

enthusiasm. Let us not be misunderstood, however, or thought for one moment to use the term with any intention of disparagement. Without enthusiasm there would be little progress. Every great inventor, every courageous innovator, has been an enthusiast, and without the steadfast faith which laughs at impossibilities, and the large hope which has taken no heed of present difficulty, but seen only in the future good, almost all the great triumphs of art science, and civilization would have been lost to the world. Mr. Sutton says:—

"It has been the reproach of panoramic photography that you cannot include the 90° of subject in height, and all other directions, as in width; that is to say that you cannot take a picture upon the segment of a sphere subtending an angle of 90° at the centre. The difficulty of doing this does not, however, depend upon any infirmity of the panoramic lens, but is entirely a difficulty of manipulation, in the case of taking the negative, and of afterwards printing from it. The panoramic lens will as easily and as perfectly cover a field of 90° every way upon a spherical segment, as of 90° in width and 50 in height upon a cylindrical segment. With a modification in the diaphragm, which can easily be made, the panoramic lens will do all that is required in height as well as breadth, and it only remains to master the difficulties of taking negatives upon the inside of a bowl, and of printing from such negatives. It is important to consider in what these difficulties really consist, and how they may be successfully overcome, because if they can be overcome, the photographic artist will have a new world open to him, and the means of leaving far behind all that has been previously done in landscape photography.

"We do not anticipate that there would be any great difficulty in getting glass bowls, made of suitable radius, upon which to take the negatives. Glass spheres could be blown to the proper radius, and segments of the right size cut from them, avoiding as much as possible any blemishes in the glass. Neither do we suppose that such glasses would be very expensive, or difficult to pack in boxes. Let us imagine all this done, and that a suitable camera has been made, with a slide to hold such glasses. The next thing will be to coat the glass with collodion. This is not, by any means, the difficult job we fancied some time ago. We have been trying lately to coat the insides of various vessels of a spherical form, such as glass scale pans, saucers, saucepan lids, &c., and there does not really appear to be any more difficulty than in coating the cylindrical glasses which are now used with the panoramic camera. Assuming then that the glass can be coated with collodion, you would proceed in the following way to excite and develop:—You would use a common wire dipper, put the flat side of the glass against it, and dip it into a vertical nitrate bath in the usual way, then remove it into a second bath containing distilled water, and cast off the free nitrate; and lastly, pour the tannin solution into it, let it flow all round, and set the glass up to dry. The development would be equally easy. You would wash the glass by pouring water into it, then put it upon a holder, which would be a simple wire hoop fixed into a handle, and pour in weak developer at first, and keep it moving over all parts of the glass until the image was visible in all its details, then intensify by adding more silver. To fix with hypo and wash would be easy enough, and then the varnishing could be applied in the same way as the collodion. The varnishing would be rather nervous work at first, for fear of forming lines and ridges on the film, but after a little practice this difficulty would probably be overcome.

Assuming then all to have gone right so far, and that we have obtained an excellent tannin negative upon the interior of a glass bowl or spherical shell, subtending 90° at the centre of the lens, and including 90° of subject in all directions, we have next to consider how to print from such a negative.

"We will not now stop to consider how a transparent positive could be printed, because that would involve some peculiar difficulties, and it is a mode of printing which has not yet become so popular as it deserves. We will confine our attention for the present to the question of printing an ordinary positive, to be looked at and not through, and to be mounted upon a card, or exhibited in any other convenient way.

"Our readers will perceive at once the impossibility of printing upon paper by contact with such a negative as we describe. If you attempt to apply a piece of paper, however thin, to the inside of a spherical bowl, it becomes puckered in

all directions. Paper is, therefore, out of the question for this purpose, but, happily, we have in certain fine elastic fabrics a suitable material. For instance, if you lay a white silk handkerchief upon a globe, you can get close contact over a large extent of surface, without a crease or pucker. A sheet of paper is composed of fibres felted together, and closely interlacing in all possible ways and directions, but a woven fabric is composed of threads which cross each other at right angles, and leave spaces between, which can be made to assume all sorts of shapes according as the material is stretched in different ways, and thus it is that such a fabric can be made to fit against a spherical surface without creases, and to be as closely in contact with it as a sheet of paper against a plate of glass. Fine white silk, or fine jaccinet muslin or linen, would be suitable for printing upon from spherical negatives, and report says that there are now on view in the International Exhibition some very beautiful photographs upon silk.

Having now in imagination made a stride over the practical difficulties of this subject, and taken a beautiful positive print upon silk from a panoramic negative including 90° of subject in all directions, let us next discuss the optical qualities of such a picture—the nature of its perspective—how it ought to be mounted, and so forth.

"If we agree to treat such a print solely as an artistic study, and without any reference to absolute truth of perspective, freedom from distortion, we should simply mount it upon a card, and in the printing should vignette out all the details which were superfluous, or injurious to the subject. Thus the round picture would be cut down to an irregular outline by one of the common modes of vignetting, and only such parts left as were required to make a pleasing composition. In a view of this kind, when flattened out, the vertical lines of a building near the margin would be curved, and in order to straighten them, the silk might be stretched a little at the corners. What a first print had been treated in this way and properly mounted, a flat negative might be copied from it, and from that any number of prints could be taken in the usual way. If our readers will open an illustrated book of travels, they will find numerous examples of views of places which could not have been taken by a common camera, or even by a panoramic camera for cylindrical glasses, but which would afford fitting subjects for the wide-embracing spherical negative, and the mode of printing and treatment which we have described. Anyone with a knowledge of landscape drawing, and a taste for that branch of art, will understand the class of subject to which we allude, and perceive that it includes the majority of good views.

"But if we desire in a photographic view something more than an artistic study, and that it should satisfy the conditions of true perspective, then it would be absolutely necessary to mount the print upon the convex side of a glass similar to that upon which the negative was taken, and view it through the glass, the eye being placed at the centre of the sphere. Mounted in this way in a circular frame would be very precise, and the perspective would then be rigorously correct.

"With respect to focus, that would be perfection in every part of the picture, except where an object happened to be nearer to the spectator than ten or a dozen yards. This would rarely happen, except in the immediate foreground of views which the camera was placed upon the level ground, and not upon a height. The focus of views taken from high ground would be absolute perfection in every part, and infinitely better than in a common photograph upon a flat plate, taken with common lenses.

"If our readers will think over what we have now suggested they may greatly assist us with hints as to the best kind of fabric to print upon; and if some of them would kindly experiment upon such fabrics, and inform us of their results, we should greatly value such assistance. The end to be accomplished is worth any amount of trouble, and that it lies within the reach of our present knowledge and means there can scarcely be a doubt. The other day a lady friend showed us a pen dipped in marking ink, and her enquiry, whether similar views could not be taken by photography, suggested the idea which has called forth this article. But before similar photographic views can be printed upon D'Oyley's, the negatives must include a much wider angle than the common lenses give. It is not one photographic view in a thousand that can now be called a picture. At present they are mere bits of detail, and bear no resemblance to pictures such as artists love to take."