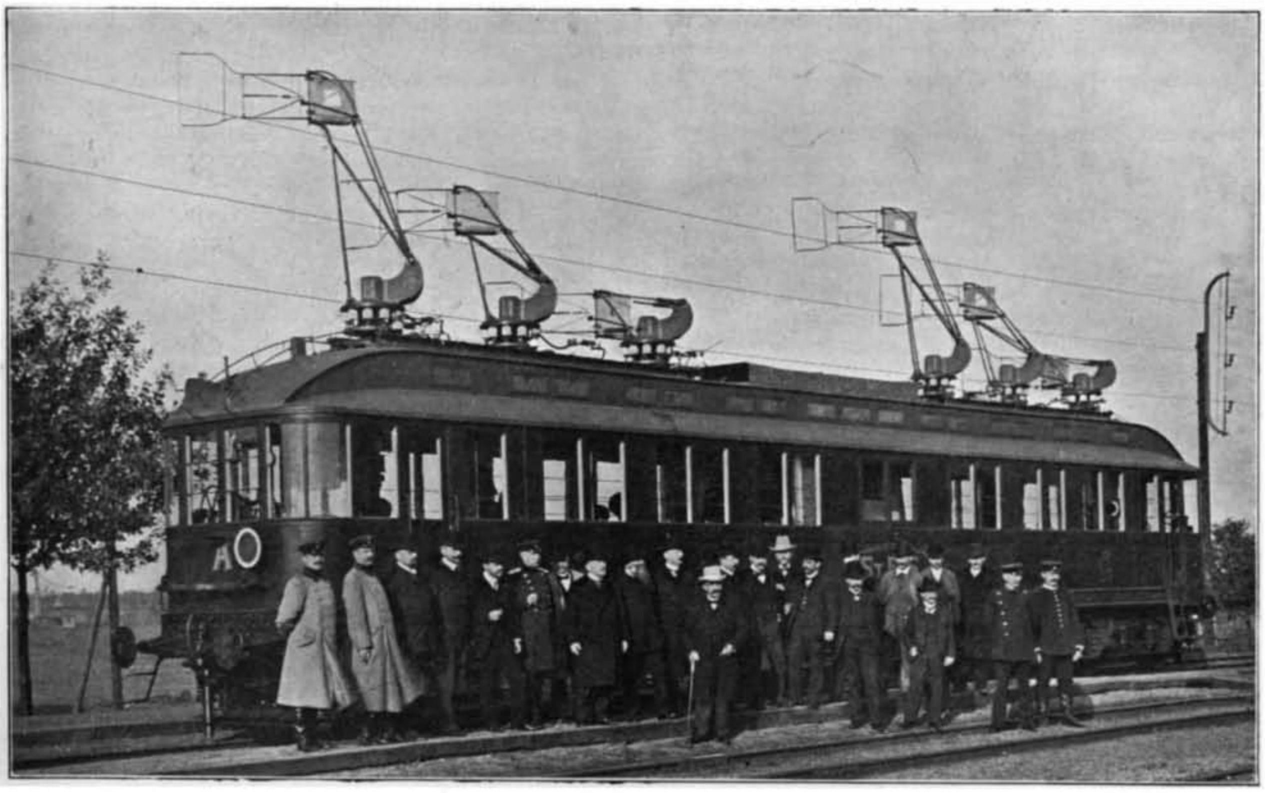
The attainment of the speed of 130 miles an hour on the high-speed electric road from Berlin to Zossen, which has been duly chronicled in these columns, has probably caused many of our readers to wonder just how the men in the cab felt when they saw poles and trees flying past. It happens that Dr. Reichel, one of the engineers who was in the car at the time it made its historical run, published in a Berlin weekly a very good account of the experience of those who conducted the experiments. We translate the more striking portions:

"All preparations have been made; a brake test has been carried out; the engineers have climbed into the car; and the military posts along the road have been informed that the car is soon to start. The motorman turns the controller very slowly through a few degrees. Fourteen thousand volts shoot from the lines to the motors. With a whirr the car starts on its memorable journey from Marienfelde at twenty-five minutes after nine o'clock. The overhead wires are swaying in a strong wind. As the car travels on, the strength of the electrical current fed to each of the four motors is gradually increased to 350 amperes. In other words, 2,300 kilowatts, or 2,600 mechanical horse power, are being expended. A mile and a quarter has been covered. The speed indicator shows a velocity of seventy-five miles an hour. When Lichtenrade is reached, about half a mile further on, the car is rushing on at 94½ miles an hour. Each second the speed increases. Just before the station of Mahlow appears, a curve of 6,560 feet radius looms up. The speed is now 109 miles an hour. We seem to be leaping toward the curve. No bend can be seen; the track apparently ends abruptly. We know there is a curve, and yet we are anxious; we brace ourselves for a shock. Just as we reach the curve the track seems to bend into a gentle arc into which the car runs easily.

