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THE BROMIDE PAPER SCREEN TECHNIQUE.

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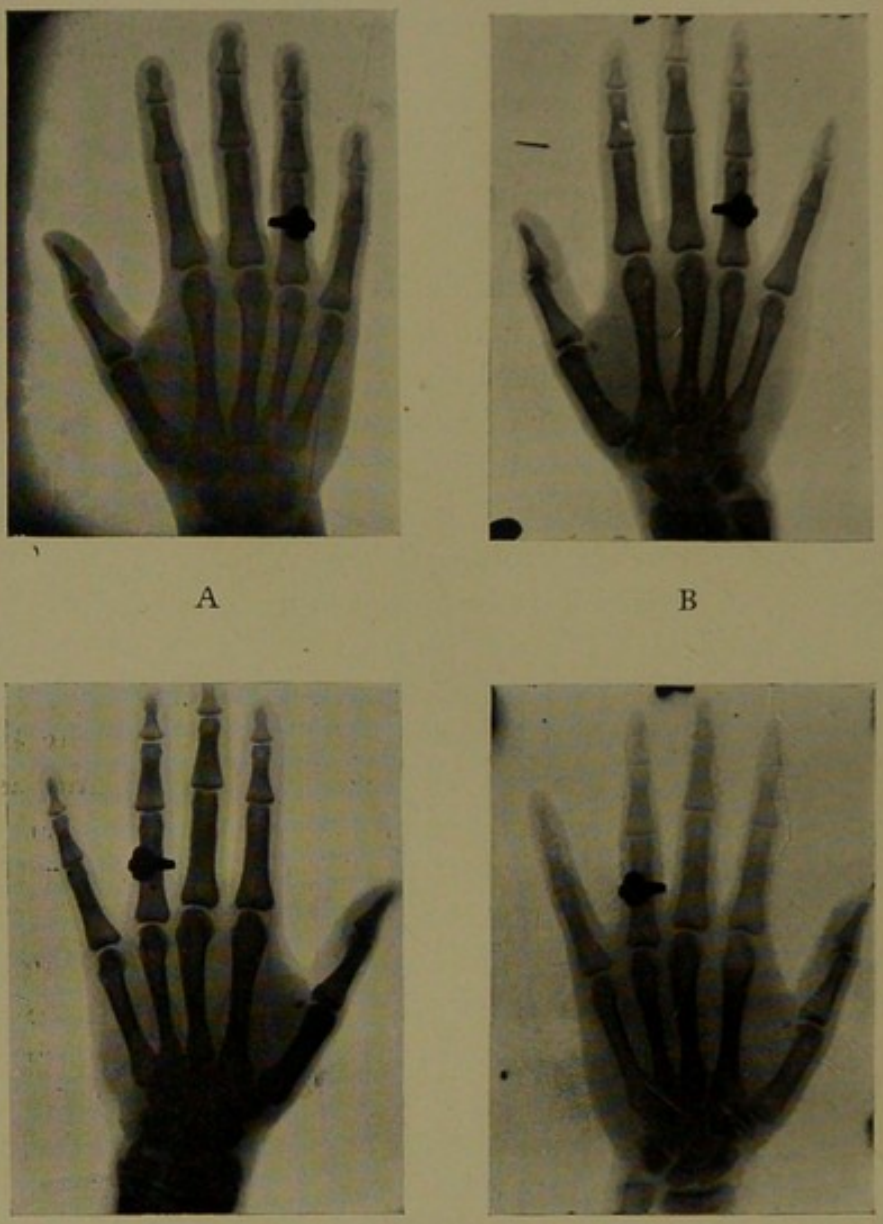
While the use of bromide paper as a substitute for plates is not new, it having been used as long as ten years ago for direct exposures of extremities, I do not know of its having been used in conjunction with an intensifying screen for more difficult work such as head, kidney, spine and gastro-intestinal tract. The manufacturer of an intensifying screen—practically free from grain—revolutionized radiography. While its greatest application is in the gastro-intestinal radiography, it is not by any means limited to this region, and I am using it, exclusive of lung radiography, and more and more extensively for other regions.

