A NOVEL MAGAZINE CAMERA.

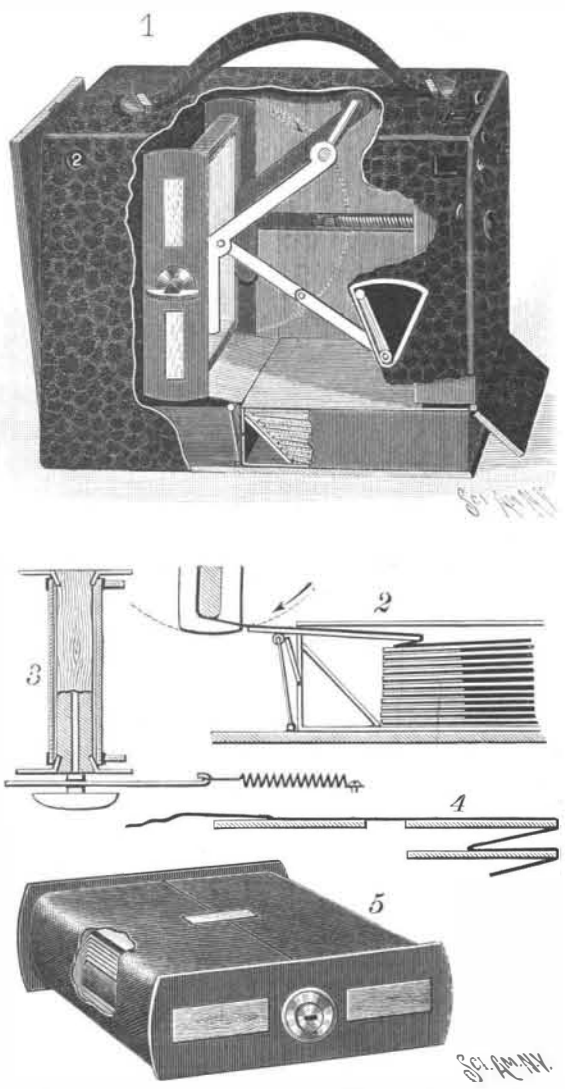
How to get the most out of the time at command is an important question in matters of recreation, as well as business. Some cling to old methods, and are satisfied with the way things were done years ago; but others find that by adopting improved methods and apparatus, more can be accomplished in a given time and in a more satisfactory way.

This applies to everything, but to nothing more pertinently than photography.

From slow plates and lenses and quick plates and magazine cameras; from roll holders and cameras to be loaded with films by daylight, we turn to an invention which allows the photographer to retain all the good qualities of glass plates and at the same time to secure the advantages of loading by daylight.

Messrs. Benjamin Marx and Henry Gassner, 2695 Third Avenue, New York, are the patentees of the camera to which reference is made, and which is shown in the engravings. Fig. 1 shows the camera with the side and top broken away to show internal construction and Figs. 2 to 5 inclusive show the details of construction.

The camera does not differ materially in external appearance from the usual form of hand camera. It has an objective and two finders. The glass plates used are placed in regular order on a long strip of tough paper, each being held in position by a mat which



MARX AND GASSNER'S MAGAZINE CAMERA.

barely covers the edge of the plate and is fastened to the paper.

The strip on which the plates are thus mounted is folded back and forth upon itself in a light-tight box, with the plates between the folds, as shown in Figs. 1 and 2. The side of the box is provided with an incline to facilitate removing the plate from the box. The box of mounted plates is sealed with the end of the paper strip projecting through a slit. The box is put in its place in the camera with the end of the strip projecting.

In the camera box is placed a flat reel provided with journals on which it can turn. The body of the reel is wood. It is made in two pieces, so that it can be folded together compactly. The metal heads of the reel are removable, thus permitting of carrying an extra reel in the camera. When it is desired to use more than two dozen plates, an extra reel may be carried in the pocket. An eyelet in the end of the paper strip is placed on a hook on the reel, and after the end of the camera is closed the reel is turned, thus bringing a plate from the box and folding it down on the face of the reel.

The journals of the reels are pulled forward by springs, as shown in Fig. 3, and when the plate is brought into an approximately vertical position, a pair of angled levers secured to a rock shaft are brought into contact with the plate, causing the plate to stand in the focal plane, the springs which draw the reel forward yielding as the angled levers are brought into position. This operation also locks the angled levers by means of the toggle joint connected therewith.

After the exposure is made, another plate may be brought into position for exposure by releasing the reel and turning it through a half revolution. The operation of focusing the plate and locking the reel is the same as before.

