PHOTOGRAPHIC NOTES.

Practical Hints and Developer Formulas.—The suggestions contained in one of G. Cramer's latest circulars are of such a practical nature that we herewith make extracts for the benefit of our readers:

Precautions.

Great care is necessary in the manipulation of very sensitive plates, to guard them against injury by traces of diffused light entering lens, camera, tablet or dark room, or by using too strong a light while developing. A good light can be obtained by combining ruby glass with orange color paper (known as Gold Bank Envelope), and its safety can be tested as follows: Cover one-half of a plate with opaque paper and hold it close to the light for about one minute. Develop, and if the unprotected part shows fog, screen the light with additional paper or fabric until it is perfectly safe. A screen should be provided which will exclude all light from the plate during development. Never expose the plate either in the developing solution or otherwise to the dark room light longer than is necessary to examine its progress from time to time. The lens should be examined by pointing the camera toward strong light and observing if any reflections of light can be noticed, caused by the shining edges of the diaphragm or the inner walls of the tube, which would naturally cause fog. Rings cut out of black paper, placed near the lenses, will stop the reflection. The diaphragms should be blackened.

To test the camera and tablet, wrap a narrow strip of black paper around a plate in such a manner that only a part is protected, put the plate in the tablet and this in the camera. After placing the camera in strong light, pull the slide while the lens is kept covered, and leave it so for about five minutes. If camera and tablet are not light-tight, it will show on developing the plate. Fog is often caused by light entering the slide or between tablet and back of camera.

Pyrogallic acid has been mostly in use and eikonogen has lately come to the front and gained much favor. From our own experience we can highly recommend eikonogen, prepared as follows:

No. 1.

Engl. Measures Troy Weight.		Metric Weights and Measures.
40 ounces	Distilled water	1000 c. cm.
2 "	Sulphite of sodium crystals	50 c. cm.
1 ounce	Eikonogen, finely powdered	25 grammes.

Keep the solution in a well stoppered bottle.

No. 2.

10 ounces	Water	300 c. cm.
1 ounce	Carbonate of potassium	30 grammes.

No. 3.

10 ounces	Water	300 c. cm.
1 ounce	Bromide of potassium	30 grammes.

For Use.

3 ounces	Solution No. 1	120 c. cm.
1 ounce	Solution No. 2	40 c. cm.
6 to 12 minims (or drops)	Solution No. 3	½ to 1 c. cm.

When the developer is quite new, it will be found necessary to add a little bromide solution (No. 3) in order to make it work perfectly clear. The addition of old developer will answer the same purpose. The developer can be used repeatedly by occasionally adding more of Solutions Nos. 1 and 2, omitting the bromide. It produces plenty of intensity by simply leaving the plate in it long enough. Any degree of softness can be obtained by diluting with more or less water, which is also recommended during hot weather and for underexposures.

For overexposed plates restrain by adding more Solution No. 3.

The sulphite of sodium "crystals" are preferred to the "dried or granulated" by reason of their greater purity, but as the crystals will melt during hot weather in their water of crystallization, the dried sulphite of sodium may be found more convenient in hot climates.

Two parts of the crystals are equal to one part of the dried or granular sulphite.

The sulphite of sodium is added to prevent rapid decomposition of the eikonogen. Too much sulphite in the developer renders its action slower.

Fixing Bath.

After developing and rinsing, the negatives may be fixed in a plain hypo bath, one part hyposulphite of soda to four parts of water, but the following formula is especially recommended:

1 quart	Water	1 liter.
4 ounces	Sulphite of sodium crystals	120 grammes.
	After being dissolved add	
½ ounce	Sulphuric acid	15 c. cm.
3 ounces	Chrome alum, powdered	90 grammes.
	Dissolve and pour this into a solution of	
2 pounds	Hyposulphite of soda	1 kilo.
3 quarts	Water	3 liters.

This bath combines the following advantages: It remains clear after frequent use; it does not discolor the negatives and forms no precipitate upon them. It also hardens the gelatine to such a degree that the negatives can be washed in warm water, provided they have been left in the bath a sufficient time. The plate should be allowed to remain in the bath five to ten minutes after the bromide of silver appears to have been dissolved. The permanency of the negative and freedom from stain, as well as the hardening of the film, depends upon this.

