THE PHOTORAMA.

The subject of panoramic projection has been illustrated and described at various times. This idea seems to have been first realized at the Chicago World's Fair in 1893 by Mr. Chase, but the result was in all probability not encouraging, since the experimental apparatus that he constructed at this time was not used afterward. At the Paris Exposition of 1900 M. Grimoin-Sanson attempted to combine animated projection with panoramic projection. The problem found under these conditions is necessarily more difficult of solution, and it was not solved in a satisfactory manner.

At the present time MM. A. and L. Lumière, who are well known for their remarkable work in all that pertains to photography, have succeeded completely in overcoming all the difficulties that surround this question, while confining themselves, it is true, to unanimated panoramic projection, which alone is sufficiently complicated.

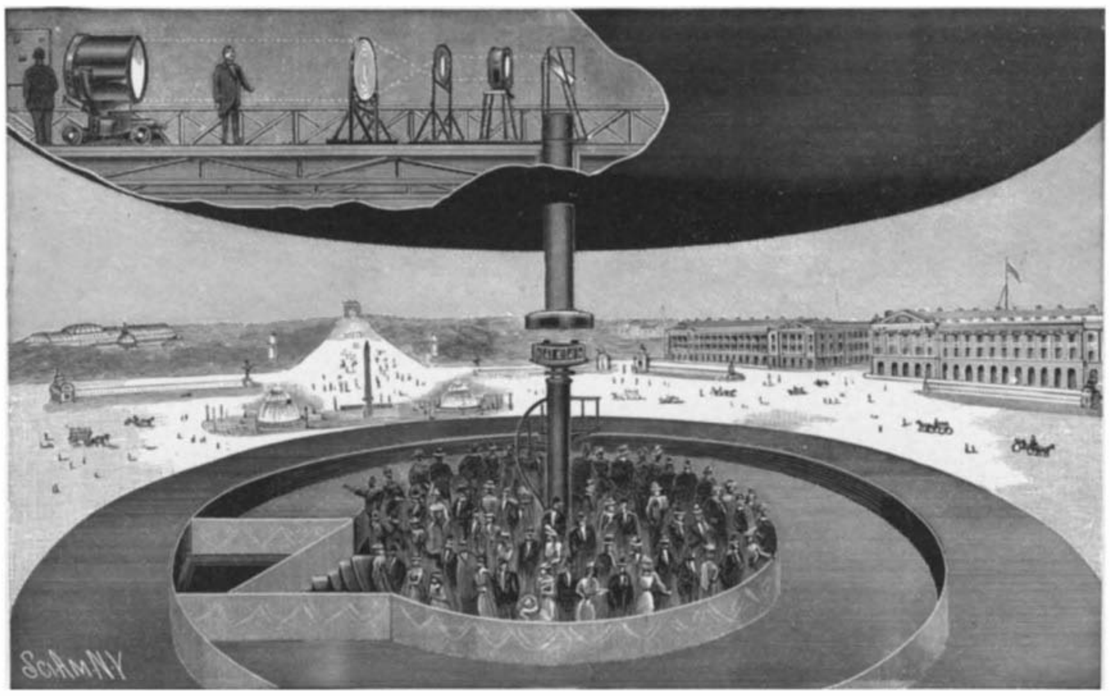


Fig. 3.—INTERIOR OF BUILDING, SHOWING PANORAMIC PICTURES.

The panorama is not operated as an experiment merely, but forms a regular public exhibition which has been shown for some little time now, in a specially constructed building on the site of the old North Pole skating rink, in the Rue de Clichy.