The selection of different plates for various types of radiography is being adopted by many radiologists. One kind of plate is used where speed is an important factor and another where contrast and crispness are desired. But very little advance has been made toward obtaining a plate which could be considered strictly an X-ray plate.

One of the principal disadvantages of an intensifying screen is the fact that the X-ray must penetrate either the screen or the plate before reaching the emulsion. While personally I think there is little choice, the manufacturers of the screen advise using the plate in the reverse position, allowing the rays to pass through the plate rather than the screen. The variation in the thickness and compositions of the glass add a variable factor which is much increased when one is using a low vacuum tube. The use of a film of course would overcome this, but it is difficult or impossible to obtain 14 x 17 films, and, it occurred to me that bromide paper with the intensifying screen might be of value, particularly in light work, but I was surprised to see that it was also of value in the more difficult work.

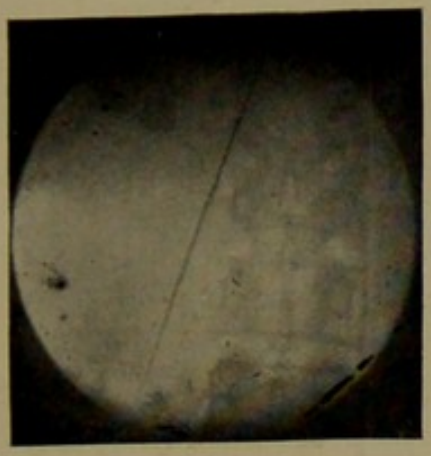
The advantages of bromide paper are that it is lighter, not easily broken, and a dark room is not necessary for develop-



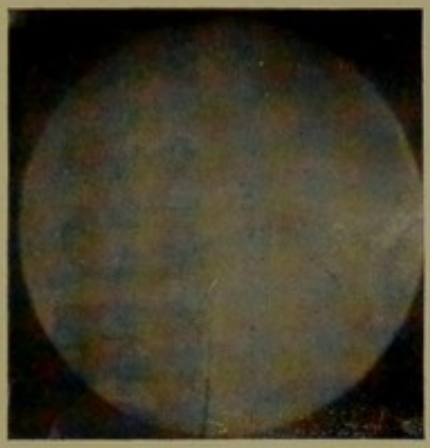
A B C D

FIGURE 1.

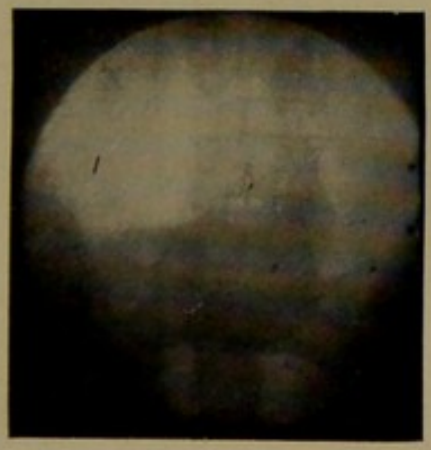
(A) Hand without screen—paper negative.
(B) Hand " " —plate negative.
(C) Hand with screen—paper negative.
(D) Hand " " —plate negative.



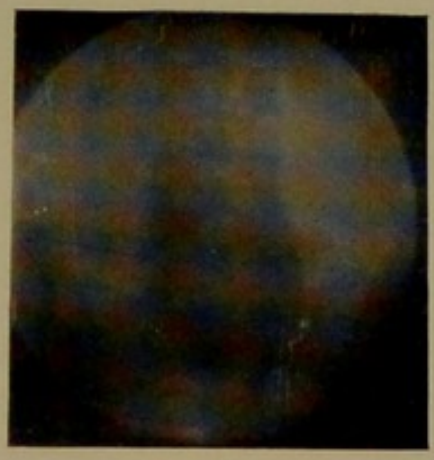
A



B



C



D

FIGURE 2—Trunk region.

