An X-ray table for serial and stereoscopic radiography and fluoroscopy / by Lewis Gregory Cole.

AN X-RAY TABLE FOR SERIAL AND STEREOSCOPIC RADIOGRAPHY AND FLUOROSCOPY

BY

LEWIS GREGORY COLE, M.D.

Reprinted from "Archives of the Roentgen Ray," September, 1913

LONDON

REBMAN LIMITED

129 SHAFTESBURY AVENUE, W.C.

AN X-RAY TABLE FOR SERIAL AND STEREOSCOPIC RADIOGRAPHY AND FLUOROSCOPY.

The principles involved in the construction of this table are essentially the same as those described by the author in the Transactions of the American Roentgen Ray Society for 1908, but an additional device for rapidly changing and accurately adjusting the plates has been added. While this is a great convenience for a radiographic examination of any part of the body, it is absolutely essential for serial radiography of the stomach, as the accurate placing of the patient allows the use of a much smaller plate than would otherwise be necessary, with the result that increased detail is obtained in localised regions of the stomach. Even a single 8 by 10 inch plate is sufficiently large for two exposures of the entire pyloric end of the stomach.

The table—which was built by the Waite and Bartlett Manufacturing Company after the designs and specifications of the author—is constructed against the partition wall of a lead-lined cabinet, from which it is operated. It has an oak top, 50 inches wide and 5½ feet long, with an 18-inch extension-leaf at one end, making the total length over all 7 feet. The top is lined underneath with sheet lead ⅛ inch thick. In the centre of the table is an opening, 14 by 17 inches, covered with a sheet of celluloid ⅛ inch thick. When desired, this can be reduced to an 8 by 10 inch opening by inserting a lead diaphragm, and a still smaller diaphragm with a 5 by 8 inch opening is used for making stereoscopic exposures on an 8 by 10 inch plate. At the right end of the table there is another opening like that in the centre, but arranged for exposing 8 by 10 inch plates only.

A space underneath the table, extending the entire width of the table and 20 inches of its length, with the 14 by 17 inch opening as a centre, is enclosed to the floor, to exclude ordinary luminous rays. A window the width of this box, and extending down 8 inches from its top, opens into the ray-proof cabinet. A wooden frame, with a handle reaching through this window, is hinged to the upper edge of the far side of the box. This forms a lever 20 inches wide and as long as the entire width of the table, which can be moved up parallel to the under surface of the table top. Attached to the near end of this lever is an apron, which closes the window into the ray-proof cabinet when the lever is raised at the time of the exposure. The sides of the lever are fitted with tracks to guide a thin wooden tray, which moves back and forth on it. Fastened to the under surface of the tray is a fluorescent screen, face downwards, which reflects its image into a mirror placed below,

facing the operator, at an angle of 45°. The tray carries two 14 by 17 inch plate holders. An 8 by 10 inch plate is kept in place by inserting a wooden block with cogs 8 or 10 inches apart. To insure a fixed position of the plate it is wise to use a cassette, with or without a screen, instead of an envelope, in which the plate is apt to slip.

The tube-stand is mounted above the table. It runs in a track attached to the top of the lead partition, 4 or 5 feet above the surface of the table. The tube-carrier is mounted so that it is always in position directly over the centre of the 14 by 17 inch opening. It may be moved toward the head or