When all of the plates have been exposed, the blank paper contained in the plate box is wrapped around the exposed plates by turning the reel, and, with the reel heads, makes a light-tight package which is removed from the camera and sealed as shown in Fig. 5.

The empty plate box is removed and replaced by a full one, another reel is placed in the camera, and the operation just described is repeated.

It will thus be seen that there is practically no limit to the number of plates that can be exposed in this camera.

It can be loaded in broad daylight. It exposes a dozen or more plates at one loading, and is lighter than other cameras of the same capacity using plates.

SPIRIT SLATE WRITING AND KINDRED PHENOMENA.—I.

BY W. E. ROBINSON.

There has probably been nothing that has made more converts to spiritualism than the much talked of "Slate Writing Test," and if we are to believe some of the stories told of the writings mysteriously obtained on slates, under what is known as "severe test conditions" that preclude, beyond any possible doubt, any form of deception or trickery, one would think that the day of miracles had certainly returned; but we must not believe half we hear nor all that we see, for the chances are that just as you are about to attribute some unaccountable spirit phenomena to an unseen power, something turns up to show that you have been tricked by a clever device which is absurd in its simplicity.

There are a large number of methods of producing slate writing, but the writer will describe a few which will be sufficient to give an idea of the working of slate tests in general. First we have the ordinary one in which the writing is placed on the slate beforehand, and then hidden from view by a flap or loose piece of slate. (Fig. 1.) After both sides of the slate have been cleaned, the false flap is dropped onto the table, the side which is then uppermost being covered with cloth similar to the table top, where it will remain unnoticed, or the flap is allowed to fall into a second slate with which the first is covered. In the latter case no cloth is pasted on the flap. Sometimes the flap is covered with a piece of newspaper and is allowed to drop into a newspaper lying on the table, then the newspaper containing the flap is carelessly removed, thus doing away with any trace of trickery.

Another way of utilizing the false flap is as follows: The writing is not placed beforehand on the slate, but on the flap, which, as before, is covered the same as the table top. This is lying on the table writing downward. The slate is handed around for inspection, and, on being returned to the performer, he stands at the table and cleans the slate on one side, then turns it over and cleans the other. As he does so he lifts the flap into the slate. The flap is held in firmly by an edging of thin pure sheet rubber cemented on the flap between the slate and the cloth covering of the slate. This grips the wooden sides of the frame hard enough to prevent the false piece from tumbling out accidentally.

We now come to another style, wherein a slate is cleaned on both sides, and, while held in the hand facing the audience, becomes suddenly covered with writing, and the slate is immediately given for inspection. The writing is on the slate previous to the cleaning, and is hidden from view by a flap of slate colored silk, held firmly in place by a pellet of wax in each of the corners of the silk. (Fig. 2.) Attached to this silk flap or covering (at the end that is nearest to the performer's sleeve) is a stout cord or string, which is also made fast to a strap around the wrist of the hand opposite to that holding the slate. If the arms are now extended their full length, the piece of silk covering will leave the slate and pass rapidly up the sleeve out of the way, and thus leave the writing exposed to view; and the slate is found to be still a little damp from the cleaning with the sponge and water it had been given previously. This is easily accounted for. The water from the sponge penetrates just enough through the cloth to dampen the slate.

There is still another slate on which we can make the writing appear suddenly. It is composed of a wooden frame, such as all wooden-edged slates have, but the slate itself is a sham. It is a piece of cloth painted with a kind of paint known as liquid slating, which, when dry and hard, is for all the world like the real article. This cloth is twice the length of the slate and just the exact width. The two ends of the cloth are united with cement, so as to make an endless piece or loop. There is a small rod or roller in both the top and bottom pieces of the frame, the ends being made hollow to receive them. Over these rollers runs the cloth, stretched firmly and tightly. Just where the cloth is joined or cemented is a little black button or stud of hard rubber or leather. This allows the cloth to be pushed up and down, bringing the back to the front; and by doing so quickly, the writing which is written on the cloth at the rear of the frame is made to come to the front in plain view. (Fig. 3.)

