A New Form of Stereoscope.*

BY A. STROH.

Although the late Sir Charles Wheatstone's beautiful invention, the stereoscope, gives the appearance of full relief or perfect solidity to photographs of objects seen by it said, the photographs for the same must naturally be of limited dimensions; and though viewed through magnifying lenses, the images of the objects are presented to the eye on a scale far below the size of their originals.

It has therefore occurred to me that if the magnified image of a photograph projected on a screen by the optical lantern could be made stereoscopic, a still greater resemblance to the original might be obtained.

With a view of producing such an effect, I have constructed the apparatus I will now describe, which is, however, not intended to enable a large number of persons to see the projected pictures at the same time, as in the case of dissolving views, but is at present limited to the use of two persons simultaneously. It could, however, be easily constructed so as to be available for a greater number.

The principle of the arrangement depends on the well known effects of the persistence of vision; revolving disks are employed for alternately obscuring two pictures, projected on a screen in the same place, and at the same time interfering with the view of the observer in such a manner that only one picture is seen by the observers' right eyes, and the other by the left eyes.

Two optical lanterns are placed side by side, as for dissolving views. Two transparencies, photographed in the same manner as if intended for an ordinary stereoscope, are placed one in each lantern, and projected on a screen in such a position that they overlap each other as nearly as possible. The picture which is intended to be seen by the right eye may be placed in the right hand lantern, and the other in the left.

Supported by suitable framework, and in the front of the two lenses of the lanterns, is a revolving disk, portions of which are cut away, so that during its revolutions it obscures the light of each lantern alternately, or, in other words, so that only one picture at a time is thrown on the screen. A continuous change from one picture to the other is thus obtained.

In the same framework, and in convenient positions for the observers, two pairs of eye holes are provided, one pair on each side of the apparatus. Behind each pair is also a rotating disk, and these disks are connected by suitable wheelwork or driving bands with the one previously mentioned, in such a way that the three disks rotate together, and at the same rate. The two last-named disks are also so cut that they will obstruct the view through the right and the left eye holes alternately.

Finally, the connection between the three disks has to be so arranged that the time of obscuring the view of the observers' right eyes or left eyes shall coincide with the time when the light is shut off from the right or left lens of the lanterns respectively.

It is obvious that by this arrangement the left eyes can only see the picture projected from the left hand lantern, and the right eyes can only see that from the right hand lantern.

The rotation of the disks must be of such a rate that the alternate flashes of the right and left pictures on the corresponding eyes follow in such rapid succession that the impression made by one flash does not diminish sensibly before the next flash on the same eye is received.

The number of flashes for each eye which is required to produce an apparently continuous view, without any flickering effect, is from thirty to forty per second. As the disks are so cut as to produce two flashes for the right eyes and two for the left in one revolution, they must consequently be kept rotating at a rate of from fifteen to twenty revolutions per second.

The rotation of the disks is effected by a driving wheel and band, worked by a crank handle at the back of the apparatus.

The perspective effect obtained by the above arrangement is very perfect, the image of each object standing out in solid relief.

Considering that by this arrangement the two eyes never see at the same time, and that each eye views its picture after the other, it is interesting to find that the persistence of vision so completely bridges over the alternate interruptions to which it is subjected as to produce the effect of a continuous view.

An unavoidable effect resulting from this arrangement is that by the rotation of the disks one-half of the light produced by each lantern is always cut off; the higher, therefore, the illuminating power used, the better is the result.

This defect is, however, I consider, counterbalanced by several advantages which this form of stereoscope possesses. First, the pictures can be enlarged to such an extent as to appear equal, or even larger, than the original objects from which they were taken; and secondly, the eyes, in looking at the pictures, are not in any way subjected to strain by lenses, prisms, or reflectors, or by the difficulty which some persons experience in getting the two pictures to superpose; for each eye views its corresponding picture in exactly the same position it would see it in ifit were looking at the original, since the two pictures are practically in the same place, which is not the case in any other form of stereoscope.

