

# PhotoMetric Camera\*

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THE PhotoMetric Camera produces four images of an object from four separate angles by a single exposure. Each of the four images is correlatable and reference points can be cross identified from one image to another for measurement and analysis.

Perfectly scaled images are projected to life size and are measured within a tolerance of  $\frac{1}{16}$  of an inch in 72 inches.

Figure 1 illustrates the position of camera, subject, lights, and the series of reflecting surfaces. Mirrors are used to obtain the several views by one exposure. Each mirror is precisely located to maintain focal paths of equal length for each view.

## CAMERA ROOM

Figure 2 shows the subject positioned and the operator taking the picture. This room contains the following apparatus:

(1) *Camera.*—The PhotoMetric Camera (Figure 4) was especially developed, after extensive research by the Eastman Kodak Company, for the exclusive use of this process. It is electrically operated (60 cycle alternating current only, 105–125 volts) and the lighting values and focus have been computed and permanently set in.

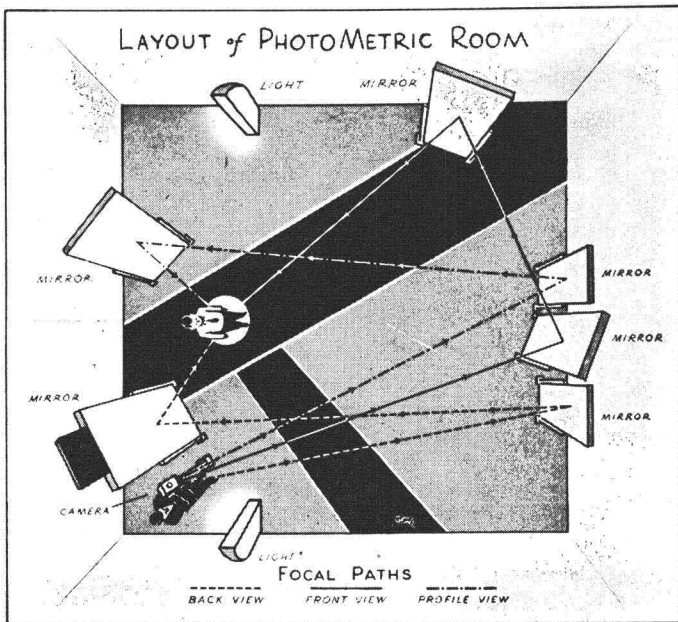


FIG. 1. Layout of PhotoMetric room.

\* This is one of the papers included in the Report of the Reporter for U.S.A. Commission V of the International Society of Photogrammetry.

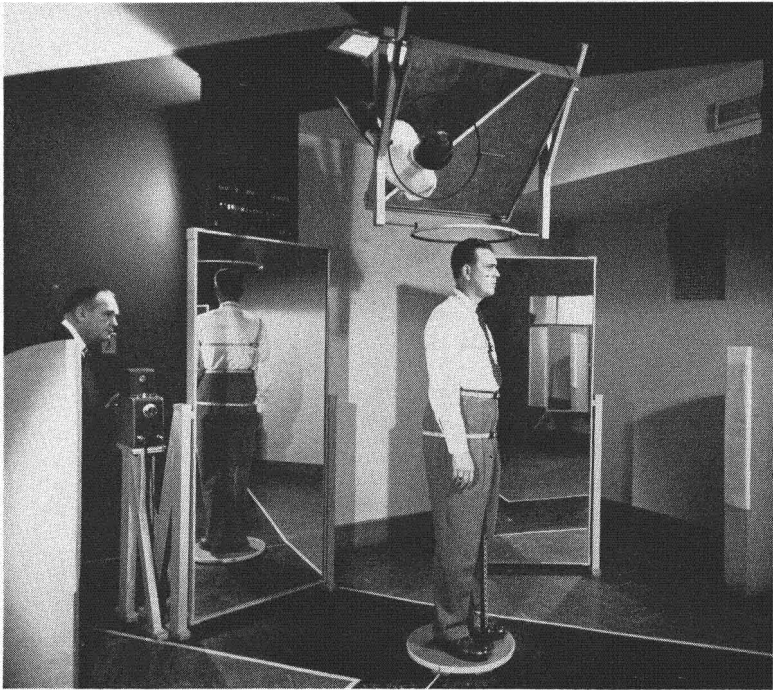


FIG. 2. PhotoMetric camera room.

