New Steam Motor.

THE demand for small and easily managed motors has led to the introduction of a great variety of low-power steam-engines. All of these new motors that have proved of real value in business have been already described from personal examination in past numbers of THE CENTURY. To this list may now be added a new double-cylinder, single-action engine, that seems likely to prove of use wherever it is difficult to obtain skilled labor. The engines examined were of only four and eight horse-power, as machines of only moderate size have yet been erected. Each engine, whatever its size, has two upright cylinders placed side by side upon a hollow cast-iron pedestal or case, that is designed to hold the crank-shaft and all its connections. Between the two steam cylinders is a smaller cylinder designed to hold the slide-valve that controls the inlet ports of both cylinders. This valve is of the common D pattern moving in a cylinder and having below it a piston placed on the eccentric rod, and serving to prevent the escape of steam from the valve-chamber. Steam enters the valve-chamber, and is admitted by the valve through very large ports into the top of each cylinder in turn, the effective stroke being downward. The exhaust steam escapes from each cylinder through a series of openings all round the lower part of each cylinder, the descent of the piston itself uncovering the exhaust-ports and permitting the steam to escape into an annular chamber surrounding each cylinder. From this chamber the exhaust passes through openings in the lower part of the valve-chamber to the open air. This arrangement of parts gives the engine the appearance of a three-cylinder engine, and as all the working parts are inclosed in the hollow pedestal, nothing is visible on the outside except the cylinders and their support. The piston in each cylinder is connected directly by means of one rod with the crank-shaft, the two cranks being balanced one against the other. The eccentric rod is also connected directly with the piston in the valve-chamber and with the valve. The chamber or hollow pedestal in which all these parts are placed is water-tight, and is designed to be filled up to the level of the crank-shaft with water. On this water is poured a film of oil. The operation of the engine may be easily understood. Steam is admitted to the top of one cylinder, and the piston is driven downward till it uncovers the annular exhaust-ports. Steam is then admitted to the top of the second cylinder, and its effective stroke brings the first piston back to its place. The motion of the cranks in the oil and water dashes them into oily foam that covers every moving part of the engine. The spray of mingled water and oil lubricates all the bearings inside and the bearings of the shaft on each side of the pedestal, a small portion escaping outside, where it is caught in a drip-pan. An inlet is provided for filling the pedestal with oil and water, and a glass tube is placed at the side to show the height of the water inside. The simplicity of the general design of the engine, its limited number of parts, and the arrangement for securing the self-lubrication of all the parts, are points in its favor. The machines examined appeared to run at a high speed in silence, and with great steadiness. As all the moving parts are balanced and kept inclosed in a spray of mixed oil and water, the motor requires no particular skill in management.

Recent Progress in Photography.

THREE new cameras, a lantern for the dark room, and some novel photographic processes, have recently been introduced. One of the cameras is intended to be used in taking a series of instantaneous photographs of a moving object, such as a flying bird, etc., in rapid succession. The lens is placed in a telescopic tube that is to be held in the hands while the end, or stock, rests upon the shoulder. At the end of the tube is placed a circular holder having a series of openings that may be brought in turn in line with the tube, precisely as the chambers of a revolver are brought into line with the barrel of the revolver, by the turning of the holder on its axis. The sensitive dry plate is placed in this holder, and each movement of the holder brings a portion of the plate under exposure in the tube or camera. In use the camera is focussed as nearly as may be on the path of the bird, and the instrument, or, as it has been called, the photographic gun, is aimed at the bird as it flies. The pictures are taken in rapid succession in what amounts to one exposure. It is of no consequence that the bird may be more or less out of focus, for as long as an image or silhouette is obtained the pictures will serve to illustrate its flight or the action of its wings. The movement of the circular plate-holder and the exposure is controlled by simple clockwork attached to the apparatus.

The other camera is of more general use, and is an ingenious application of a common opera or field glass to photographic purposes. In the apparatus examined, a field-glass of convenient size forms the camera. The lenses of the glass were in place, so that it could be used in the usual way. On taking these out and substituting two lenses at the smaller ends of the glass, it was transferred into a double camera. Over one of the larger ends was then slipped a cap having a sheet of ground glass. On holding the glass in the hand and looking at the ground glass the picture could be seen as in any camera, and to adjust the focus it was only necessary to move the screw in the usual way. A small metallic plate-holder having a sliding shutter and containing a single instantaneous dry plate was then fitted over the larger end of the other tube. The opposite end has a snap-shutter kept closed by a spring, and on drawing the shutter of the holder the camera was ready for exposure. As the views are taken in a small fraction of a second, the camera may be held in the hand toward the subject, and, when it is seen on the ground glass to be in the field, the expos-