Although with the apparatus as here described only two persons can see the pictures at the same time, it would not be very difficult to construct it so as to be available for a greater number. The side disks above described only serve to control one pair of eye holes each, but by making them a little larger they would serve for two pairs each, thus accommodating four observers. By increasing the number of disks, the number of observers might be increased proportionately.

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Natural History in Philadelphia.

The Zoological Society of Philadelphia has just issued its annual report, from which we learn that a few interesting specimens have been added to the garden the last year. The managers lament the fact that the receipts have fallen off very much, and that the financial condition of the society is not more promising.

Mr. Brown, General Superintendent, says in his report that one of the rarest additions ever made to the collection was a specimen of Whitney's owl (*Micrathene whitneyi*). This miniature of the larger species of the group is hardly larger than a well-fattened English sparrow. It is, in fact, the smallest of known owls, and being an extremely scarce bird, is looked upon with much interest by ornithologists. The limits of its range are not fully known, the few specimens which have been collected coming from Arizona and the adjoining province of Sonora. A pair of them were captured near Tucson by Mr. Herbert Brown, of that city, who kindly presented them to the society. One of the pair unfortunately died during the long journey, and the other lived only a few weeks after arrival.

Through the kindness of Prof. Baird, of the Smithsonian Institution, the society has been able to exhibit one of those rare prizes which have but seldom fallen to its lot, in a tooth-billed pigeon (*Didunculus strigirostris*). This bird was brought from the Samoan Islands—its native region—by the late Dr. Canisius, U. S. Consul at that point, and was by him presented to the U. S. National Museum, and subsequently, with his consent, deposited in the garden, where it has done exceedingly well. Aside from its curious appearance and habits, a special interest is attached to the species, from the relationship which it alone, of existing birds, bears to the strange and almost anomalous pigeon-like dodo, which formerly inhabited the islands of Mauritius and Bourbon, but which is believed to have become extinct within the last two hundred years, and of which no remains now exist except a few bones and feathers in museum collections and a few badly executed drawings in the published works of early explorers.

A Chat about Pumps.

Power, regarding the theory of the action of a suction pump, suggests that a few words relative to the working of pumps may not be out of place. It has been found that by securing a perfect vacuum the water may be raised by suction to about thirty-four feet, when the apparatus is at the sea level, but this involves a perfectly air-tight pump and a heavy atmosphere. In practice, however, it is best not to attempt to lift water more than twenty-five feet, and even this will give trouble when the valves become slightly worn.

In locating a pump, too, it is best to set it as near the source of supply as possible, and to use the least number of elbows and bends that the connections will admit of, and make the suction pipe plenty large; for the flow to the pump, being entirely dependent upon the light pressure of 14·7 pounds per square inch, should be made as free as possible.

In setting up a hot water pump, be sure to put it below the source of supply, or you will involve yourself in endless trouble. Hot water cannot be raised by suction with any degree of certainty. The reason is this: It must be pressed up into the pump by the atmospheric pressure in the tank or heater; and when the water has reached a temperature of 212° F., the steam given off would have when confined a pressure equal to the atmosphere.

Therefore, when the plunger rises and the water is to be pressed into the pump, steam of atmospheric pressure rises instead to fill the pipes and pump, counterbalancing the atmospheric pressure and holding the water at its own level. If the temperature of the water is less than 212°, it will rise a proportional distance in the piping. But if it is warm enough to give off any steam at all, the pump is liable to stop at any time and make all the way from 1 to 1,000 strokes before it will fill again.

Clearance is also a matter that should be carefully considered in selecting a lifting pump. After the pump is once filled, the amount of clearance does not have any very great effect, except as air may be drawn in with the water; but when everything is empty, the pump must act for a number of strokes as an air pump for exhausting the air, not only from the suction pipe, but also from its own cylinder. If the clearance is excessive, the air forms a first-class air cushion, and a great deal of priming will be required before the pump will fill solid with water.