(A) Kidney stone—paper with screen.
(B) Kidney stone—plate without screen.
(C) Spine of 200 lb. woman with screen and paper.
(D) Spine of same woman without screen on plate.

ment; it is rapidly developed and fixed, and the rays do not have to penetrate glass before reaching the emulsion; it does not scratch or rub the delicate surface of the screen; it is much less expensive and as many negative prints as are desired may be ~~from the original which is~~ trimmed and squeegeed on glass and photographed before dry, giving a finished positive reduced print of all the negatives on one print in a few minutes. There are some disadvantages of the bromide negative print, but most of these can be remedied. The most rapid paper that I have yet obtained is much slower than the regular X-ray plates, but undoubtedly this can be improved and I see no reason why any plate emulsion could not be applied to paper. In hot weather the paper is likely to blister, but not more so than a plate is to frill; we are much less accustomed to examining negative prints than we are negative plates; paper is readily torn but this can be prevented by backing prints with cloth.

Figure 1—Illustrates the character of radiograms of extremities made on paper and plates with and without screen. Detail in bone structure is the one place where the screen is at a disadvantage, therefore, while the hand is the easiest of all parts for regular radiographs, it is the most difficult for screen work.

Figure A—Is a radiograph made with bromide paper without screen.

Figure B—Is with a plate without screen.

Figure C—Is with bromide paper with screen.

Figure D—Is with plate with screen.

Figure 2—Illustrates the relative value of paper with screen compared with plates without screen for radiographs of the trunks.

Figure A—Is a radiograph on paper with screen of a large man. It shows two kidney stones and the outline of the kidney.

Figure B—Is the best of several radiographs of the same patient made on plates without a screen.

Figure C—Is a radiograph on paper with screen of the spine of a woman about five feet three who weighed 200 pounds.

Figure D—Is the best of a series of radiographs of the same woman made on a plate without screen.

Figure 3—Shows four radiographs of the stomach of a moderate sized woman; these are made on paper with a screen and demonstrate that even with a slow bromide paper exposures may be made sufficiently short to show the gastric peristalsis.

Figure 4—Demonstrates that even in radiography of the head the use of paper and screen compares favorably with that of plate without screen.

Figure 5—Shows the cæcum, ascending colon and appendix well filled with bismuth solution.

Figure 6—Demonstrates the very great practical value of this method. This case was a young girl who had been shot in the back with a 22 calibre bullet and was practically paralyzed below the waist. The accident happened in the country and in the nearest town to which she was taken only alternating current was available. The examination was made on a bed with a small "dress-suit case" coil and a single cell rectifier. Only two radiographs using paper and screen were made; the first was developed by my assistant in a shaded room, but without a red light, while the second exposure was being made; and the second paper negative was developed in like manner while the third exposure on a plate without a screen was being made; and within three minutes after the second exposure was made, we were studying the bromide negative which is shown in Figure 6—A. This paper negative was carried home in a wet roll and not thoroughly washed until the next day and it has turned yellow which makes reproduction difficult.

Four plates were made and later developed at the laboratory and the best one of the four plates is shown in B, and you will see that the original bromide negative obtained within three minutes after the exposure and developed in a practically darkened cellar compares favorably with the best of the plates.

Figure A—Is a radiograph on paper with screen.

Figure B—Is a radiograph on plate without screen.