The first condition to be fulfilled in such a cyclorama is to obtain a continuous circular image that shows no lines of juncture between the several pictures that go to make it up. The inventors have satisfied this condition by employing a continuous circular film joined at its two ends. No effort is made to conceal this one joint, as it forms such a small proportion of the entire surface of the picture that it is scarcely to be noticed. This film is mounted in two metal rings so as to form a cylinder 3.93 inches high by 7.87 inches in diameter (Fig. 2, No. 3); and the principle of operation is that this film being placed in the center of a very much larger cylinder formed by the screen, all that is necessary to project its image on the latter is a strong light within it and a suitable lens without. But as this lens would project only the image of the part of the film covered by it, it would be necessary, in order that it should project the whole image, to revolve it rapidly enough around the film for the retina to retain the impression of the whole image.

The solution of the problem, although apparently simple, is in reality not so at all, first, because the image given by a constantly moving lens is not fixed, and, secondly, because, in order to obtain the proper continuity of the various images, it would be necessary to revolve the lens at a rather high speed, and the light would then be insufficient.

It was necessary in the first place, therefore, to find some way of keeping the image stationary. The Messrs. Lumière, who are not only good theorists in physics and chemistry, but also practical men, have discovered a new optical principle by which they accomplish this result. This consists in placing behind the lens a mirror which inverts the image. The conditions under which this mirror must be placed with respect to the focus of the lens, and the position of the latter as regards the film, depend on considerations based on the formulas relative to lenses that would be too lengthy to go into here. We will simply state that under these conditions the lens can move around the film while giving an image that is perfectly stationary. The necessity of not giving the lens too great a speed of rotation has been fulfilled by mounting twelve lenses in place of a single one, by which means the speed of rotation of the lenses can be twelve times less than would be required with a single lens. The speed is in this manner reduced to three or four revolutions per second, and the brilliancy of the projected pictures is twelves times greater.

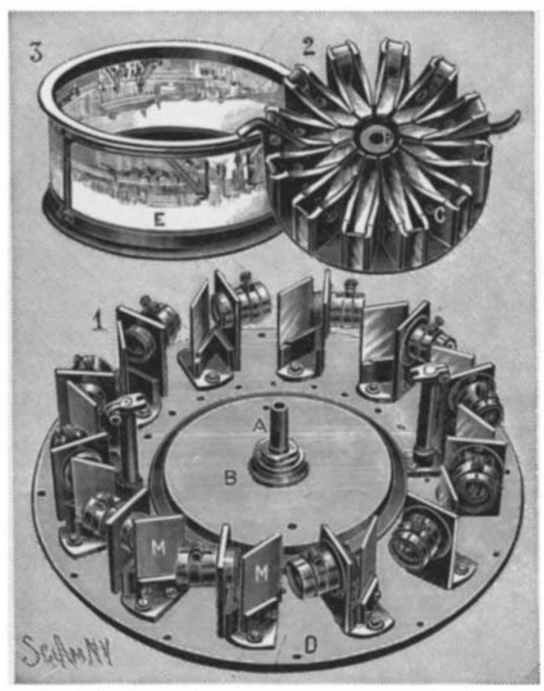


Fig. 2.--DETAILS OF THE PHOTORAMA.

1. Platform carrying lenses and their mirrors. 2. Condensers. 3. Film holder.

But it was not necessary merely to conceive the means of overcoming these difficulties; it was necessary to realize them. Let us examine now, therefore, the construction of the apparatus which is used for projecting the pictures.

The apparatus consists, first, of a circular platform (Fig. 1) on which the film holder, *E*, is mounted, and which forms part of a central vertical axis. This platform is stationary. Below it is a second platform, *D*, movable around the axis, and, within the film, a third platform, *B*, which is also movable. These two movable platforms are connected together by transverse arms passing over the film from the inner one to the tops of posts on the outer, as plainly seen in the illustrations. They turn together, therefore, when a rotary movement is given one of them by a small electric motor.