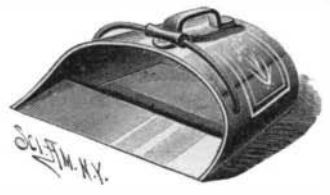
In packing, avoid screwing down too tightly. If this is done, it will cause an excessive frictional resistance, and tend to wear the plunger or piston rod. It is only necessary to screw down tight enough to keep the water from leaking through, but not so that the front of the packing remains dry. If the packing is damp or wet, the water acts as a lubricant upon the plunger, and prevents wear. If a vertical plunger pump is in use, the gland is usually made cup-shaped, so that any leakage through the packing is retained about the plunger, serving to keep it tight. It is well to allow of leakage enough at this point to keep a little water in these cups, as the packing may then be left quite loose, and the pump worked with the least possible friction. Of course, an excess that would keep water streaming down the side of the pump must not be allowed; and in horizontal pumps, any leakage at all is objectionable.

The main difficulty in most places where pumps are either in use or held for reserve is that they receive too little attention. A pump is usually a generous, wholesouled piece of mechanism, that seems to try to pour out the full quota, and when this cannot be done, it will give an occasional gurgle or squirt as though it would say, "I'm doing my best, and I'll be all right soon." So an engineer will fuss and fool around, and talk about a bad pump, and say it's no good, when the trouble lies with him. He would not think of letting his engine get the treatment that is all right for the pump. There will be a neglect to oil or pack or clean, and as for wiping, that does not seem to be thought of in many cases. Then the pump is stuck off in some corner where it is "out of the way," and the suction and delivery pipes are made to crawl all around the walls, under the floor, and across the ceilings; elbows and tees abound, and if the work is put up in warm weather, there is no protection whatever from freezing.

The writer knows of one case where the cold water pump was so located that ten elbows were used between the cistern and the heater; whereas, if the pump had been put directly across the engine room, and been driven by the same line of shafting, three are all that would have been required, besides affording complete protection against freezing; whereas, where they were run, every cold snap means a half day thawing out and all hands idle in consequence. But the pump was put and kept where it would be "out of the way."

DUST PAN.

This dust pan, the invention of Mrs. Hannah V. Shaw, of Lawrenceburg, Ind., is formed with a high cover to catch light dust, and is widened toward the open end for greater convenience in sweeping around the edges and corners of a room. The front of the base is bent to inclose a strip of wood in the form of an angular sill. This strengthens the sill and affords a ready means of taking up dirty water, when scrubbing with a broom, by sweeping the water over the sill into the deep cavity, and then emptying it into a bucket from either side. Upon the cover is a handle, and a bail is secured to the sides. By means of a hole in the back, the dust pan may be hung up and used as a wall pocket. This dust pan will be found to be particularly serviceable during the "cleaning up" operations following a flood.



How to Disappoint a Balky Horse.

The Fitchburg *Sentinel* tells how a Leominster farmer cured his horse of a balky freak by gentle means.

He drove him, attached to a rack wagon, to the wood lot for a small load of wood. The animal would not pull a pound. He did not beat him, but tied him to a tree and "let him stand." He went to the lot at sunset, and asked him to draw, but he would not straighten a tug. "I made up my mind," said the farmer, "when that horse went to the barn, he would take that load of wood. I went to the barn, got blankets, and covered the horse warm, and he stood until morning. Then he refused to draw. At noon I went down, and he was probably hungry and lonesome. He drew that load of wood the first time I asked him. I returned, got another load before I fed him. I then rewarded him with a good dinner, which he eagerly devoured. I have drawn several loads since. Once he refused to draw; but soon as he saw me start for the house, he started after me with the load. A horse becomes lonesome and discontented when left alone, as much so as a person, and I claim this method, if rightly used, is better for both horse and man than to beat the animal with a club."

THE burn produced by nitric acid may be successfully treated by a dilute solution of sulphurous acid.