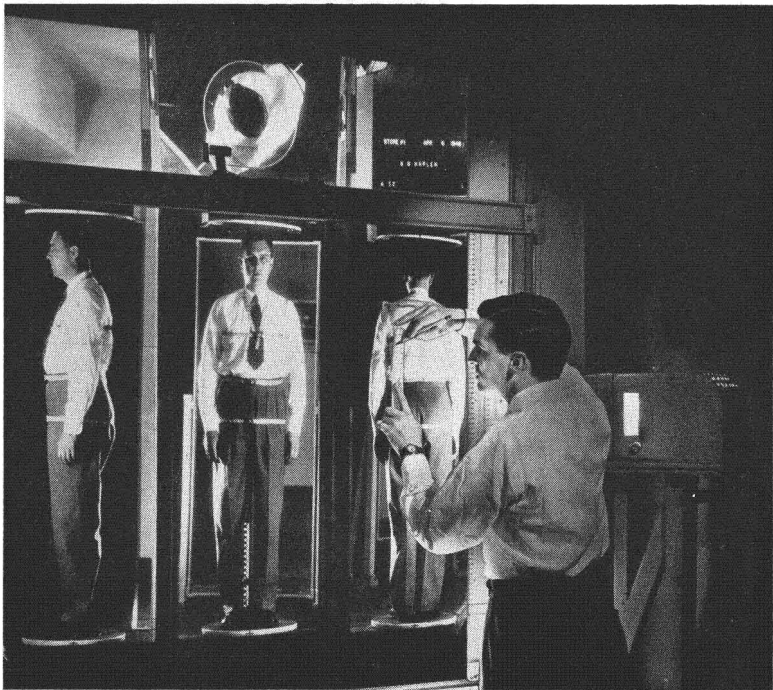


FIG. 3. PhotoMetric projection.

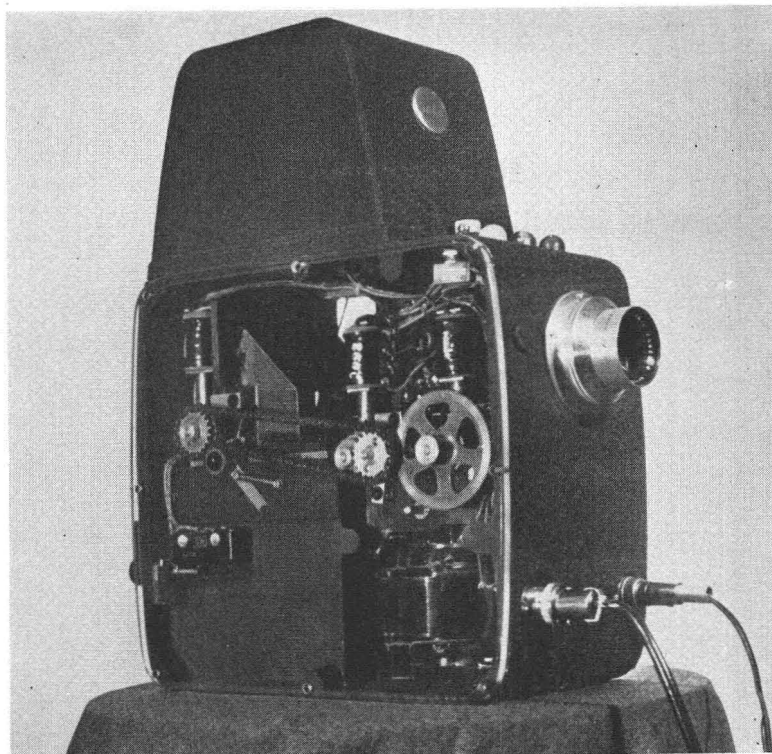


FIG. 4. PhotoMetric camera.