ure is made by snapping the spring-shutter with one finger. While the pictures taken in this camera are only five centimeters in diameter, they are sharp and clear, and can be easily enlarged by copying in a lantern. With the camera is a cloth muff or tent for the hands, so that by placing the holder and a dry plate wrapped in black cloth in the tent the plates can be changed without going into a dark room. Each plate is previously wrapped in black cloth. The hands are inserted in the muff or tent, and the work is done by feeling. A little practice will enable any one to do this, and it would seem that the tent might be useful in changing plates in ordinary plate-holders. To exclude the light, elastic bands at the ends of the muff fit tightly over the wrist. The field-glass and its lenses, the holder, dry plates, and hand-tent are packed in a small hand-bag, the whole apparatus weighing only about two kilos. The camera seems to be one that may be useful for reporters, detectives, and tourists who wish to make photographic records of scenes and events upon their travels.

In making photographs of microscopic objects, it has been thought necessary to use the light of the sun, and for this reason it has been the custom to use some kind of heliostat to bring the light into the camera. By a novel arrangement of the lantern here described it is now possible to photograph any object seen in a microscope, and by means of any cheap form of camera. In the apparatus examined, a good negative was taken in ninety seconds upon a dry plate, one half-size, by the aid of a lamp and a camera costing only about ten dollars. A long and narrow board was made to rest on rubber balls, in order to deaden vibrations from the table on which it was placed, and on this was set up the lantern, with the door at the side open. In this door was placed a wooden shield holding a single lens condenser. Directly in front of this was placed the microscope stand with the tube laid down horizontally. The stage holding the object to be photographed was brought close to the condenser so that the light would pass directly through it. The eye-piece was then taken off the microscope, and a roll of blackened paper was slipped inside the tube to destroy the reflections from the sides of the tube. The camera with the lens taken out was then placed behind the microscope and a blackened tin tube was placed between them to cut off the light, the annular space between the tube and the microscope being covered with a sleeve or curtain of black cloth. This apparatus was the first ever made, and it is proposed in other instruments to make the tin tube between the microscope and camera fit tightly, so that no curtain will be needed. When the parts had been arranged in this manner, and the lamp lighted, the object on the stage of the microscope appeared on a greatly magnified form on the ground glass of the camera. To adjust the focus it was only necessary to fix the focus of the microscope. On exposing a dry plate in the camera, a good negative was obtained that on development was ready to be used in printing.

The new dark-room lantern is intended to hold a large oil-lamp inclosed in a tin box or lantern about 30.5 centimeters (12 in.) square. The back of the lantern has a sliding-door to give access to the lamp. There is also a door at one side. This door is closed by a sheet of porcelain or opal glass, that may be covered by a tin door on the outside. The front of the lantern projects a few centimeters at the top, and is glazed with a large sheet of ruby glass. There is also a movable hood or cover over this to shade the eyes and throw the light downward. A reflector is also placed behind the lamp inside the lantern. In the dark room the lantern gives a strong, pure ruby-light, and when it is desired to expose a plate to white light, as in making lantern slides, the side door is opened and the printing frame is held before the opal glass.

Among photographic copying processes recently reported is a plan for reproducing pictures on silvered glass. Ordinary mirrors are covered on the silvered side with a film of sensitized bitumen. The glass is then placed under a negative and exposed to the light. After the exposure the bitumen is washed with oil of turpentine, and the parts not affected by the light are washed away. This leaves the picture in hardened bitumen on the back of the mirror. The silvering is then washed with nitric acid, which removes all not protected by the bitumen.

In photo-engraving processes a new formula is announced for taking impressions from gelatine films. Sheets of polished metal are prepared by covering with gelatine sensitized with bichromate of potash. This is exposed under a negative to the sun in a printing-frame. The film is then washed with water to remove the surplus gelatine that has not been fixed or hardened by the light. An alloy of bismuth, tin, and lead is then prepared and poured while quite liquid into a special vessel or flask, and the metal plate with the gelatine film is laid over it and submitted to pressure. The alloy takes the impression from the film, and when cold it may be used as an engraved block in printing. It is also said that the new alloy, known as "Spence's metal," may also be used in this way, as it sets or hardens before the gelatine film can melt.

BRIC-À-BRAC.

Triolets.

AN APOLOGY FOR GAZING AT A YOUNG LADY IN CHURCH.

THE sermon was long
And the preacher was prosy;
Do you think it was wrong?
The sermon was long,
The temptation was strong,
Her cheeks were so rosy,—
The sermon was long
And the preacher was prosy.

REJECTED.

YOU'VE spoken of love
And I've answered with laughter;
You've kissed my—kid glove,
You've spoken of love,—
Why, powers above!
Is there more to come after
You've spoken of love
And I've answered with laughter?