ADVANCES IN THE TAKING, VIEWING, AND PROJECTION OF THE LIPPMANN COLOUR PHOTO-GRAPHS.

[Some months ago Dr. Hans Lehmann demonstrated to us in the laboratory of the Physikalisches Institut in Jena the method and apparatus employed by him in working the projection attachment which have been worked out by him in a recent paper read before the Dresden conference of the German certain technical particulars, we have to thank Dr. Lehmann.—Eds. "Colour Photography Supplement."]

Dr. Lehmann's work has been devoted to devising a convenient form of dark-slide in which the Lippmann plate may be exposed, to working out a viewing frame in which surface reflections may be avoided, and to designing an instrument for projecting the Lippmann heliochrome by reflected light after the manner of the little-used aphiensoscope. He has also prepared a gelatine dry plate of a kind ready for use in the Lippmann process, and plates made according to his formula were, we believe, formerly obtainable from the works of Kraneder, of Munich. Since the death of Herr Kraneder, however, some months ago, other arrangements have been made as to the commercial manufacture of the Lippmann plates.

The following is a description of the apparatus as made by the Zeiss works:

Fig. 1 is a diagram of the dark-slide for holding the sensitive plate and the mercury with which it is backed. The plate lies in the frame A, which is closed by the shutter B, and has the glass side D turned away from the lens. On this surface D a rubber frame F is pressed by means of the screw G, the bar H, and the plate F. The space E between the sensitive plate and F is filled with mercury. This is done by means of the tube L, which is removable from the apparatus. The passages X are so arranged that in either position of the plate, upright or horizontal, there is a head of mercury in the chamber: also that the surface of the mercury remains free as the metal enters the chamber, and lastly that the upper edge of the rubber is not touched. This latter is found to be a necessary precaution towards keeping a clean surface in contact with the image.

For holding the mercury, the vessel shown in Fig. 2 is a convenient accessory. It consists of a cylinder A of polished steel. The screw cover B is provided with an air vent C, which can be closed with the cap B. The inlet and outlet of the mercury are controlled by turning the ring E. The outlet tube F is connected with the inlet K (Fig. 1) by means of a flexible rubber tube. The hook G is for hanging the vessel temporarily to the dark-slide during filling. The joint use of the two pieces of apparatus allow of the mercury being used in the cleanest manner.

The Viewing Chamber.

The Lippmann photograph, as is well known, must be viewed by reflected light, best in an apparatus specially constructed for the purpose. The new Zeiss instrument is so designed that disturbing stray light is cut off and the full colour of the Lippmann heliochrome obtained. Fig. 3 is a diagram of the principle on which the apparatus is made. The heliochrome is provided with a glass wedge to avoid surface reflection, as suggested by Professor V. O. Wiener. In front of this latter is fixed a collecting lens C, at the focus of which the pupils D and F of the whole system are placed. The light is thrown upon the lens O by the total reflecting prism D and the flat mirror E, and transmitted by it in parallel pencils which are reflected perpendicularly by the surface of the image A, and pass for a second time through C to unite at the eye of the observer F. The whole system is placed in a light-tight chamber. It may be arranged for stereoscopic pictures.

The Projection of Lippmann Heliochromes.

A new piece of apparatus has been constructed by the Zeiss works for the projection of Lippmann heliochromes, and can be adapted to the ordinary projection instruments. It permits of the projection of sharp pictures on a larger scale than has previously been possible. Fig. 4 explains the principle of the apparatus. The condenser B throws an image from the crater of the arc lamp A in A'. This latter, however, is not actually formed here, but in the diaphragm aperture of the projection
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