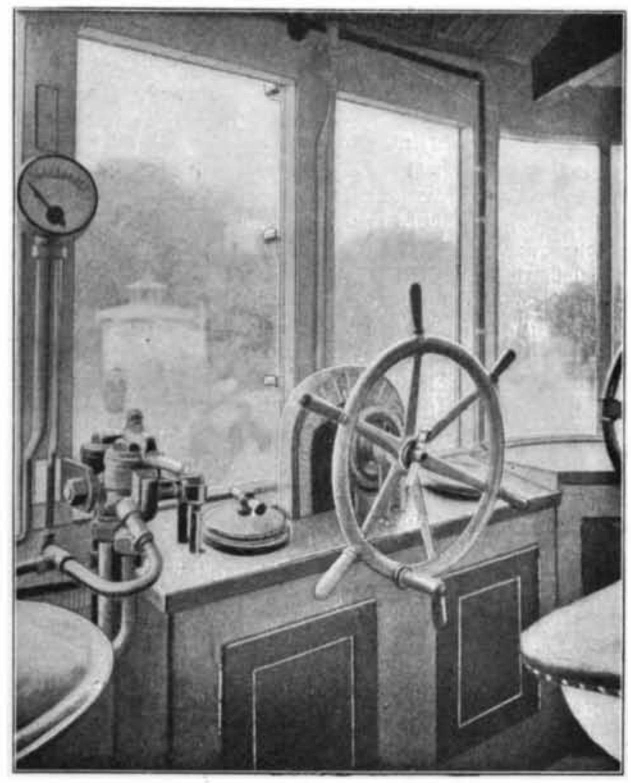
"The curve is passed. About a mile ahead of us a safety signal can be seen. We climb a grade of 26 feet to the mile—slight, to be sure, and yet to ascend it at full speed we must expend 300 horse power more. The train is flying on faster and faster. We rush through Mahlow (4 miles from Marienfelde) at a speed of 115 miles an hour. No vibration or shock is felt. It seems as if the car itself were not moving—as if buildings, poles, trees, were flickering past. Only the humming of the wheels assures us that it is we who are moving. The voltmeter shows that the current collectors are doing their work smoothly. No fear of increasing the speed need be felt. The last resistances of the controller are gradually cut out under the load of 2,300 kilowatts. The finger of the speed indicator slips along to a mark which shows that the car is making 121 miles an hour. At every crossing a loud ringing note can be heard, caused by the wheels.

"Fragments of ballast as large as walnuts are sucked up into the air and fall back as the train rushes on. At first the speed is bewildering, almost stupefying. We in the cab are much nearer the track than is the engineer of a steam locomotive. On that account it seems at first as if the car is literally devouring the road by the mile. Gradually we become accustomed to the new sensation. The feeling of safety and comfort which overcomes the first shock of amazement gives rise to the desire to travel still faster. After the 120 mile an hour mark has been passed, the excitement in the car becomes intense. Not a word is spoken. Only the click of the wheels over the rails is heard. Every eye that is not fastened on the speed indicator is glued on the track. Suddenly, at a distance of about half a mile, we see two men unconcernedly standing in the middle of the road calmly awaiting the car. The motorman jumps for the whistle string. As the danger signal shrieks, the two men on the track turn about with a frightened look, and then flee for their lives. No power on earth can stop this 93-ton car within a mile.