On the periphery of the large platform, *D* (Fig. 2, No. 1), are mounted the twelve lenses and their respective mirrors, while on the inner platform opposite the lenses (*C*, Fig. 2, No. 2) are placed twelve condensers for illuminating the film. Each of these condensers consists of a rectangular lens of suitable focus placed vertically at the end of a narrow box, the bottom of which consists of a mirror set at an angle of 45 degrees. All the boxes are built in around the central axis, from which they radiate as shown. Under these conditions a powerful bundle of luminous rays directed vertically on the mirrors is dispersed all around the film and lights it equally at every point.

The above description gives, in the main, an idea of the essential parts of the apparatus.

The circular building (Fig. 3), in the center of which the spectators are placed, is 65 feet in diameter, with a screen 26 feet high.

The apparatus we have just described is placed on top of a pillar in the center, and a small electric motor, to which it is suitably connected, gives it the necessary rotary movement. A spiral stairway permits the operator to reach the apparatus easily for the purpose of changing the film. Above the auditorium is a bridge on which is placed a powerful Mangin searchlight with a lens 2½ feet in diameter and a 90 ampere arc lamp of the same type as is used for marine work.

Since the horizontal bundle of parallel rays from the searchlight is too large to fit into the cylinder formed by the film, it is transformed into a cone by means of the first echelon lens, *B* (Fig. 4). This cone is then intercepted by a second lens, *C*, at the proper point to obtain a smaller bundle of parallel rays of the proper diameter, and these rays, after passing through the cooling water tank, *D*, are reflected down through a tube to the condensers by a mirror set at 45 degrees. The water tank through which the rays pass absorbs their heat, so that it does not damage the film.

As the regular Edison circuit is not wired heavily enough to supply a current of 90 amperes' intensity, which is used in the arc light, this had to be produced by a special dynamo driven by an electric motor run by current from the mains.

Notwithstanding the power of this light, the images are not as brilliant as one would expect. This is because each part of the screen reflects some of the

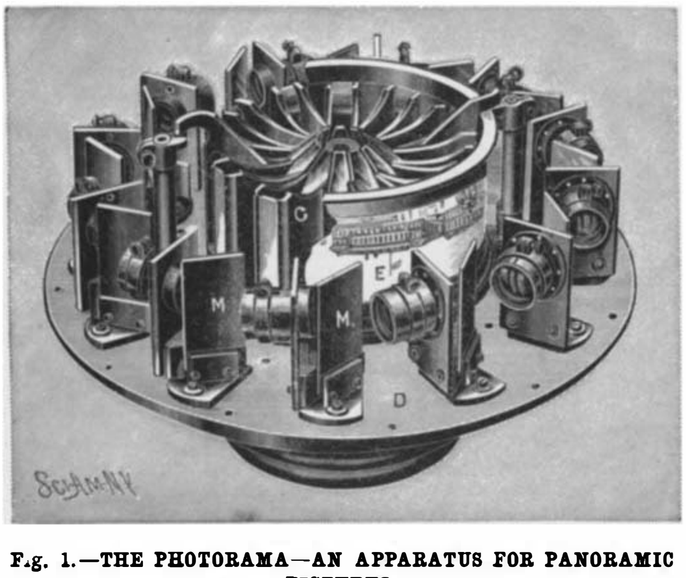


Fig. 1.—THE PHOTORAMA—AN APPARATUS FOR PANORAMIC PICTURES.