Still another idea in a single slate is as follows: An ordinary looking slate is given for examination, and, on

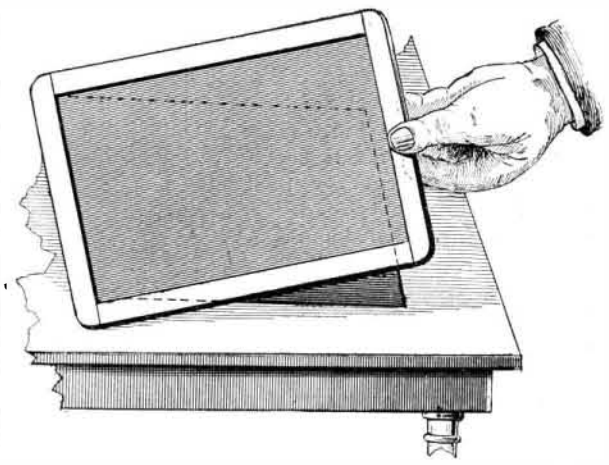


Fig. 1.—ORDINARY SLATE WITH FLAP.

its being returned to the medium, he takes his handkerchief and cleans or brushes both sides of the slate with it; and, upon again showing that side of the slate first cleaned, it is found covered with writing apparently done with chalk. The following is the simple explanation of it: Take a small camel's hair brush and dip it in urine or onion juice, and with it write or trace on the slate whatever you desire, and when it becomes dry, or nearly so, the slate can be given for examination without fear of detection. The handkerchief the performer uses to clean the slate with is lightly sprinkled with powdered chalk. He makes believe to clean the one side devoid of preparation, but the side containing the invisible writing is gently rubbed with the handkerchief, not too hard, just enough to let the powdered chalk fall on the urine or onion juice, where it leaves a mark not unlike a chalk mark.

Fig. 3.—THE ENDLESS BAND SILICATE TRICK SLATE.

Casualties in the Army.

Adjutant-General Corbin has prepared a list showing the total number of officers and men who were either killed or wounded during the Santiago campaign. On June 30 the American army in Cuba consisted of 852 officers and 17,358 enlisted men. Of this number 23 officers and 222 men were killed and 92 officers and 1,285 men wounded. According to the official records the Santiago campaign only extended from July 1 to July 17, and this list does not include any of the casualties which occurred after the latter date.

Fig. 2.—REMOVING THE SILK FROM THE FACE OF THE SLATE.

Miscellaneous Notes and Receipts.

To Protect Reservoirs from Rust.—The Deutsche Färber Zeitung recommends to clean the tanks from rust and paint by means of a steel wire brush, to heat piece by piece by the use of a soldering lamp, and to rub down the heated portions carefully with shoemakers' wax. The wax enters all the pores and gives a protective covering which lasts for years, if the work is carefully done.

Solder for Glass.—A metallic compound which firmly adheres to glass, and can, therefore, be employed as a solder for glass, is obtained by melting together 95 per cent (by weight) of tin and 5 parts of zinc. The melting point lies at about 200° (C.?) By means of the soldering iron it can be spread upon the glass, previously heated to this temperature, and, after cooling, adheres firmly to it. An alloy of 9 parts tin and 1 part aluminum may be used for the same purpose, but has the drawback that its fusing point lies considerably higher, viz., around 390°.—Gold und Silberwaren Industrie.

Silver Affected by Sunlight.—Erdmann reports, in the Zeitschrift fuer Naturwissenschaften, that some tetradrachm pieces from about the year 500 before our era had experienced peculiar changes by the action of the sunlight. However strange it may appear that silver coins should be affected by the influence of light, yet chemical research has proved the correctness of the above statement. The analysis showed that the upper layer of the coins consisted of silver chloride, which probably had formed by their lying for centuries in sea water or in earth containing salt. Silver chloride, which, as regards its silver value, corresponds to an alloy of 75 per cent of silver and 25 per cent of copper, has, by the way, already been used for coining silver pieces, e. g., in the sixteenth century, at Freiberg, in Saxony, where rich finds of silver chloride had been made at that time. It had, therefore, to be decided whether the Greek coins in question might not have been coined directly from silver chloride. This supposition, however, was found to be wrong, as the silver chloride layer only constituted one-half gramme, below it very pure silver containing but slight traces of copper being met with.

Forgings of Aluminum Bronze.—Aluminum bronze is an alloy of 90 to 95 per cent of aluminum and 5 to 10 per cent of copper, of golden color, which keeps well in the air, without soon becoming dull and changing the color, like pure copper and its alloys with tin and zinc (bronze, brass). It can be cast excellently, can be filed well and turned, possesses an extraordinary hardness and firmness, and attains a high degree of polish; it is malleable and forgable. On the latter qualities are founded applications which were originally never thought of, viz., forged works of art for decorative purposes. An alloy of 95 parts aluminum and 5 parts copper is used here. The technical working of bronze is not materially different from that of iron. The metal is, especially in a warm condition, worked like iron on the anvil, with hammer and chisel, only that the temperature to be maintained in forging lies between dark and light cherry red. If the bronze could also be welded like iron, the artist forger would indeed have an ideal material, but that is not possible. If the articles are not forged in one piece, and the putting together of separate parts becomes necessary, riveting, and, above all, soldering, has to be resorted to, which can be done with soft or hard solder. Besides forging, the bronze is well suited for embossing, which is not surprising, considering the high percentage of copper. After finishing the pieces, the metal can be toned in manifold ways by treatment with acid.—Journal der Goldschmiedekunst.