While I do not advocate the universal use of paper as a substitute for plates, this article shows that it may be used even on the most difficult cases, but it is of greatest value in cases of foreign bodies or fractures. Where an immediate report

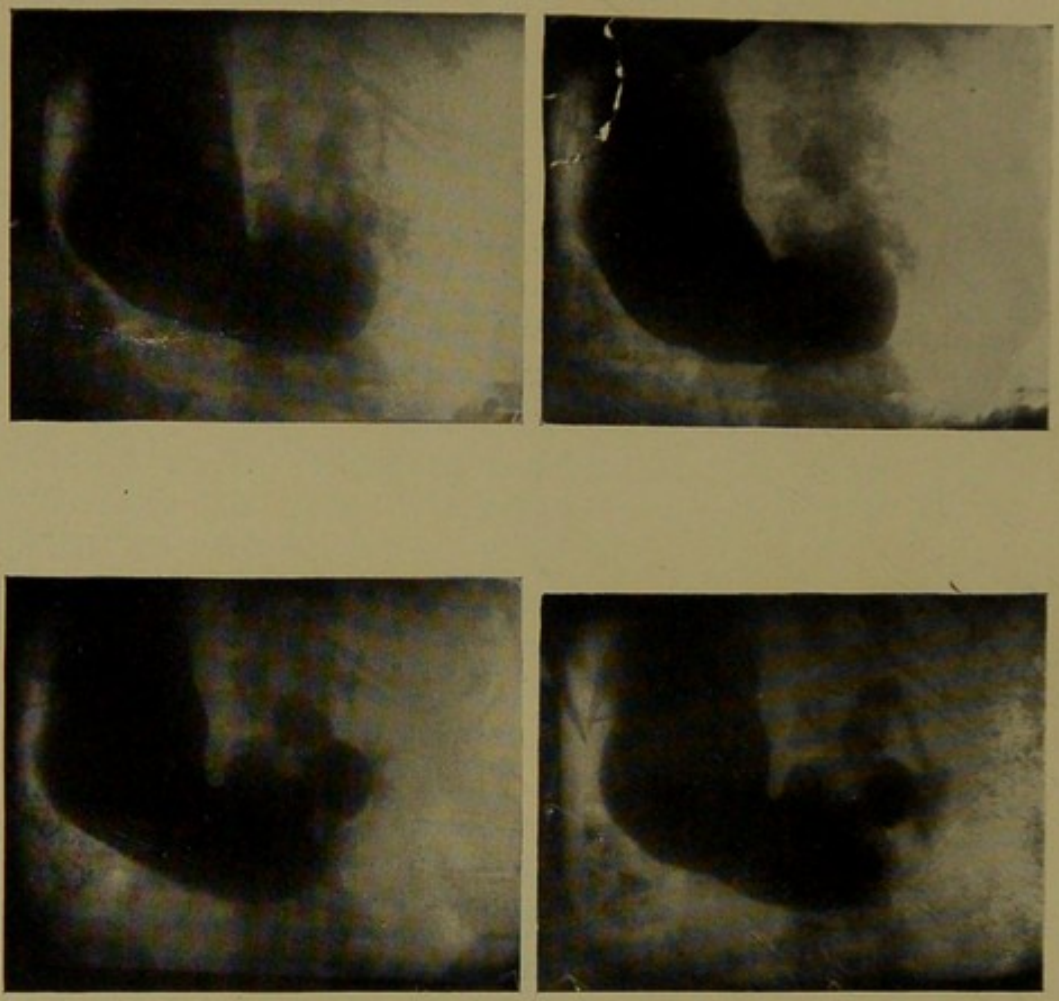
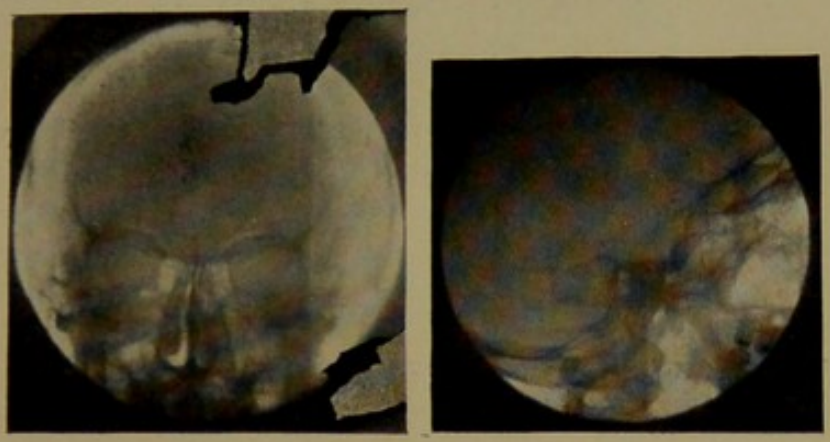
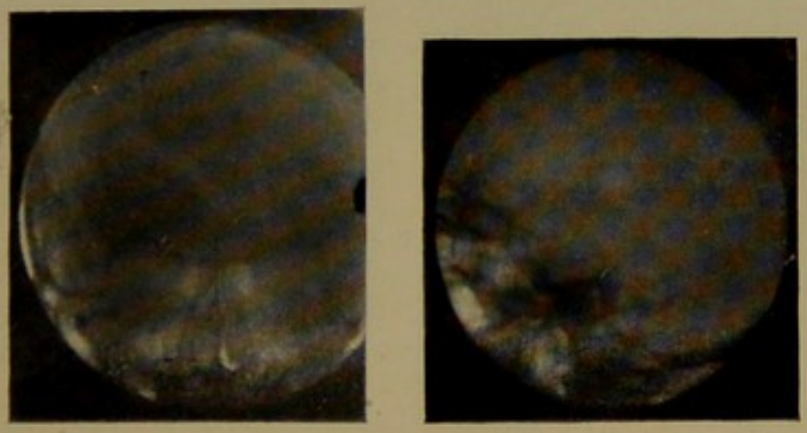