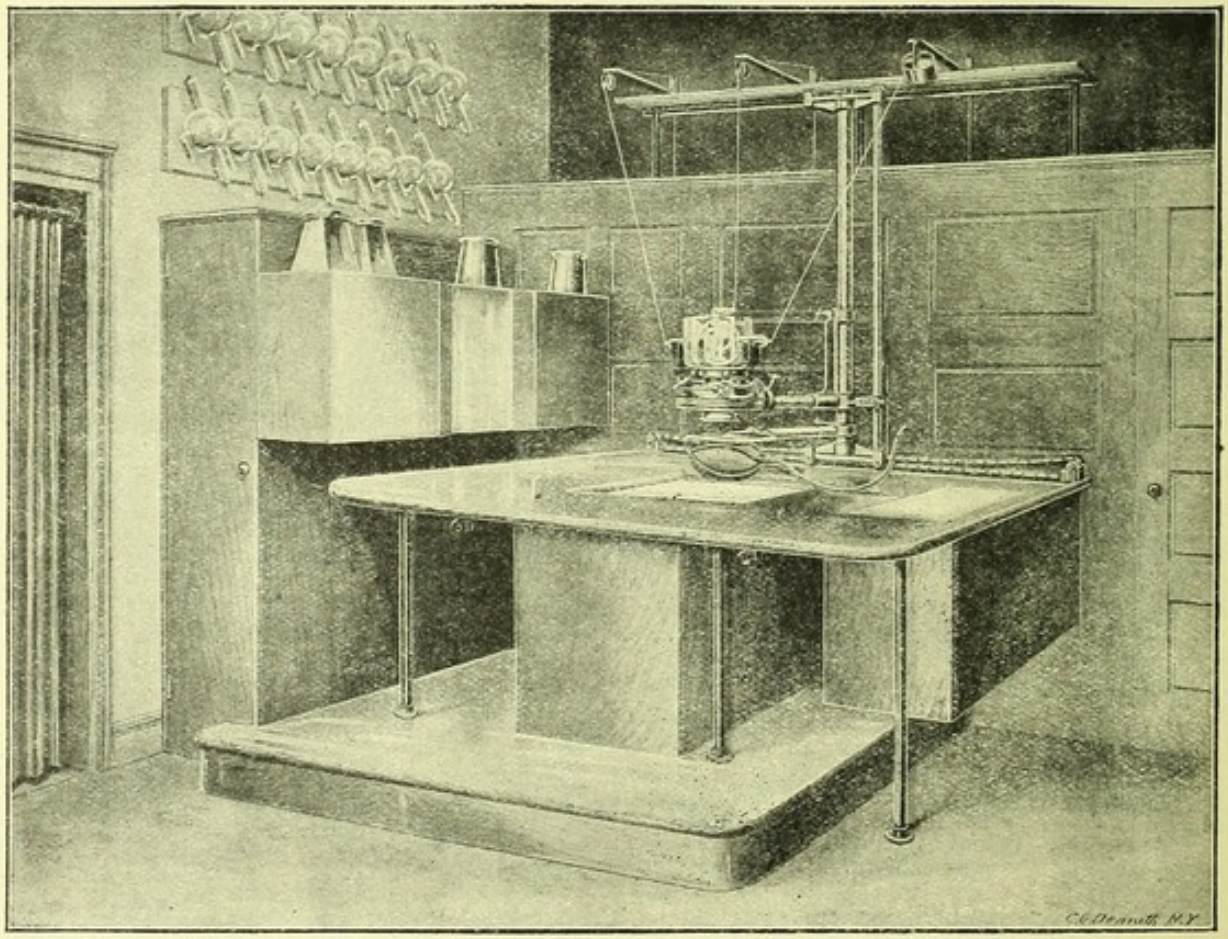

Fig. 1.—The X-Ray Table with Ray-Proof Cabinet behind it.

foot of the table by an endless chain, which is operated either from the cabinet or from the outer side of the table.

The metal part, upon which the lead glass globe is mounted, moves in a track, and is arranged so that the maximum distance that it can be moved is $2\frac{1}{2}$ inches. The track is mounted on a circular metal leaf, so that the tube can be turned at any angle and still be shifted the stereoscopic distance. The joint upon which the tube-carrier is mounted is practically universal, so that it can be placed in almost any position. Cones of various sizes and shapes may be attached to the under surface of the carrier.

Compression on the patient is obtained by the use of a rubber bag fastened to a celluloid diaphragm. This diaphragm covers a square aluminium frame,

attached to an adjustable arm below the tube-carrier on the vertical tube-stand. A rubber tube leads from this bag to a similar one placed on the stool where the operator is to sit. By sitting down on the bag containing the air, he forces the air through the tube into the bag placed on the patient. The celluloid diaphragm prevents the bag from moving upward, so that as it fills with air, it slowly compresses the patient, causing a not disagreeable and yet very firm compression.

