

PHOTOGRAPHY-PHYSICS

Aluminum Mirror Is Superior For Movie Photography

Special Alloy Condensed on Glass Reflects All Colors Alike and With Greater Efficiency Than Ordinary Silver

STRIKING economies in motion-picture illumination are forecast in the use of a new type of metal-front mirror recently developed by Dr. Hiram W. Edwards, physicist in the University of California at Los Angeles. The new reflector, known to camera operators as the "pancro" mirror, is so called because of its panchromatic behavior. It reflects all colors alike. It also reflects light much more completely than the standard silver mirror.

In the manufacture of this mirror a piece of glass, and near it a piece of aluminum alloy are placed together in a large airtight enclosure. Nearly all of the air contained in the vessel is now removed—to be exact, 99.99999 per cent is pumped out. The alloy is then electrically heated to a very high temperature, and readily evaporates into the extremely rarefied air. So few molecules of air are left that the metallic vapors find a rather free and unobstructed path over to the cool glass, where they condense to form a brilliant mirror. Although this process has been used occasionally for many years in preparation of small devices for optical research, its application to commercial illumination problems is new.

The mirror reflects light with approximately 93 per cent. efficiency. The common silver mirror, when operated from the metal side—not as usual through glass—gives approximately the same efficiency with red light, but only 81 per cent, with violet light. Viewed through glass, still lower efficiency is observed. The alloyed metal of the pancro mirror, which is amenable to a special heat treatment, thereby acquires great resistance to deterioration without appreciable loss in power of reflection. It is thus not necessary to put a layer of glass in front for protection. The open surface, unhampered by refraction and absorption, gives properly colored, realistic images not seen hitherto by ordinary mirror gazers. Silver, on the other hand, not only distorts the colors but has a delicate surface which is easily

scratched or corroded.

Motion-picture producers, especially those making films in color, require literally terrific quantities of electric energy for illumination. A single scene has taken 45,000 amperes at 110 volts—enough to light a fair sized city. It is not practicable to throw the direct glare of huge lamp batteries directly upon actors' faces, or upon any shiny surface, lest "hot spots," or bright patches, show in the picture. Reflectors are necessary. Unfortunately the low efficiency of silver mirrors with blue and violet light, so valuable in photography, seriously affects the situation.

With the aid of pancro mirror surfaces, direct rays are thrown back, and thence are concentrated upon the photographed objects. Great economy, perhaps as high as 50 per cent. in energy consumption, is expected. Furthermore, the excellent rendering of color values promises usefulness in exhibition as well as production.

Astronomers are greatly interested in a somewhat similar mirror, made of aluminum, which is being independently developed for their uses by experts both in Cornell University and the California Institute of Technology.

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GEOGRAPHY

Lofty Mountain Tops Little Higher Than Sea Deeps

MT. EVEREST'S summit is not so far from the middle of the earth as are several other mountain-tops of less pretentious altitude above the sea level. And the bottom of the deepest hole in the ocean, Emden Deep near the Philippines, is very little closer to the earth's core than is the top of Mt. McKinley in Alaska, North America's loftiest mountain.

These and other geographic paradoxes have been worked out by Dr. G. Rösch, German geographer, who reports them in *Die Umschau*.

They are due, of course, to the well-known fact that the earth is not a true sphere but bulges somewhat at the equator and is flattened at the poles. Consequently the nearer you approach either "end" of the earth the nearer also you come to its center. Sea level in high latitude is some thousands of feet nearer the center of the earth than it is at the equator.

Thus it comes to pass that the summit of Everest, in latitude 30 degrees north, has a lower "geocentric altitude" than have the Andean peaks Huascaran, Cotopaxi and Chimborazo and the African mountain, Kilimanjaro, all of them less than ten degrees from the equator. On this same standard, the bottom of the deepest oil well in Texas is "higher" than the top of the Empire State Building, and the bottom of a still deeper borehole in California is "higher" than the Eiffel Tower.

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BIOLOGY

Metals Kill Microbes By Remote Effect

METALS seem to exert a harmful influence upon microbes and seeds even though they are not in contact, it is indicated by experiments reported by G. A. Nadson and C. A. Stern, Soviet scientists, who communicated their researches to the French Academy of Sciences.

They first found that metal plates at a distance of one to two millimeters (1/25 to 1/12 inch) from certain microbes, influenced the microbes. Some kinds of microbes are killed, other kinds are weakened or modified in their characteristics.

Metals of high atomic weight were found to be more effective than metals of low atomic weight. Thus the order of decreasing effectiveness was lead, gold, platinum, aluminum, which is also the order of decreasing atomic weight.

In another investigation, the scientists found a similar effect on plant life. Mustard seeds that had started to germinate were exposed for three days to various metal plates distant one to three millimeters, and their growth was found to be retarded. Again the influence of the metals was in the order of their atomic weights.

Whether the effect is due to some kind of rays, to a metallic vapor, or to some other cause, the scientists are not yet ready to say.

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