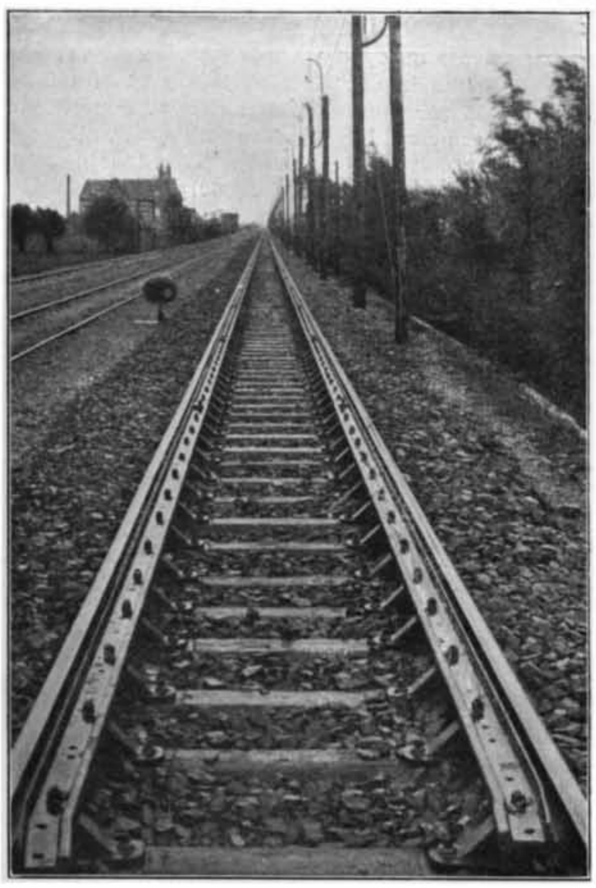
"We whizz past the town of Dahlwitz. Dust, sand, and large pebbles leap up behind us. We just catch a glimpse of people on the station throwing up their hats in joy. Suddenly a smashing blow is heard against the window of the cab, as if a man brought his fist heavily down upon a table. It was a bird, *overtaken* in its flight and killed. The speed indicator finger climbs up past the 124-mile mark. Rangsdorf is only 1¼ miles away (8.6 miles from Marienfelde). It is soon time to shut off the current. Unless the 4,000-horsepower engine at the power station at Oberspree does not help us, we shall not reach the speed for which we are all hoping. The engineers at the power house have not forgotten us. The finger of the speed indicator, as we near Rangsdorf, moves just a little further. And so we cover the last mile which we still have before cutting off power, at top notch speed, using up 1,400 kilowatts, or 1,600 horse power.



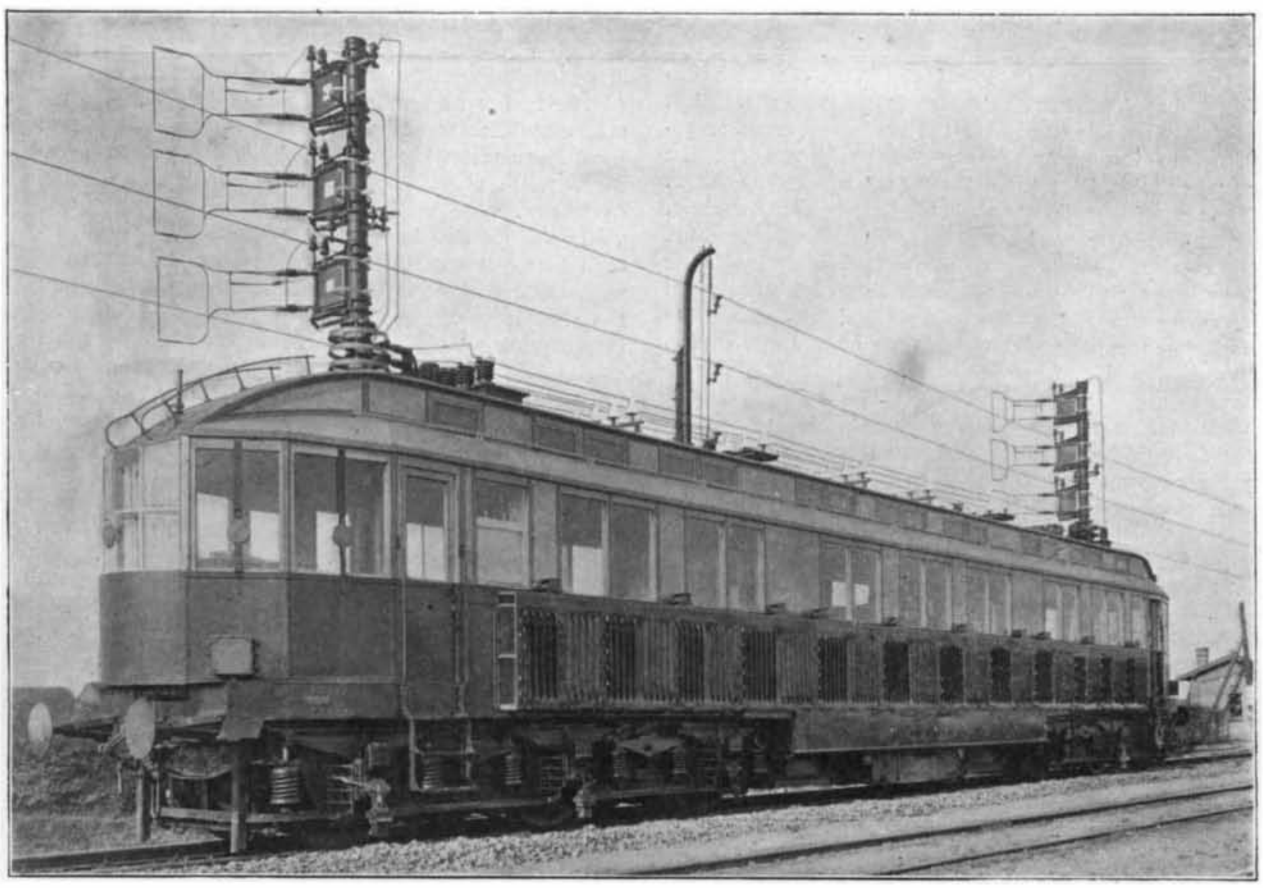
A View of the Car Which Made the Record of 130.4 Miles per Hour on October 28, Taken Immediately After the Run.