Automatic Photograph Apparatus.—At the expense of Prince Albert of Monaco, L. Cailletet has invented two devices which have been used for the first time with the international balloon ascensions and have given great satisfaction. The first is a photographic apparatus which, every four and one-half minutes, takes a picture of the earth as well as of the upper regions automatically. Of the upper clouds very handsome pictures were obtained on which the numerals of the barometer could be distinctly read. This renders it possible, although the balloon be destroyed, to determine the height reached. In the same manner all other occurrences during the aerial trip are photographed and taken cognizance of. The Paris unmanned balloon has brought back 23 photograms, which show that the air ship after 36 minutes reached a height of 13,700 meters, while the temperature was 65° below zero; it is also known that it began to sink after a distance of 420 kilometers was covered. Such an apparatus can of course be taken along anywhere, and handsome views can be brought back from trips and excursions by any one not familiar with the art of photography. For tourists and wheelmen a new sport is opened thereby.

The second invention is an apparatus which collects air samples from the highest regions. On account of its weight, however, it could not be suspended from the unmanned balloon, but was taken along by the manned one and brought back air from an altitude of 2,800 meters, which is of great importance for the study of the character of the air at great heights.—Staats Zeitung.

Cost of Good Roads and Loss from Bad Roads.

In a paper read before the Engineers' Club of Philadelphia, recently, General Roy Stone, director of the Office of Road Inquiry in the United States Department of Agriculture, discussed "Various Phases of the Road Question," says Municipal Engineering. From data obtained from over ten thousand letters of inquiry sent out from his office, General Stone deduced certain figures, referring to the average length of haul from the farms to market or shipping points, the average weight of load hauled and the average cost per ton for the whole length of the haul. The figures, tabulated, are as follows:

Group of States.	Average haul, miles.	Average weight, pounds.	Average cost per 2,000 pounds per mile.	Total average cost per ton for whole length of haul.
Eastern	5·9	2,216	$0.32	$1.89
Northern	6·9	....	.27	1.86
Middle	6·8	....	*.31	*2.72
Cotton	12·6	1,397	.25	3.05
Prairie	6·8	2,409	.22	1.94
Pac. Coast and Mtn.	23·3	2,197	.22	5.13
Whole United States	12·3	2,002	.25	3.02

* Middle Southern States.

Assuming the correctness of the data, and using the census return of farm products and forest and mineral outputs, and estimating incidental traffic, General Stone arrives at a total of 313,349,227 tons as representing the total annual movement over country roads. At the average cost, $3.02 per ton, the grand annual cost of haulage on public roads amounts to $946,414,665. Not including the loss of perishable products for want of access to market when prices are good, and the uselessness of cultivating certain products which depend upon the markets being always accessible, statistics of the cost of operating foreign highways, and the data obtained from the use of the few good roads existing in this country, would indicate that nearly two-thirds of the above cost is directly chargeable to bad roads. The enforced idleness of men and horses during a large part of the year is another item which should be charged largely to bad roads. The negative or hostile attitude of the rural population toward all effective legislation in this direction is an obstacle also to road improvements in this country, while another is the general overestimate of the cost of such improvement.

A few years ago the macadam roads of New Jersey cost $10,000 per mile; now equally good roads are being built for $3,000, even where railway transportation of material is required; and in localities better supplied with road material, and where a narrower road is deemed sufficient, $1,500, or even less, will make a mile of good stone road. Experience has demonstrated the fact that in most country districts a single stone road, 8 or 10 feet wide, with a good earth road on one or both sides, is more generally satisfactory than a wider road of macadam.

The discussion which followed brought up the question of steel for highway construction, and in answer to questions General Stone said the road proposed by the Department of Agriculture was to be made of longitudinal stringers, with about 8 inches of level surface, with a 3-inch flange to hold the ballast and a ½ × ¾ inch bead on the inside of the stringer to assist wheels in keeping on the track. These stringers would rest on broken stone or gravel in a trench provided, and be tied together at intervals by rods. About 100 tons of steel per mile of single track would be required, and he estimated the cost at about $3,500 per mile, at present prices for material. As yet the demand has not been sufficient to warrant the expense of preparing rolls for these special rails, or stringers. But experiments on short lengths had been made with the lightest kind of channel iron, and with plates and angles, and the results had been very satisfactory in the decreased tractive power required and in the ability to resist wear and displacement.

