### PHOTOGRAPHIC NOTES.

*Preserving Flour Paste.*—In mounting photographs it is desirable that the flour paste be used fresh or be prevented from turning sour and mouldy. Mr. William Thompson has found, after a number of careful experiments, that hydrofluoric acid possesses this property to a remarkable degree, which should be used in combination with a silicate. He therefore advises the mixture with the paste of a small quantity of fluosilicate of sodium. It is said to be a powerful antiseptic, non-poisonous, odorless, and dissolves very sparingly in cold water.

*Mounting Paste.*—The following formula is recommended as possessing merit on account of its excellent keeping qualities, the mixture having been known to retain its freshness in a fluid state for over two years. Dissolve the best white gum arabic in water sufficient to make a mucilage of the proper consistency. To this add one ounce of lump sugar for every four ounces of gum used, and also a piece of camphor. The sugar has the property of rendering the gum tougher and more elastic when dry. The gum contains no trace of sulphur, which is an important advantage.

*Test for Hypo. in Washing Prints.*—Formerly it was the custom of photographers to have the silver prints in a tray of changing water all night, to completely eliminate the hypo., but we understand now it is the custom to wash for three hours. A simple test to tell when the hypo. is eliminated is to add to the washing water in which the prints are immersed a small quantity of an alcoholic solution of iodine. This will change the white back of each print to a light blue color, which proves that hypo. is still present in the paper. The prints are continued to be washed until the blue disappears from the back of the print. We then know that the hypo. is completely eliminated.

*Copying Daguerreotypes.*—It is necessary first to avoid the reflection of all objects in front of the picture, then to illuminate only by a side light. The front of the camera should be covered with a black cloth with a hole in it for the lens.

The iridescent stain sometimes appearing on the plate may be removed by treating with a solution of cyanide of potassium.

An excellent way to avoid showing the grain in copying an unmounted photograph is to place it in optical contact with a glass plate and photograph through the glass. The picture should be lighted by a side light and the precautions observed as to reflections as above stated.

*Improved Developer for Lantern Slides.*—Very few amateurs are acquainted with the valuable qualities of hydrochinon as a developer, in place of pyrogallol. Though much more costly, yet it has advantages not to be found in pyro. The present cost is $1 per ounce. One of the peculiarities of the developer is its utility in developing a large number of plates, 34 lantern slide plates being successively developed with but ten grains of the hydrochinon.

A special advantage also is that it does not in any way injure or stain the film, permitting very prolonged development. In practice, it is found advisable to give a liberal exposure and develop out the image rather rapidly, otherwise the shadows may be too dense. The following are the normal proportions:

*No.* 1.

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| Hydrochinon | 10 grains. |
| Sulphite soda crystals C. P. | 60 grains. |
| Water | 1 ounce. |

*No.* 2.

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|---|---|
| Carbonate of potash C.P. | 30 grains. |
| Water | ½ ounce. |

Add No. 2 to No. 1, and also enough water to make the whole measure two fluid ounces, and pour upon the plate.

The development starts rather slower than usual, but when once commenced proceeds with remarkable uniformity. A developer for negatives is made up as follows:

*No.* 1.

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| Hydrochinon | 15 grains. |
| Water | 1 ounce. |

*No.* 2.

| | |
|---|---|
| Carbonate of soda (crystals) C. P. | 30 grains. |
| Water | 1 ounce. |

Use equal parts of each, and less of No. 2 in case overexposure is feared. After use, the developer may be preserved until as high as forty plates have been developed.

### Germanium.

Dr. Clemens Winkler publishes in No. 15 of the *Journal fur praktische Chemie* an account of his latest work upon the new element germanium, recently discovered by him in the Freiberg mineral argyrodite. In his first announcement last year, Dr. Winkler stated that the metal was obtained by reduction of the oxide in a stream of hydrogen gas, but since that time large quantities of the mineral have been found and dealt with on a much larger scale. The powdered oxide, after undergoing an elaborate process of purification, is intimately mixed with fifteen to twenty per cent of starch meal, made into a paste with boiling water, and rolled into balls. These balls are then placed in a crucible in contact with powdered wood charcoal and heated to redness. On cooling, each ball is found to be converted into a regulus of metallic germanium. After removal of the adhering charcoal they are placed in a second crucible, covered with a layer of powdered borax glass, and melted in a gas furnace, when they fuse together to a single brittle regulus, fine octahedral crystals being formed at the outer surface. Among the numerous compounds of germanium prepared by Dr. Winkler, two are of great importance, as conclusively indicating the position of this new element in the periodic system.