The camera uses a  $f/6.3$  Ektar lens with an  $8\frac{1}{2}$  inch focal length. The lens is set for a subject distance of 30 feet 5 inches. The lens diaphragm is locked at  $f/8$ . A  $2\frac{3}{4}$  by  $3\frac{1}{8}$  inch negative is provided by the 17 foot long un-perforated (Super XX Panchromatic) 70 mm. roll film with fifty exposures. Loading is accomplished by placing the roll of film in the camera housing at the top; the film is automatically drawn into the camera by its electrically operated mechanism.

A photograph is taken by merely pressing the operating button on the rear of the camera. This trips the shutter and sets off the flash lamps simultaneously. The camera mechanism then automatically draws the exposed film into the magazine, and fresh film is drawn into position.

The complete roll of film need not be used before removing the exposed film from the camera. The magazine containing the exposed film may be removed at any time by pressing the magazine release which automatically cuts the film, leaving the unexposed portion of the roll in the camera for future use.

(2) *Lighting*.—This is provided by two or more Kodatron Speed-lamps synchronized with the camera.

(3) *Mirrors*.—The eight mirrors are optically flat within three thousandths of an inch tolerance and are rigidly mounted in heavy metal frames, which are securely positioned.

#### PROJECTION APPARATUS

Figure 3 shows a projected image of four views of the human form. The operator is taking measurements of the image directly from the screen. The apparatus for projection includes:

(1) *Slides*.—Photographs are contact-printed on glass slides for dimensional stability.

(2) *Projector*.—Projects image on mirror behind screen which reflects image to rear of screen. This method of rear projection conserves space and enables the operator to work on screen without obstructing projection.

(3) *Screen*.—This is enameled Herculite glass especially prepared to accommodate pencil work. The screen is mounted in an aluminum frame and stand, rigidly affixed to floor.

(4) *Measuring Devices*.—Sliding vertical and horizontal rules are mounted on screen frame. A contour meter is furnished to take off all curved line measurements. Other devices can be adapted depending on the type of measurements desired.

#### USES

The PhotoMetric Camera is being used in American and European research centers, universities, hospitals, and industries. A significant application of the PhotoMetric Camera is in the field of men's custom tailoring. The photographic process takes about five minutes. Approximately thirty measurements are determined from the photographs to plot the customer's shape and posture.

## *Photogrammetry Applied to Making Sculptured Portraits\**

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**T**HOMAS EDISON refused to sit for a portrait. He asserted that he was opposed to painted or sculptured portraits; since made without the aid of mechanisms, they could not be "really very good." A large number agree.

Man has always searched for means to make his work less laborious, and to devise tools that extend the skill of his hands. With each tool civilization was advanced. But in the Fine Arts, and especially the Art of Portrait Sculpturing, little progress has been made. The sculptor in modeling a portrait, apart from his fingers, uses only a few simple wooden or wire tools. For measuring distances between points, he has only simple calipers and simple scales and can make measurements only in a straight line. He has no means for measuring and recording the relationship between all points on the portrait. Placing one point the correct distance from another might disturb the distances of the corrected point from all other portrait points. For getting a likeness this is especially unfortunate, as a portrait is made up of a number of irregular surfaces, each one of which flows imperceptibly into the other.

The sculptor has no aids such as the precision tools the mechanic utilizes in a modern machine shop, or with the intricate devices the photographer uses in making a photograph. He must depend upon visual guesswork and trial-and-

NOTE: The U. S. Patents for the new sculpturing methods described in this paper and issued to the author of the paper are 1,546,636 and 1,594,607.

\* This is one of the papers included in the Report of the Reporter for U.S.A, Commission V of the International Society of Photogrammetry.