

Of course the production of the more complex mountain features cannot be simulated.

All, then, that is needed for the illustrative production of a number of the physiographic features of the earth, is the above described simple apparatus, a basement where water can be allowed to run or a sillcock in the school yard, and sufficient water pressure to keep a constant stream. This kind of work can be performed where it is inexpedient to take classes on excursions. Although in many ways it is not as valuable as the excursion, yet in some ways it is more valuable, as here the action is seen in its entirety, whereas in the excursion only the finished product or a phase of the formative action is seen. Photographs taken at different stages in the production of the model are very instructive for reference but the formation of the model itself is the essential thing. The great need is to show the pupils that surface features can be produced in the way in which they are taught that they are produced. Seeing is believing.

HOW TO MAKE A LANTERN SLIDE CAMERA.

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Lantern slides are easily made by the "contact method" with quite limited appliances. Even the tyro, with the ordinary photographic equipments, can by careful work obtain quite good results. Working in the dark-room, a negative is put into the printing frame and an ordinary lantern-slide dry plate, $3\frac{1}{4} \times 4$, is placed upon it in the desired position, with the films in contact. The process is similar to that of making the ordinary print on sensitized paper. When properly adjusted the frame holding the plates is exposed to the light for a suitable time; then the exposed plate is removed and developed like an ordinary negative.

The range of work which can be done by the contact method is necessarily limited. The positive obtained must correspond in size with the negative. Any enlargement or reduction by this method is absolutely impossible. Consequently the operator who has used plates of various sizes for photographic work is fre-

quently annoyed by being unable to make slides from many of his pet negatives. To overcome this difficulty one must have some kind of enlarging and reducing camera. Such cameras are somewhat expensive in these days of trusts and high prices on things photographic. So the photographer who is not expecting to do much work in this line does not feel justified in making the expenditure.

It is possible, however, for anyone having some mechanical skill to construct a lantern-slide camera which will do as good work as the high-priced instruments. An ordinary camera can be used, and, instead of the usual additional extension bellows, two boxes can be prepared, one of them slightly smaller than the other and made to slide easily within it. The directions for constructing a lantern-slide camera of this kind may be stated as follows:

Visit the lumber room of some large retail drug store where their empty boxes are kept. Select two light and well-made boxes, one of which will slide easily within the other and fit in it well. (If boxes of the right kind cannot be obtained, one or both can be made from good half-inch boards.) Both ends should be removed from the larger box and one end from the smaller box. Bore a hole through the remaining end of the smaller box. In this is to be fitted the lens tube of the camera.

Secure a board suitable for a base. This should be about one inch thick and dressed to equal, in width, the base of the larger box. The length should be suited to the requirements and may be determined by experiment, observing the position of the camera when pictures of the proper size are focused upon the ground glass. Nail the larger box firmly to the base, and fit the smaller box within it as shown. The smaller box should telescope within the larger, and slide without any jerky motion. If it binds anywhere, plane it until it works smoothly.

Prepare the open end of the large box for the reception of the negative by fitting in it strips of wood with narrow grooves. After sliding the negative into the grooves the surrounding fittings should prevent all light from entering around the edges of the plate. Paint the inside of the telescoping boxes a dull black. Place the camera on the base and make careful connections between the front end of its lens and the opening in the sliding

box. Be sure that the apparatus is perfectly light-tight, so that no light will enter the lens of the camera except that which comes through the negative.

Take two pieces of thin metal, such as were formerly used for making tintype pictures, and trim them both to the pattern of the camera diaphragms. Make a diaphragm of one of these by cutting a small, round hole through its center. A small opening is better than a large one for this work, as it makes the image sharp and increases the time of exposure, both of which are desirable. The other metal slip may be used in place of a shutter, withdrawing it to make the exposure, and again inserting it when the exposure has been sufficient. Good illumination for this work may be obtained at a north window, supporting the apparatus with the front end elevated so that it will point above the horizon toward the clear sky.

The negatives should be inserted upside down and with the film side facing the camera. If the image on the negative is not vertical but appears somewhat twisted, the fault may be corrected in the lantern-slide which is made from it, by blocking up one edge of the camera with small wooden wedges, until the edges of the picture which is focused upon the ground glass are parallel with the edges of that glass.

Of the two processes for making lantern slides, by contact and with the camera, the latter is generally regarded as the more scientific method.—*The American Inventor*.

The recent discovery of *platinum deposits* on the Gerssena river, at the east side of the Ural mountains, is included in a dispatch from St. Petersburg to the *New York World*. It is said that the deposits are very rich and that, before the government authorities had news of the discovery, hundreds of miners had entered the region and thousands of dollars' worth of the metal had been extracted. Platinum is a metal whose use, for the last twenty years, has enormously increased, while its quantity has steadily diminished.

The news of this "find," therefore, if authenticated, will be most welcome to both the scientific and the commercial world.