THE OPTICAL INTENSIFICATION OF PAINTINGS.

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One of the great difficulties which the artist has to contend with in representing scenes in which great contrasts of luminosity occur, is the comparatively narrow range of luminosity obtainable on canvas with pigments. According to Aubert, the whitest paper is only fifty-seven times as luminous as the darkest black paper, and this probably represents about the range obtainable in paintings. Contrast with this the enormous range of luminosity in a sunlit landscape, where the high lights are many hundred times brighter than the deep shadows, to say nothing of sunset views, where the disk of the sun itself is to appear in the picture. As is well known, the colors of natural objects change in tint as the illumination is increased, green becoming yellowish for example; and artists, by taking advantage of this circumstance, consciously or unconsciously, are able to suggest a high degree of illumination without actually reproducing it. Pictures are sometimes improved by strong local illumination; anyone who has spent much time in sketching must have frequently noticed what pleasing effects are sometimes produced when a ray of sunlight, filtering through the trees, falls upon that portion of the canvas which represents, say, a sunlit meadow. Noticing effects of this kind so frequently, I have been led to experiment with carefully-graded illumination, and have obtained results of remarkable beauty. If we can produce a strong illumination on all of the high lights of the picture, and a feeble illumination on all of the shadows, we shall obviously greatly increase the range of luminosity. This may be done by a very simple means. We have only to take a photograph of the painting on an orthochromatic plate, preferably on a red sensitive plate with a suitable ray filter, make a lantern slide from the negative, and project this picture, not on a white screen, as is usually the case, but upon the original painting. The experiment is to be made in a darkened room, of course.

Effects of a very startling nature are produced in this way, especially in the case of moonlight and sunset pictures with fine cloud effects. The most striking, and artistically the most pleasing subject which I have yet tried is a little pastel of the market place in Concarneau (Brittany) by Bullfield, which is a wonderfully sunny picture. Under the graded illumination of the lantern the picture becomes filled with a perfect flood of sunlight, and we feel at once that here for the first time we are looking at a picture in which the enormous luminosity contrasts of nature are really approached. If after looking at the picture illuminated in this way for a few minutes, we remove the slide from the lantern, allowing a uniform illumination to fall upon it, we feel a decided shock. The picture looks as if it had not been dusted for ten years, the sunlight leaves it, and everything looks flat. As we become accustomed once more to the usual illumination, the appearance of the picture gradually improves. It is most curious, however, to note how a short view of the painting under the light of the lantern educates us at once to a higher standard of luminosity contrast, so much so in fact that when we change suddenly to ordinary illumination the picture at once strikes us as a very feeble attempt at anything like correct values. The effects are very different, according to whether we take our negative on an ordinary or on an orthochromatic plate, especially if there is much blue in the picture. We can in this way alter the relation of the values in the picture, and study the effect.

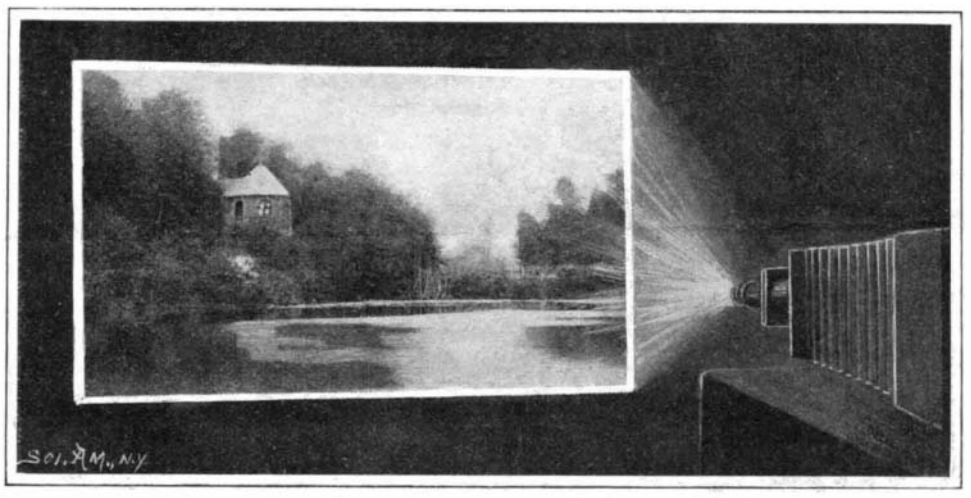
It is my opinion that if the values are correct in the original painting, they will hold under the graded illumination produced by the lantern. If they are not right, the errors will be glaringly magnified. As yet I have not had an opportunity to experiment with many pictures, but the method is so easily carried out that anyone having a good lantern can repeat the experiment.