The first is germanium chloroform, $GeHCl_3$, analogous to the similar well known compounds of carbon and silicon, which is obtained by gently heating germanium in a stream of dry hydrochloric acid gas. The metal glows and continues to do so after removal of the lamp, the chloroform passing along with the excess of hydrochloric acid, and being condensed to a liquid by means of a freezing mixture of ice and salt. The second is germanium ethide, $Ge(C_2H_5)_4$, analogous to the ethides of silicon and tin, which is obtained by the action of two volumes of zinc ethide upon one volume of germanium tetrachloride. The operation is performed in an apparatus filled with carbonic acid gas, and the reaction is very violent. If, however, the temperature be kept down by immersion in cold water, the action is more regular, and after two or three hours the whole solidifies. On the addition of water, gas is evolved and a layer of the oily ethide separates out. When pure, it is colorless and of weak garlic odor, slightly lighter than water, and boils at 160°. It burns with an orange-colored light, giving off white clouds of the oxide. There can no longer be the slightest doubt that the gap in the periodic table between silicon and tin must be occupied by germanium, for Dr. Mendelejeff predicted that the metal thus filling up this particular gap would be found to form, if discovered, a tetrethide of specific gravity about 0·96 and boiling at 160°.—*Nature.*

### Edison's New Phonograph.

A reporter of the *Evening Post* lately interviewed Mr. Edison, and obtained the following interesting particulars:

When found in the laboratory of his lamp factory in Newark, from which 4,000 lamps a day are now sent out, Edison said that the commercial phonograph is now the most interesting thing in the world to him, although it is perfectly finished, and tools are being made for its manufacture upon a large scale. The stories which Edison tells of what his perfected phonograph will do are so extraordinary that he scarcely expects people to believe him, and yet he says that the apparatus is so simple, so effective, and so immediately useful that he is certain of its rapid introduction into business—far more certain than he was of the universal adoption of the telephone as a business instrument. Edison said of his newly finished phonograph: "You know that I finished the first phonograph more than ten years ago. It remained more or less of a toy. The germ of something wonderful was perfectly distinct, but I tried the impossible with it, and when the electric light business assumed commercial importance, I threw everything overboard for that.

"Nevertheless, the phonograph has been more or less constantly in my mind ever since. When resting from prolonged work upon the light, my brain would revert almost automatically to the old idea. Since the light has been finished, I have taken up the phonograph, and, after eight months of steady work, have made it a commercial invention. My phonograph I expect to see in every business office. The first five hundred will, I hope, be ready for distribution about the end of January. Their operation is simplicity itself, and cannot fail. The merchant or clerk who wishes to send a letter has only to set the machine in motion, and to talk in his natural voice and at the usual rate of speed into the receiver. When he has finished, the sheet, or 'phonogram,' as I call it, is ready for putting into a little box made on purpose for the mails. We are making the sheets in three sizes—one for letters of from 800 to 1,000 words, another size for 2,000 words, another size for 4,000 words. I expect that an arrangement may be made with the post office authorities enabling the phonogram boxes to be sent at the same rate as a letter.

"The receiver of a phonogram will put it into his apparatus, and the message will be given out more clearly, more distinctly, than the best telephone message ever sent. The tones of the voice in the two phonographs which I have finished are so perfectly rendered that one can distinguish between twenty different persons, each one of whom has said a few words. One tremendous advantage is that the letter may be repeated a thousand times if necessary. The phonogram does not wear out by use. Moreover, it may be filed away for a hundred years and be ready the instant it is needed. If a man dictates his will to the phonograph, there will be no disputing the authenticity of the document with those who knew the tones of his voice in life. The cost of making the phonogram will be scarcely more than the cost of ordinary letter paper. The machine will read out the letter or message at the same speed with which it was dictated.

