ELECTRIC ILLUMINATION OF THE FIELD IN ABDOMINAL SURGERY.

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(With five illustrations.)

In the first year (1884) of my abdominal and pelvic work, I realized the great importance of securing a satisfactory means of artificially illuminating the field of operation, and purchased for that purpose one of the well-known little Charrière cylindrical oil lamps provided with a good reflector and a strong movable lens. This was employed on a number of occasions, with but indifferent results. The trouble with this lamp was that it could not be tilted so as to direct the light on to the field in the abdomen. I then tried, and with some success, a hand mirror held at such an angle as to reflect either artificial light or daylight on to the desired area. I have finally adopted the electric light as a perfect means of artificial illumination, looking upon it as an indispensable part of my armamentarium, whether in clinic, private hospital, or at the patient's home.

I have felt constrained to write this brief article under the assurance that if my colleagues could be brought to adopt its suggestions they would perform better work in the pelvis, both in suturing and in controlling hemorrhage, and would thus in a larger percentage of cases be able to dispense with the use of drainage. Good illumination therefore puts us in the possession of better knowledge of the existing conditions, is conducive of better work, limits the use of the drain, and decreases, therefore, both mortality and morbidity in abdominal surgery.

When the private gynecological ward of the Johns Hopkins Hospital was first supplied with electricity in December, 1890, a portable drop-light was arranged at my request for the purpose of illuminating the abdominal cavity. This apparatus was extremely simple, consisting of a thirty-two-candle-power lamp

attached to a short wooden handle, and connected with the source of supply by insulated wire cords. My chief object in its introduction was to become independent of the sunlight, so that I might be able to secure a satisfactory illumination of the field even on the dullest and most cloudy days, and occasionally to illuminate distant parts of the pelvis in bad adherent cases. It soon became evident, with a little use, that even the brightest sunlight was far inferior to the electric light for a much larger proportion of cases than I had anticipated.

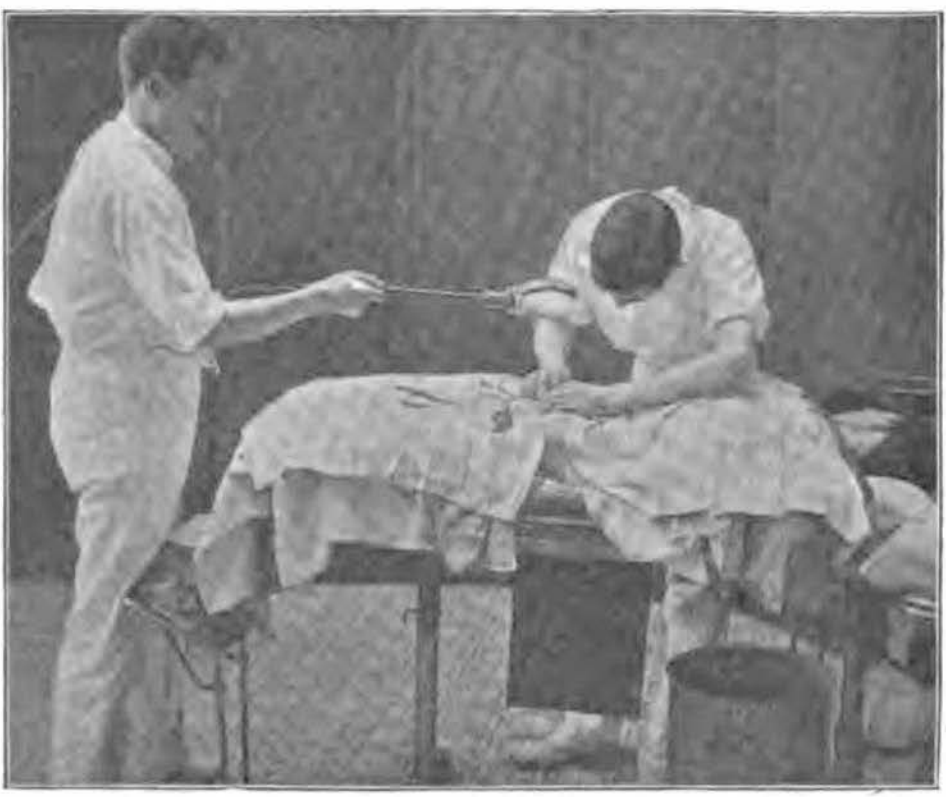

Fig. 1.—Drop-light, connected with house circuit, in use for abdominal operations.

By means of this light, which is held in the hand and directed according to will to one side or the other, every accessible part of the pelvis appears with startling distinctness, and the smallest oozing vessels can be picked up and torn surfaces accurately united by delicate sutures under direct inspection.

Since using artificial illumination in this way it has been my constant practice to call for the light in almost all cases while making the minute inspection of the pelvis at the completion of each operation, before closing the incision (Fig. 1).

In the apparatus now in use in my operating room at the Johns Hopkins Hospital, two insulated wires, sixteen feet in length, are attached to the bracket on the wall, and pass through a handle two feet in length, at the end of which a sixteen-candle-power lamp is attached; half of the lamp is surrounded by a reflector, painted black and covered with flannel on its con-

FIG. 2.—Electric drop-light for use in abdominal operations, connected with house circuit.

vex surface, thus protecting the operator's eyes and face from the light and heat (Fig. 2). The nurse or assistant who holds the light requires some training even for such a simple duty, as it is necessary to hold it steadily and properly directed about six inches above the patient's body, a short distance below the operator's face. After a little experience the operator will find no difficulty in seeing around the light, gaining a perfect view of

the pelvis and using instruments, ligatures, and sponges with freedom, without striking the lamp. Such a mode of illumination is practicable and most reliable wherever the electric current has already been introduced into a building for general illuminating purposes.