Forestry Preservation in the Schools.

Persons interested in forestry preservation in the United States are familiar with the name of Dr. B. E. Fernow, formerly the very efficient chief of the Forestry Division of the Department of Agriculture, and at present director of the recently established New York State College of Forestry at Cornell University. Dr. Fernow was one of the speakers at the recent meeting of the American Association for the Advancement of Science at Boston, and his address, which was in form a statement of the aims and organization of the institution of which he is director, attracted attention because of the practical bearing of many of his remarks on the general problems of forestry preservation, says Bradstreet's. Dr. Fernow said that the establishment of the college in the semicentennial year of the American Association marked a greater progress in the science and art of forestry than could be shown in any other direction during the existence of the association, for the reason that it meant the establishment of a professional center for an art which was not even known by name in this country when the association first met. It was also, he said, worth noting that just twenty-five years ago the first organized effort to establish the science of forestry preservation in the United States took shape in Section I of the association, whose council formulated a memorial to Congress, which the association indorsed, and which led to the establishment of the Division of Forestry in the United States Department of Agriculture, which became at once the center of the movement to secure recognition for this unknown science.

The movement culminated this year in the creation of a high-grade establishment, where the principles and methods of forestry may be professionally studied, the first of its kind in the United States. The establishment of the college, Dr. Fernow said, is a logical sequence to the policy to which the State of New York has been committed since 1885, with regard to the forests in the Adirondack Mountains—a policy under which the State has acquired over 1,000,000 acres of forest land, to be gradually increased to 3,000,000 acres. In the spring of the present year the New York Legislature passed an act providing for the State College of Forestry, and for the purchase of a demonstration area in the Adirondacks, placing both under the trustees of Cornell University, thus withdrawing the enterprise from any baneful influence of politics. In placing this college at a university instead of establishing a separate school, Dr. Fernow said, the most advanced ideas of forestry education in Germany, where it is best developed, have been realized. After an enumeration of the courses given in the college, Prof. Fernow described the proposed management of the demonstration school forest, which is to consist of 30,000 acres in the Adirondacks. Forestry, he said, has not for its ground maxim, as seems popularly to be believed, "Woodman, spare that tree," but "Woodman, cut those trees judiciously." The handling of a slowly maturing crop like forest trees requires an especial consideration of the problem which is quite unlike any other that presents itself to the business man. The trees ripen slowly, a full century being oftentimes necessary for the full development of growth. Obviously, therefore, it would be inadvisable to cut down the product and then wait for a hundred years for further income from the land; but another system is necessary, whereby the interest is taken merely in trees which are in condition to be cut, while the great principal, the forest itself, always remains practically intact. With such an experienced and capable director at its head, the new College of Forestry should do a kind of service not hitherto done for the promotion of forestry preservation, and attract more or less continuously a degree of attention to the subject hitherto only evinced at comparatively rare intervals.

The Effect of Anger on the Eyes of Animals.

"Until comparatively lately," says Louis Robinson, writing on "Eye Language," "there seems to have been a good deal of difference of opinion as to the action of the pupil under the influence of emotion. About five years ago I had some correspondence with Sir S. Wilkes, the distinguished president of the Royal College of Physicians, upon this very subject, and he informed me that after long inquiry he had been unable to get any trustworthy information as to how the pupil behaved in the lower animals when they were under the influence of emotion. The correspondence had been called forth by my stating in an article . . . that a dog's pupils dilate when he is angry.

"The evidence upon which I based this statement was gathered at the house of a friend who had a fox terrier which used to become furious when teased. It had a basket in the corner of the room to which it retired when offended. The light from the chandelier shone full upon its face, and I frequently observed that when the animal was especially angry, the eye chambers reflected the light in the same way as do those of a human being when the pupils are dilated with atropin. Having no quarrel with the animal myself, I could approach him with safety when others were exciting his wrath, and found that on such occasions the pupils of his eyes were widely open.

"It so happened that about the same time Sir S. Wilkes had been making observations upon parrots, and found that the pupil contracted when the birds were under the influence of anger. On extending my observations to other animals, I found that cats and monkeys exhibited the same peculiarity as the dog when enraged and meditating mischief, but that in several instances, as soon as the creatures were provoked beyond endurance and flew at their persecutors, the pupils suddenly contracted. I offer the following conjecture as to the reason of this phenomenon: When an animal is angry and face to face with a foe, but has not made up its mind as to the most effective method of attack, it is important that the eyes should take in as much as possible of the enemy and his surroundings; but when the actual onslaught is made, the attention of the assailant is fully concentrated upon some particular point of his adversary's body."—The Humanitarian.