If the picture contains patches of bright, pure red, and a red sensitive plate is not available, it is a good plan to touch up the negative, as otherwise the illumination of these patches will be too feeble. Any desired effect can be secured by local reduction or intensification of the negative or lantern slide. We can in this way experiment to our heart's content with a painting, altering the values at will without injuring it in the slightest. A most curious effect is obtained if the negative itself is projected upon the painting. This of course lessens the contrast, and if the negative is a fairly dense one, it may destroy the contrast almost entirely, making the picture look like an almost flat wash of chocolate. This experiment is instructive only as showing how completely the values in a picture can be controlled by local illumination.

The method is of course of very little practical importance, though a small exhibition of suitable pictures illuminated in this way would be well worth attending. Each picture would have to be illuminated by a separate lantern, of course.

In repeating these experiments, the only difficulty which will be found is getting the lantern picture "into register" with the painting. In taking the negative care should be taken to have the painting exactly vertical, and the lens of the camera directly in front of its center. The same conditions should obtain during the illumination of the painting. It takes some little practice to get the projected picture exactly the right size. The best plan is to select two conspicuous objects, and note whether their distance apart is greater or less in the projection than in the painting. If the former is found to be true, the painting should be brought nearer to the lantern, the focus being changed, of course.

Very likely scenic effects on the stage could be heightened by employing this method of illumination, or some modification of it.



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The Cause of Soft-Shelled Eggs.

Poultry writers, since the time the Shanghai rooster first invaded Boston, have been repeatedly telling us that soft-shelled eggs were caused by an insufficiency of lime in the food consumed by the hens. Such, however, is not the case. The soft-shelled egg is a case of arrested development, due to nervous interference with the functions of the oviduct. The laying of incompletely developed eggs corresponds to abortion in mammals, and can likewise be brought about by extreme mental disturbance. In experiments conducted at the Kansas Experiment Station the writer was able to cause the production of soft-shelled eggs by continued excitement of confined hens. It was also shown that the hen's system on an ordinary diet contains enough calcium carbonate for the formation of about five or six eggs. If lime was withheld from the food, the hen after having laid this number of eggs, will stop laying. When lime was given in limited quantities the hens laid apparently normal eggs, but only as frequently as the lime furnished would supply shell material. Careful weighings proved that eggs thus produced, though apparently normal, were actually thinner-shelled than normal eggs from the same hen. But little is known about the process and control of egg formation, and further study should yield facts of both scientific interest and practical bearing.

Official Meteorological Summary, New York, N. Y., January, 1907.

Atmospheric pressure: Highest, 30.69; lowest, 29.57; mean, 30.23. Temperature: Highest, 62; date, 7th; lowest, zero; date, 24th; mean of warmest day, 54; date, 7th; coolest day, 7; date, 24th; mean of maximum for the month, 38.9; mean of minimum, 25.6; absolute mean, 32.2; normal, 30.5; excess compared with mean of 37 years, +1.7. Warmest mean temperature for January, 40; in 1880 and 1890. Coldest mean, 23; in 1893. Absolute maximum and minimum for this month for 37 years, 67 and —6. Precipitation: 3.26; greatest in 24 hours, 0.98; date, 12th; average of this month for 37 years, 3.76. Deficiency since January 1, —0.50. Greatest precipitation, 6.15, in 1882; least, 1.15, in 1871. Snowfall, 11.7. Wind: Prevailing direction, N.W.; total movement, 9,060 miles; average hourly velocity, 12.2; maximum velocity, 59 miles per hour. Weather: Clear days, 7; partly cloudy, 9; cloudy, 15. Fog: 8th, 18th, 19th, 20th.