"I have experimented with a device for enabling printers to set type directly from the dictation of the phonograph, and think that it will work to a charm. It is so arranged that the printer by touching a lever with his foot allows five or ten words of the phonogram to be sounded. If he is not satisfied with the first hearing, he can make it repeat the same words over and over again until he has them in type. For busy men who dictate a great deal for the press, I am sure that the phonograph will be a necessity after a very little experience.

"For musicians the phonograph is going to do wonders, owing to the extreme cheapness with which I can duplicate phonograms and the delicacy with which the apparatus gives out all musical sounds. In the early phonograph of ten years ago, which was a very imperfect and crude affair compared to that of to-day, it was always noticed that musical sounds came out peculiarly well. The machine would whistle or sing far better than it would talk. This peculiarity of the phonograph remains. I have taken down the music of an orchestra, and the result is marvelous. Each instrument can be perfectly distinguished, the strings are perfectly distinct, the violins from the cellos, the wind instruments and the wood are perfectly heard, and even in the notes of a violin the overtones are distinct to a delicate ear. It is going to work wonders for the benefit of music lovers. A piece for any instrument, for the piano, or for an orchestra, or an act, or the whole of an opera, musical instruments and voices, can be given out by the phonograph with a beauty of tone and a distinctness past belief, and the duplicating apparatus for phonograms is so cheap an affair that the price of music for the phonograph will be scarcely worth considering. As the phonogram will be practically indestructible by ordinary use, such music can be played over and over again.

"My first phonograph, as you remember, consisted simply of a roller carrying the foil, and provided with a diaphragm point properly arranged to scrape or indent the foil. The roller was turned by hand. In the new instrument there is far more complication, but altogether different results. My propelling machinery consists of a small electric motor run by a very few cells. Strange to say, I have found more difficulty in getting a motor to suit me than any other part of the apparatus. I tried various kinds of clockwork and spring motors, but found them untrustworthy and noisy. The motors I am now making are absolutely steady and noiseless. There is no part of the apparatus, the tools for which I am now making upon a large scale here, which is likely to get out of order or to work in an uncertain manner. The two finished phonographs are practically exactly what I intend to offer for sale within a few months."

Among the things at which Mr. Edison is hard at work, taking them up in turns, are the cotton picker, the heat generator of electricity, and a new device for propelling street cars by electricity. As already mentioned, the heat generator has been brought to a standstill by the lack of nickel in this country. Edison found that the rapid heating and cooling of iron plates in his generator, which was described at length in the *Evening Post* at the time of the September meeting of the American Association for the Advancement of Science, caused them to disintegrate very rapidly. Nickel does not attain so high a degree of magnetization as iron, but it loses it more rapidly under the action of heat, and Edison expects better results from it than from iron. The cotton picker upon which he is at work is the result of an idea which came to him down in Florida last winter. He is not quite sure that it will result in a practical cotton picker, but he has faith enough in it to make the experiments. He will not yet say in what consists the essential feature of his proposed machine. The last work which he proposes to undertake very soon is to run the Orange street cars upon an electric system which he says will not need any overhead wires or underground conduits, both expensive and troublesome necessities of all existing electric railways. He is confident that he can do this, and is now busy upon the first working models.

### A New Disinfectant from Coal Oil.

We read in *Le Monde Pharmaceutique* that a new disinfectant of great energy has been introduced in Paris. It is a brown liquid of sirupy consistence. Water is turned milky by a small addition, and the odor imparted is not disagreeable.

An examination of the product justifies the supposition that it is a peculiar saponification of coal oil by caustic soda.

It is especially adapted for disinfecting localities where epidemics rage.

It cures skin diseases in animals, and gives luster to the hair.

It destroys moss and fungus on trees and plants.

By sponging a horse with a solution (100 grammes in 10 liters of water), flies are kept off.—*Nat. Druggist.*