When a street or house current cannot be tapped, it is still

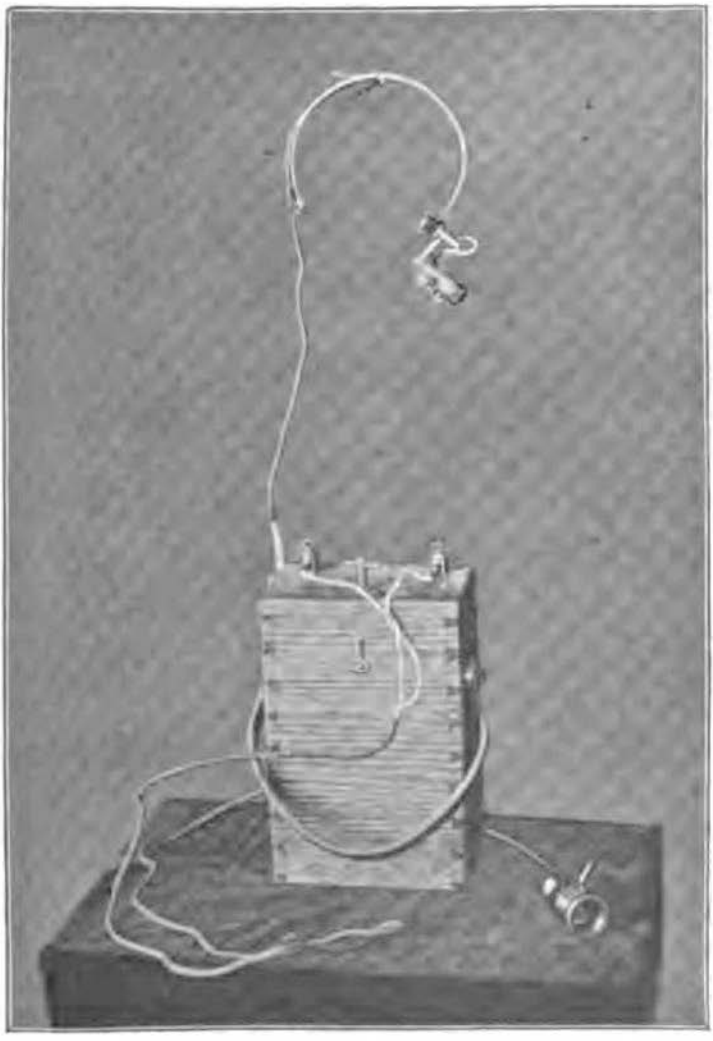

Fig. 3.—Electric head-light with storage battery for transportation.

possible to secure an equally good light by using a portable storage battery. The inconveniences of storage batteries are their weight and uncertainty as to the persistence of the light, which may suddenly grow dim or give out, when the operator's only resource is to return the cells to the dealer to be overhauled or refilled. The recent improvements in construction have, how-

ever, largely overcome these objections, and I have found the storage battery invaluable in my private Sanatorium, where a street current has not been available. In all cases where it is not necessary to transport the light from house to house, a storage battery may be used consisting of from ten to twenty cells, carrying sufficient electricity to run a ten- or twenty-candle-power lamp for thirty hours or longer. After the electricity has been exhausted it is only necessary to send the cells back to an electrical depot to be recharged.

The outfit consists of one twenty-candle-power, twenty-volt

FIG. 4.—Electric head-light and storage battery in use for abdominal operations.

lamp with cord, handle, and reflector, and ten small storage batteries put up in two oak cases of five cells. Each case weighs twenty-five pounds and measures outside ten by nine by eight inches. Connection is made from binding posts on the outside of the boxes. The cost of the outfit is forty dollars. The lamp can be used on one charge of the battery from ten to thirty hours, depending upon the candle power of the lamp. The cells are sealed in the cases, and can be recharged from electric-lighting circuits.

For transportation from house to house and over long distances the most convenient form of illumination is the little

Edison Company storage battery, measuring six and a half by four and a half by ten inches, and weighing ten pounds. This is capable of running a six-volt, four-candle-power mignon lamp fifteen hours (Fig. 3). The light of this miniature lamp is enclosed in a small cylinder; it is condensed by means of a reflector behind, and a lens in front which is focussed by a thumb-screw at the side. The lamp is attached to a flexible steel band which fits the head. I have adopted the improved device of Dr. W. C. Phillips, of New York. When the lamp is placed upon the forehead and the current is turned on, it is only neces-

FIG. 5.—Electric head-light supplied with reflector, mignon lamp and lens, adjustable, connected with light portable battery.

sary for the operator to incline the head toward the pelvis to illuminate the whole field (Figs. 4 and 5). With this lamp a brightly illuminated circle of light six inches in diameter can be thrown upon a table at a distance of twelve inches from the head.

By means of a Vetter current-adapter fitting into the ordinary electric-light socket and carrying a lamp interposing necessary resistance, this little battery can be refilled wherever a direct (Edison) current is in use.

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