The Motorman's Cab.



The Track on Which the Record Run Was Made.



One of the Two Cars Built for the Speed Tests.

THE BERLIN-ZOSSEN RECORD RUN.

A quarter of a mile before reaching the curve near Rangsdorf, we shut off the current and apply the full power of the brakes. The speed of the car drops to 102 miles. The curve is rounded in a noble swing. The brake is released, and the car glides along under its own momentum without any current whatever until Zossen is reached. In eight minutes we have leaped from Marienfelde to Zossen. We crowd around the telegraph instruments, which have recorded a speed never before attained in the annals of railroading. The telegrapher can hardly attend to his instruments, so many heads are pressing about him. Finally he succeeds in reading off the record—130.4 miles an hour. Everyone smiles; hands are shaken, congratulations exchanged. An officer rushes off to the telegraph station to announce to His Majesty the Kaiser the feat which German engineers have succeeded in performing.

"The front end of the car is covered with flies, bees, and small insects, crushed as if by a thumb against the iron and glass."

THE FINSEN LIGHT-CURE IN ENGLAND.

BY HERBERT C. FYFE.

King Edward and Queen Alexandra paid a visit the other day to the London Hospital in order to open three new departments lately added to the hospital. The first of these is known as "Queen Alexandra's Light Department," for Her Majesty was the first to introduce the Finsen light-treatment into England, presenting a four-tube lamp to the London Hospital in 1900.

In a large room of the London Hospital, ten lamps of various kinds are being used. In a smaller room cures are being effected by means of the Röntgen rays. The other two departments are the electro-therapeutic, where all kinds of electrical treatment are given, and the radiographic, where photographs are taken for the purpose of locating foreign bodies.

Dr. Niels R. Finsen is the director of the five new buildings in Copenhagen known as "Finsen's Medicinske Lysinstitut," which was founded by the Danish government. Since 1890 Finsen has devoted himself to work on phototherapy or the therapeutic influence of the various rays of the solar spectrum. His first great result was the red-light treatment for small-pox, which is now being used all over the world with splendid results.

The result of the red-light treatment is that suppuration is usually abolished. Scars are extremely rare, and the duration of the disease is shortened. Turning now with renewed energies to his chosen field of research, Finsen soon found that the chemical rays were of inestimable value in curing lupus and like eruptive skin diseases. He finally discovered his world-famous method of treating local superficial bacterial skin diseases by the concentrated chemical rays of light. The method is founded on the following facts, which have been proved after a long series of experiments:

1. That the chemical rays of light (particularly the violet and ultra-violet) are capable of destroying bacteria.

Prof. Finsen has found that, on days of bright sunshine, at noon, in July and August in Copenhagen, sunlight will kill bacteria in a few hours, and that an electric arc lamp has the same bactericidal property. But neither the rays of the sun nor of the electric lamp are sufficiently strong by themselves to kill bacteria growing in the skin; if they were, then all bacterial skin diseases would be cured spontaneously in the summer.