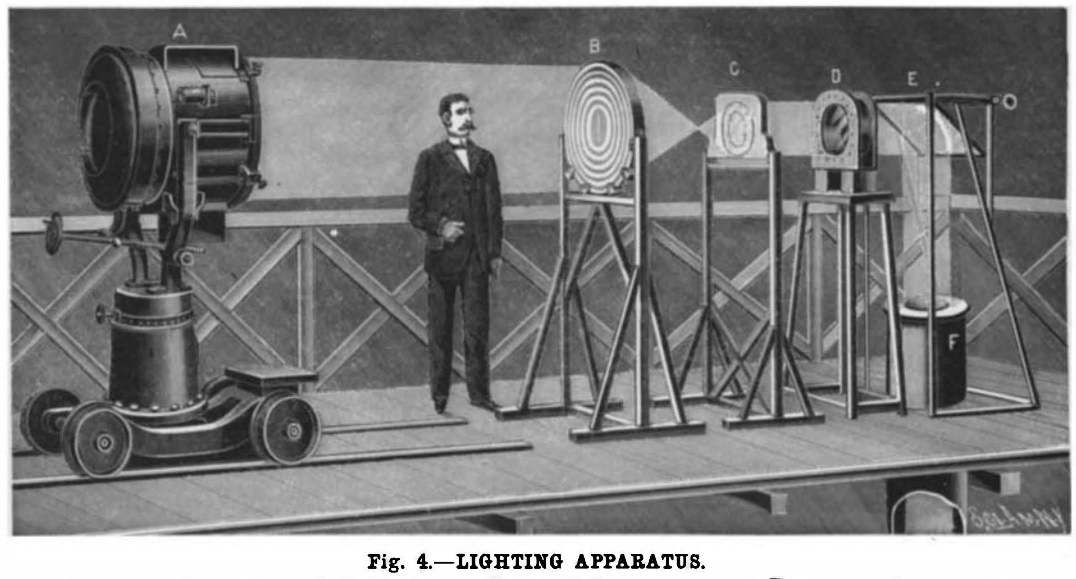


Fig. 4.—LIGHTING APPARATUS.

A. 90-ampere Mangin searchlight. B. Condensing lens. C. Lens forming parallel rays. D. Water tank. E. Mirror F. Pipe leading down to film.

light it receives to the point directly opposite, and this parasitic light takes away the intensity of the projected image. This is shown perfectly if half of the circular film is covered so that no light can pass, when all the illuminated part will at once be seen to gain in intensity. The inventors have tried to remedy this defect by varying the form of the screen, by coating it with different substances, and by various other methods; but up to the present without any great degree of success.

This reflection of the light is not, however, a serious disadvantage, as even with it the image is quite brilliant. We spoke of it merely to show how many unforeseen difficulties were encountered in realizing an idea that is simple only in appearance and that has haunted different inventors for years. — For the above description and the illustrations we are indebted to La Nature.

THE VENICE OF LONG ISLAND.

The intense humidity and generally debilitating effect of the summer months in New York and vicinity render a vacation at the seaside or in the mountains a veritable necessity for those who can afford, and, indeed, for many who can ill afford, the time and expense of making such a change. Those people who are not fortunate enough to own a summer cottage may resort to the less expensive shanty or camping tent; and the sheltered bays and estuaries around New York swarm with people who spend from a couple of weeks to the whole season under canvas, or within the shelter of the cheapest kind of a shanty or hut. One of the most curious and picturesque summer settlements of the kind is a nondescript collection of dwellings, all home-made and pile-supported, which fringes the shore line of a shallow estuary which extends for a mile or more inland from Grassy Bay, a subdivision of Jamaica Bay, Long Island. The estuary is one of several which spread in serpentine fashion through the stretch of tide flats which surrounds the bay. Ordinarily there is in the creek about 4 feet of water, although in the spring tides it is not uncommon to have a variation of 8 or 10 feet in the tide.