FIGURE 3.

Four stomach plates with paper and screen showing gastric peristalsis.



A B

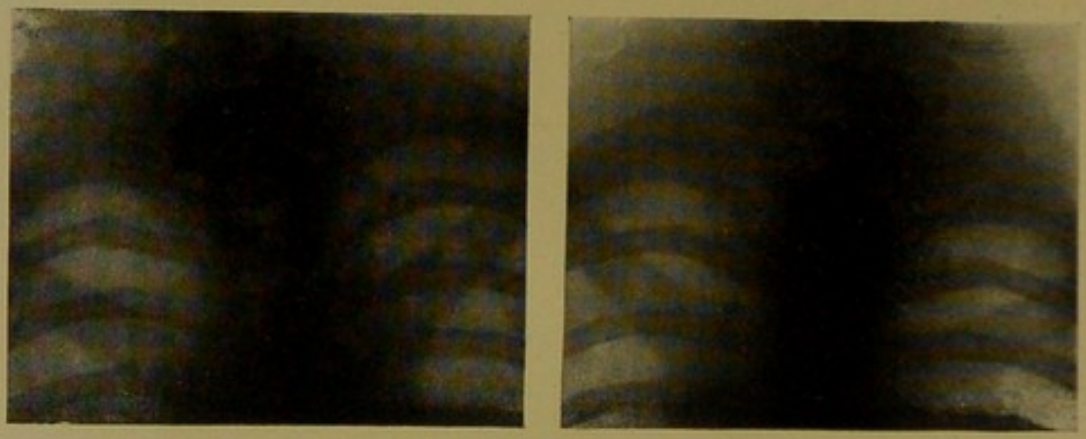


C D

FIGURE 4.

(A) Antero-posterior head with screen and paper.
(B) Lateral head with screen and paper.
(C) Antero-posterior head without screen and plate.
(D) Lateral head without screen and plate.

FIGURE 5—Appendix and colon.



A B

FIGURE 6.

(A) Paper with screen—best of two exposures.
(B) Plate without screen—best of five exposures.

is desired, the prints can be developed and fixed so rapidly that the first print may be studied while the third is being made, and if the position is not satisfactory it can be altered and another made without delay—it takes the place of a fluoroscopic examination and gives a permanent record.

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