Owing to the fact that the pressure is obtained independent of the cone,

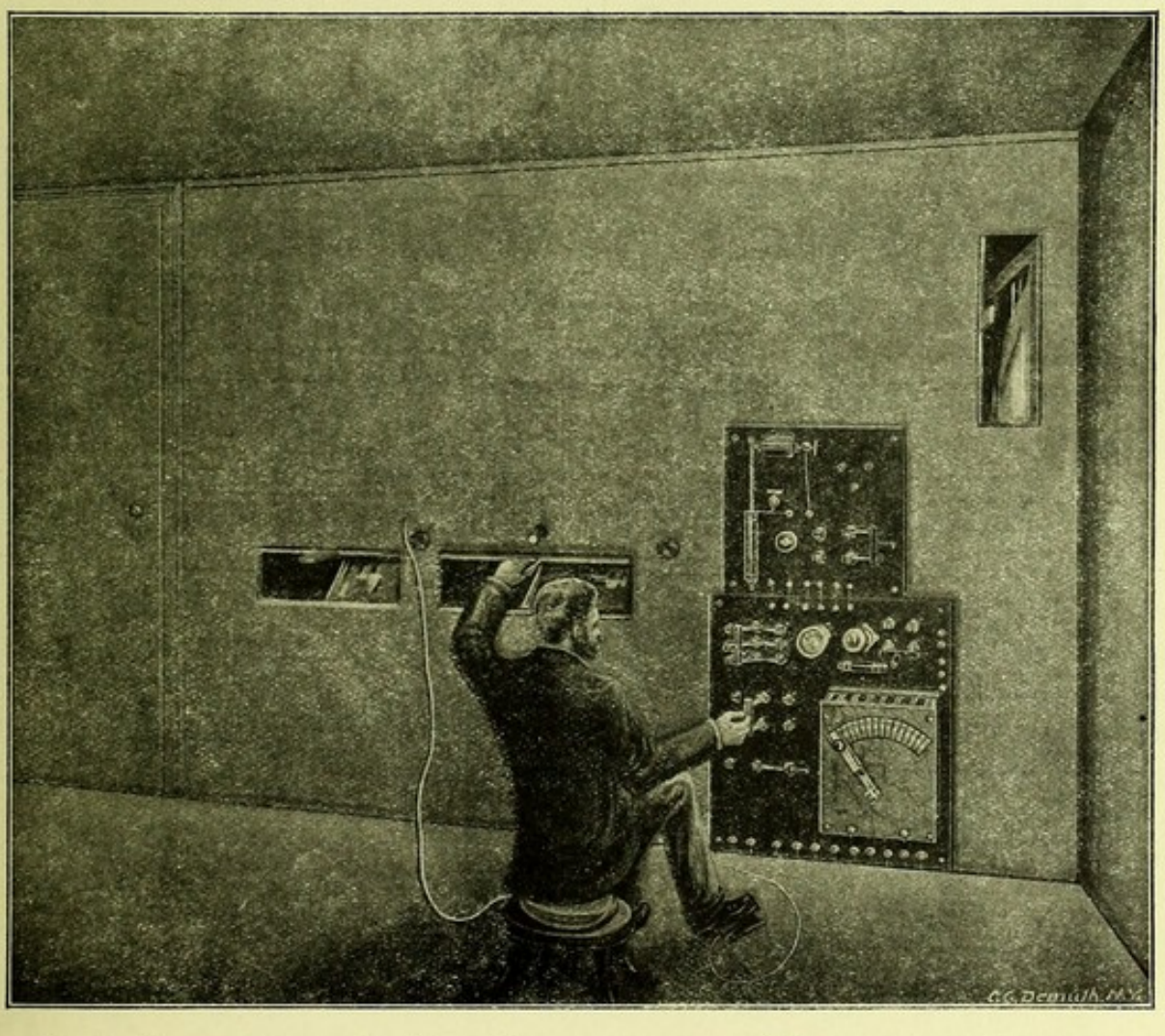

Fig. 2.—Interior of the Ray-Proof Cabinet, showing the Window through which the Plates are manipulated and the Compression Bag on the Operator's Seat.

there is no danger of the tube being moved by efforts at respiration, and the tube may be shifted to make stereoscopic plates of the kidney under compression without removing the bag. So far as I know, there is no device of this kind in use at the present time other than that above described.

The table is used in the following manner: After placing the patient in position on the table, the tray is raised by means of the lever. This brings the fluorescent screen up against the under part of the celluloid. The current is then turned on, and the image on the screen of the interposed part is dis-

tinctly visible in the mirror below. This enables the operator to make a fluoroscopic examination of the part to be radiographed before adjusting the photographic plate for exposure. If the placing of the patient is not satisfactory, as observed fluoroscopically, the position is altered until a proper posture is obtained. Thereupon the tray is lowered and the plate slid in through the window until it comes into position under the celluloid, controlled by the guides above referred to. The tray is now raised, so that the plate is brought within $\frac{1}{8}$ inch of the part to be radiographed. The exposure is made and the tray is lowered. The inclined plane on which the tray rests allows the tray and plate to slide out into the operator's hand. Another plate is inserted, the tray raised, another exposure made, and so on.

For stereoscopic plates, two holders are placed on the tray in line with each other, so that when the frame is brought up parallel to the table top, the proximal plate comes under the celluloid opening, and the distal plate under the lead protection beyond. The focus tube-stand is connected with the tray by means of a cord. The first exposure is now made. The tray is lowered, allowing the exposed plate to slide out under the proximal lead protection, and bringing the second plate under the celluloid diaphragm; and at the same time the tube-carrier is automatically shifted the proper distance. The second exposure is then made.

The great advantage of this method is that there are no springs to stick, and the operator knows absolutely that the plates have been properly shifted.

A vertical arrangement stands at the left end of the table. It contains a celluloid window, and a tray with a fluorescent screen and mirror behind it, so that after making an examination in the horizontal position, the patient is radiographed in front of the vertical opening by means of the same tube and tube-carrier before used. The plates are changed from the cabinet in a manner similar to that just described.

The construction of this apparatus allows for teleradiography in both the prone and erect postures.

Rebman Limited, 129, *Shaftesbury Avenue*, *London*, *W.C.*