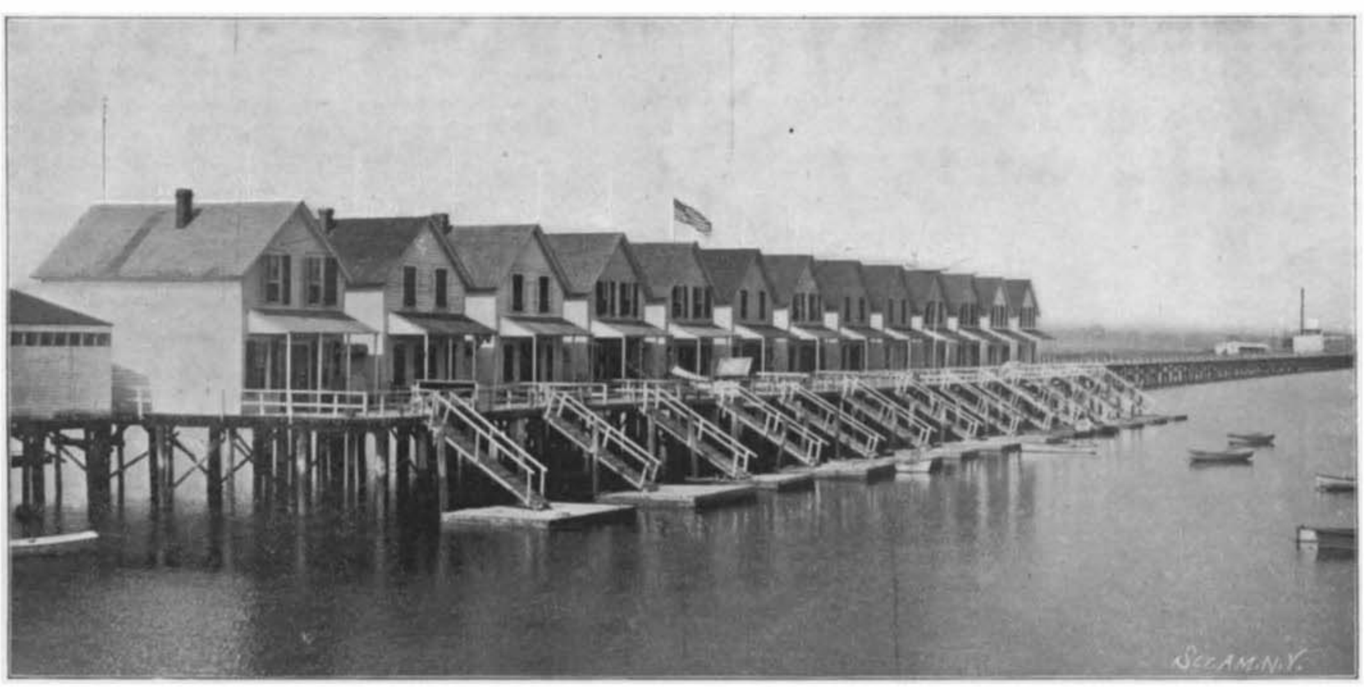
Ramblersville, as the place has come to be called, has been built chiefly by Germans of the artisan class from East New York, and the materials and style of construction are of the very cheapest. The houses are mainly of one story, and contain usually one. two or three rooms apiece. Each is built on its own little "dock," and has its own landing stage and steps leading down to the water. The outfit consists probably of a bed or two, a table, chairs, and, above all, a flat-bottomed rowboat or sailboat. In the foreground of our illustration is seen a tall pile with slats nailed against it and a diving platform at the top, while in the middle distance is a practical illustration, in the shape of a drawbridge, of the ingenuity which is always the mother of invention; the center span of the bridge is swung by means of ropes extending to a tall mast at one end of the draw.

The inhabitants of Ramblersville are enabled to spend the season at this Newport of Long Island at a minimum of cost in the way of board and lodging. Many of the shacks have been put up for $50 or $75 cost, and the present owners of the land charge only a few dollars for the squatter's right, under which the erection of the shanties is permitted. For food the Ramblersvilleite has only to jump into his flat-bottom boat and spear for eels on the mud flats, or pull out with hook and line the abundant flounders and flukes from the deeper waters; while he can have a clambake at any time for the mere trouble of digging in the mud.