Prof. Finsen soon discovered that he must *concentrate* the light by means of special apparatus in such a way that it contains as many blue, violet and ultra-violet rays as possible. This concentrated light, whether it be sunlight or electric light, will kill in a few seconds bacteria which were destroyed by ordinary light in as many hours.

2. That the chemical rays of light can produce an inflammation of the skin; and

3. That these same rays have the power of penetrating the skin.

The Finsen treatment may be divided into two varieties: the treatment by sunlight and the treatment by electric light.

In the treatment by sunlight, the apparatus used consists of a lens of about 20 to 40 centimeters (7.8 to 14.7 inches) in diameter. The lens is composed of a plane glass and a curved one, both framed in a brass ring. Between them is a light blue, weak, ammoniacal solution of copper sulphate. As one surface of the liquid is plane and the other one curved, its optical function is that of an ordinary plano-convex glass lens.

In order to avoid burning the skin of the patient it is necessary to cool the light by eradicating the heat rays of the spectrum, and this the lens accomplishes. By making the lens of a blue liquid instead of solid glass, a considerable cooling of the liquid is effected, for the reason that water absorbs the ultra-red rays and the blue color excludes a considerable number of the red and yellow rays. These three kinds of rays have particularly strong heating effect, while their bactericidal power is insignificant. The blue, violet, and ultra-violet rays, which it is important to procure in as great a number as possible, are but very slightly impaired by passing through the blue liquid.

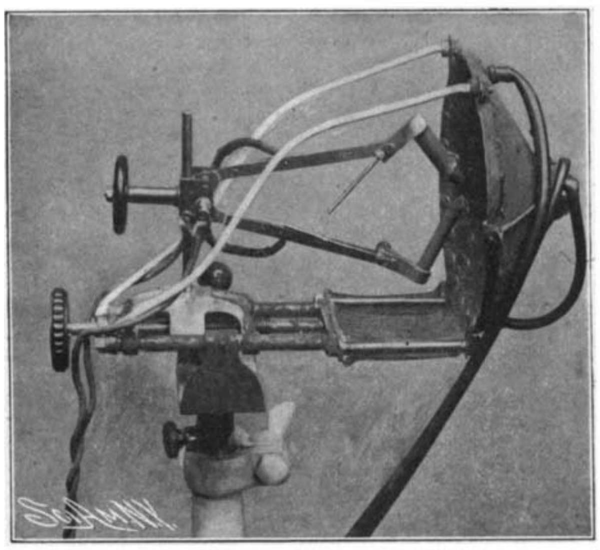
The lens can be raised or lowered as well as turned on a vertical and a horizontal axis, and thus is capable of concentrating the rays of light upon any portion of the skin which it is desired to treat.

Where sunlight is not available (in Copenhagen and London this is unfortunately very often the case) light from an electrical source is requisitioned. In the general arrangement of the original lamp is included a central electric arc, protruding from which are four brass tubes which remind one of telescopes. Each tube consists of two parts, inside of which are fixed lenses of quartz, used because this material to a far higher degree than glass allows the ultra-violet rays of shortest wave length to pass through. It is just these ultra-violet rays that have a considerable bactericidal effect.

The reason that glass and not quartz is used in the sunlight apparatus is that all ultra-violet rays of short wave length emanating from the sun have been absorbed by the atmosphere before they reach the lens and that the longer rays can quite easily pass through glass. Between the lenses in the tube there is distilled water, which cools the light by absorbing the intensely heating ultra-red rays, but does not impair the blue, violet, and ultra-violet ones.

