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Infrared Photography

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Infared Photography*

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In introducing my subject, "Infrared Photography," I should like to say a few words about light in general. If I seem to be too fundamental, I hope you will bear with me.

We might ask the question—how are we to explain light? We know that sunlight which is our chief source of light is a continuous shaft that spreads more than 90,000,000 miles and vibrates in all directions. Now if a beam of this white light is allowed to pass through a transparent prism, its general direction is changed and the beam spreads out into a broad band of rainbow colors. This dispersion of the beam into its constituent colors is called the visible spectrum. These bands of color differ from each other in that their vibrations may be fast or slow and the wave length correspondingly short or long.

When a beam of light strikes an object, it is reflected in a new direction. It is only by the light rays reflected from a reflecting surface that we are able to see objects. Thus, what we learn of the size, shape, and color of an object will depend upon which wave lengths are reflected and which are absorbed. For example, a book that reflects the waves of red light and absorbs the other colors, we see as red, while one that absorbs all colors, we see as black. In studying the visible spectrum we observe, also, that the brightest colors lie in the middle of the band. The outer colors, violet and deep red, are very dull and appear to shade into darkness. The darkness is, however, only apparent, for these radiations merely do not excite any sensation of luminosity in the eyes of the observer, but can be found with suitable detectors. Just beyond the visible violet are the ultra-violet radiations and beyond the visible red the infrared. The latter are the radiations we are concerned with this afternoon. The infrared radiations behave in many respects like visible light. They can be reflected and refracted. Our senses do not, however, tell us much about the special properties of the different wave-length regions in this broad band of infrared. Thus, we need special detectors for the infrared radiations. The infrared sensitive plate and film is not only a detector of the infrared but also records some of the properties of this radiation.

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The infrared region of the spectrum is very broad extending from 76A to A millimeters. In our simple dispersion experiment their existence may be demonstrated by placing a sensitive thermometer just beyond the red end of the visible spectrum. A slight rise in temperature will be observed. For this reason infrared radiations are generally considered as heat rays.

In order to make infrared photographs the following materials are necessary: any ordinary camera can be used (it is merely necessary to place over the lens a filter which will transmit the infrared rays and absorb the violet and blue light), the infrared sensitive plate or film. The source of light is several banks of incandescent lamps. Processing is done in complete darkness.

Uses of Infrared Photography

Some of the applications are as follows:

1. Penetration of haze such as is seen in a landscape at a great distance.
2. Documents and manuscripts which have been censored by covering with various types of ink in most cases become visible because of the penetrating qualities of the infrared.
3. Infrared photography permits photographs to be obtained with transmitted light in cases in which visible light does not penetrate.
4. Slight differences in the color and morphologic detail of gross anatomic specimens may be recorded with excellent contrast.
5. Infrared photography demonstrates the variable patterns in the superficial vascular system in the living and furnishes a permanent photographic record of any progressive or regressive changes in the pattern.

It is true that with the infrared emulsion we merely extend into the fringe of the extensive infrared band. However, the results thus far have been very encouraging. [A series of lantern slides illustrating the above facts was shown.]