Howard's Dock, of which we present an illustration, represents a more ambitious development of the same style of summer resort, the houses in this case being built on very solid and well-braced pile foundations, and the homes being commodious two-storied

"RAMBLERSVILLE" ON JAMAICA BAY.

cottages, measuring about 18 by 25 feet, and containing four well-finished rooms. The pier extends into Grassy Bay for fully three-quarters of a mile. It has a well-planked surface and is protected by a stout handrail along either edge, so that on the darkest night there is no danger in passing from the houses to the shore. At the outer end of the pier is a large, thoroughly up-to-date hotel, and inshore from the hotel are a dozen or more of the comfortable homes shown in the illustration. The owner and builder of the dock rents the houses for from $150 to $250 for the season, and in front of each is a wide porch, a float, and a hinged gangway. In almost every case the occupants of these homes have their yacht or sailboat moored within convenient reach of the float, and have one or more rowboats tied up, so that at any time, when the breeze is favorable, they can pull off and hoist sail for a cruise to the outside fishing ground. It is claimed by those who make a point, summer by summer, of going down for the season to this unique



HOWARD'S DOCK.

spot, that for a complete realization of the benefits of seaside life it cannot be beaten, as everything in the way of sea breezes, salt water, bathing, boating, yachting, and fishing is more completely at hand than it could be at any seaside resort of the ordinary type.

At a meeting recently held in Boston for the purpose of taking action upon the restoration of the "Constitution" to the condition in which she was before the war of 1812, it was unanimously decided that the State of Massachusetts should take up the matter and bear all the expense. The cost of rebuilding the old ship is estimated at $300,000.

An Interesting Sensitive-Flame Experiment.

BY L. DE FOREST.

While conducting experiments with Hertzian waves at the Armour Institute, Chicago, some time since, a rather new and striking sensitive-flame effect was accidentally brought to my notice. At the time I was carrying on the work at night, by the light of a Welsbach gas burner. An ordinary induction coil was used, giving at the time a 1-16 inch spark, and located twenty feet from the gas burner.

The operation of this coil was frequently accompanied by a decided increase in the light in the room; and by altering the adjustment of the air-intake of the Welsbach burner, this increase of light produced by the spark could amount to several candle-power.

For this condition of maximum sensitiveness the mantle was put at considerably less than its maximum brilliancy, portions of it being at but red heat. The flame within, as in the case of the ordinary sensitive flame, appeared to fan outwardly, at the sound of the spark, extend downward, and play upon the red portions of the mantle, causing these to incandesce. Hence the increase of light. There was a slight lag in the return to normal brilliancy after cessation of the sound.

When the coil was closeted, or placed behind a projecting wall, the effect on the light was naturally diminished; and when the door of the closet was almost but not quite closed, the effect was completely cut off, although the source was in plain view from the lamp.

At first sight this decided light effect from a coil spark might be readily mistaken for a new response to electric oscillations; but as a simple acoustic phenomenon the Welsbach mantle properly illuminated seems to afford an unusually sensitive sound-responsive device. The relative effect of different qualities of sound is very marked; it being, as is the case with the ordinary sensitive-flame for such weak sounds, practically unresponsive to ordinary sound or musical notes, but influenced chiefmost by the sharp crack peculiar to the electric spark. That from a small electric bell held not too far away also showed its effect. As with the ordinary flame this is a pressure phenomenon. The relative proportions of gas and air have all to do with it. An excess of gas is necessary for the effect described, but by increasing the amount of air the reverse effect may be obtained, a diminution of the light by the sound. Between these two effects is a point of neutral regulation, near that of maximum illumination, at which the flame appears entirely deaf to any such sound. I have been able to obtain a falling off in the light of the mantle to one-half or one-third its normal brilliancy (which latter required to be made very low for this extreme sensitiveness, with a small pressure). In this condition the light responded even to the exceedingly weak sound of the primary spark of coil, at the distance named.

When the gas is led to the lamp through a long rubber tube, offering considerable friction to its passage the response is accompanied by a distinct jingling sound in the burner; and sometimes, as a secondary effect of the flame's motion, the whole mantle is seen to rock to one side or the other when the spark is operated.