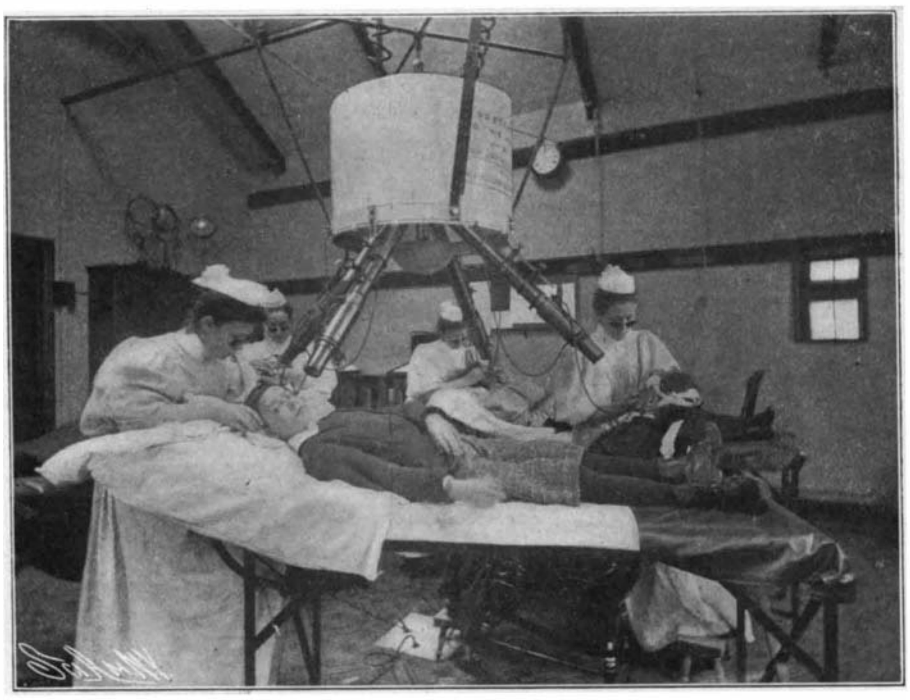
Dr. Finsen explains that it is not possible, as in the sunlight apparatus, to make the water blue in order to cool the light further, because the extreme ultra-violet rays which abound in the electric light might well pass the quartz but get absorbed by the blue coloring matter; the advantages of using the lenses of quartz would consequently be lost. In order to prevent the distilled water from boiling by absorbing the ultra-red rays, cold water is made to circulate around it.

Notwithstanding the fact that the special arrange-

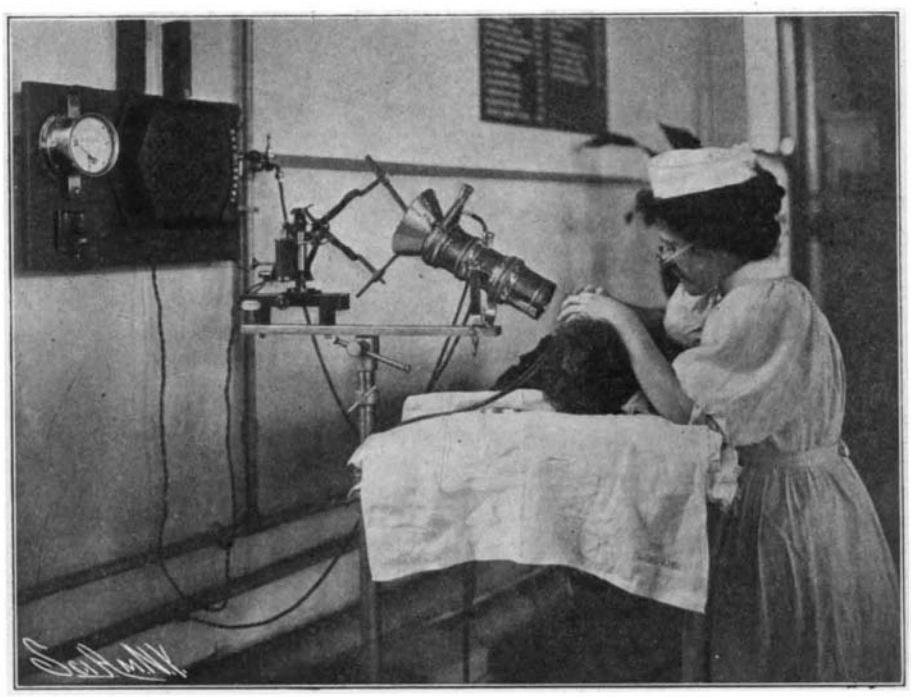


One of the New Ultra-Violet Ray Lamps Designed by the London Hospital Staff.

The Interior of the Finsen Medical Light Institute at Copenhagen.



Treating a Patient with the Finsen Apparatus Presented by Queen Alexandra to London Hospital.



Dr. Finsen's New Apparatus for Light-Treatment.

THE FINSEN LIGHT-CURE IN ENGLAND.