In the year just closed 11,753 automobile owners registered with the Secretary of State of the State of New York. This is an increase of 3,128 over the preceding year. During 1906 certificates were issued to 7,067 chauffeurs, as against 4,387 in 1905.

Has the Gulf Stream Any Influence on the Weather of New York City?

The following letter, by Mr. James Page, was sent in reply to a gentleman who had been told that a mild winter in New York city was due to the fact that the Gulf Stream is running sixty miles nearer shore than previously. We hope that its publication may contribute to correct the numerous popular misapprehensions relative to the important part played by the Gulf Stream in the economy of nature.

The Weather Bureau is in almost daily receipt of inquiries of this and a similar nature, all having their origin in a misconception of the character and extent of that motion of the ocean waters to which the name Gulf Stream may properly be applied. Speaking with precision, the term should be limited to that continuous discharge of the water of the Caribbean Sea and the Gulf of Mexico which takes place through the Straits of Florida, a narrow outlet bounded on its western side by the State of the same name, and on its eastern by Cuba and the Bahama Islands and Bank. Through this channel, constricted in its narrowest portion to a width of 32 miles, there is a constant outflow of the warm, equatorial waters heaped up in this vast and almost landlocked basin by the persistent action of the trade winds, rising at times in midstream to a velocity of four or five knots, and having a constant temperature of 81 deg. or 82 deg. F. The impetus imparted to this water by the pressure from the rear is moreover sufficient to maintain it in motion for a considerable distance beyond the actual point of exit from the channel proper, which may be considered as terminating at Matanilla Shoal, the northern extremity of the Great Bahama Bank, in latitude 27 deg. north. As a result the stream continues to be felt as a distinct body of warm water about forty or fifty miles in width, moving steadily onward, but with uniformly diminishing velocity and temperature, until a point opposite Cape Hatteras is attained, or even opposite the Capes of the Chesapeake. Beyond this point, however, the warm current spreads out over the adjacent area of the ocean like a vast fan, and the identity of the stream is consequently obliterated in the general eastward drift which characterizes the waters of the temperate latitudes.

Speaking then with precision, the Gulf Stream is a current of warm water, forty or fifty miles in width, which emerges from the Straits of Florida, follows the coast of the United States northward as far as the Capes of the Chesapeake, and is there merged in the generally eastward drift underlying the prevailing westerly winds of the temperate latitudes. To describe it in the language of Maury as "a river in the ocean, having its fountain in the Gulf of Mexico and its mouth in the Arctic Seas" is picturesque, but highly exaggerated and erroneous.

With reference to movements of the stream (viz., changes in its location as a whole), reports of which, furnished by navigators, appear from time to time in the daily newspapers, it may be said that these probably do exist, although within narrow limits. Observations of the "set" experienced by vessels crossing the stream, as also of the warmth of the surface waters, show that the position of the axis, or line of greatest velocity, as also that of the line of maximum temperature, may vary from day to day over a range of fifty miles. The methods of observations employed are, however, so replete with sources of error that little confidence can be placed in any single result. That such movements can have any effect upon the climate in the vicinity of New York is highly improbable, the stream itself in these latitudes being so dispersed as to be almost indefinable, and the modifications of the surface temperatures of the adjacent waters wrought by a temporary change in its position being certainly negligible.—Monthly Weather Review.

The three turbines of the "Carmania" contain in the aggregate a million and a quarter of blades, and those of the "Lusitania" will have approximately three millions of blades together. This means probably over one million of blades for each of the low-pressure turbines. The number of blades in the largest turbine which the Westinghouse Company has yet built is something over 85,000, but these turbines being built for electrical station purposes run much faster than the marine turbines, which latter have therefore a much larger number of blades. While the insertion and fastening of all these blades may present a problem to the manufacturer, the entire rotor shaft and attached blades are, so far as the operating engineer is concerned, a single piece. The blades when they leave the builders' hands are really integral with the spindle and case.—Power.