Wooden boxes, with grooves to hold a number of plates, will be found both convenient and economical for fixing.

When the bath becomes weakened by constant use, it should be replaced by a fresh solution.

We think three ounces of bisulphite of sodium may be substituted to advantage in place of the sulphite sodium and sulphuric acid.

Intensifying Negatives.—Mr. Cramer also advises the single solution intensifier, should the negative be too weak. First wash the negative well to eliminate all traces of hypo.

Prepare a saturated solution of bichloride of mercury in water, and pour of this a sufficient quantity gradually into a solution of

1¼ ounce	Iodide of potassium	50 grammes.
6 ounces	Water	250 c. cm.

until the point is reached when the forming red precipitate will no longer dissolve by shaking, but be careful not to add more mercury than just enough to make the solution *very slightly* turbid. Now add

1 ounce of hyposulphite of soda	40 grammes.
Dissolve and fill up with water to make total 20 ounces solution	800 c. cm.

For use this should be diluted with about three parts of water. If the plate has not been thoroughly fixed, the intensifying solution will produce yellow stains. Be careful not to overdo the intensifying. Should it have gone too far, the negative can be reduced by placing it in the fixing bath for a short time.

Another method is to first place the plate in a solution of bichloride of mercury, ten grains to the ounce, until the film is whitened, then wash and immerse in a bath of sodium sulphite and water, 40 grains to the ounce, until the film is well blackened.

To reduce over-dense negatives: Dissolve one part red prussiate of potash in 15 parts of water. Wrap the bottle in yellow wrapping paper, as the solution is affected by light and will not keep long. Immerse the negative in a hypo solution, 1 part hypo to 15 parts of water, to which has been added a little of the above, immediately before use. When reduced enough, wash thoroughly.

Yellow colored negatives are caused by insufficient sulphite of sodium in developer, or if the article used is decomposed.

Yellow stains are caused by using plain hypo bath which has assumed a dark color, or by not leaving the plate in the hypo bath long enough.

Developer for Lantern Slides.

No. 1.

Distilled water	80 ounces.
Sodium sulphite (crystals)	3 "
Eikonogen	1 ounce.
Hydroquinone	1 "

No. 2.

Distilled water	80 ounces.
Sodium sulphite (crystals)	3 "
Sodium carbonate	6 "
Lithium carbonate	1 ounce.

Take equal parts of Nos. 1 and 2 for the developer.

The following Eder hypo bath is advised on account of its clearing qualities:

Water	1 gallon.
Hyposulphite of soda	3 lb.
Tartaric acid	1 ounce.
Sodium sulphite (granular)	1 "

The bath keeps white and clear for two weeks.

The combination of hydroquinone with the eikonogen gives a peculiar warm tone to the slide which is not obtainable easily with each alone.

Progress in Electric Welding.

In process of construction at the gun factory in Watervliet is a 10-inch gun which, when completed, will be one of the greatest caliber and most wonderful in its design ever made in this country. The huge gun will be built according to Captain Crozier's latest design of wire winding. Captain Crozier is located in the ordnance department at Washington, and the present gun is the fourth of its kind in existence. The work of boring the gun has been completed, and now it will be placed in the lathe preparatory to commencing the wire winding. The square wire to be used will be of steel, as is also the gun proper, a tenth of an inch in thickness, and will be wound from the breech to the muzzle, the entire length. To produce the desired work a dynamo has been placed in the gun factory which will be utilized to weld the ends of the wire by electricity.

The great demand for artificial ice machines, and the necessity for furnishing long coils of pipe to be used in their construction, has furnished a new and extensive field for the pipe welding machines of the Thomson Electric Welding Company. The difficulty of welding pipe by the old methods is that, unless the joints are perfect, there is an escape of ammonia vapor which renders them practically useless. It is found that by the electric welding process these joints are perfect, and lengths of 400 or 500 feet of homogeneous pipe can be made without difficulty. The electric welds stand bending either hot or cold, and by this process it also becomes practicable to frequently test the coils as they are being bent, and so correct any defects as the process of pipe bending goes on. It is also found that, by the electric welding machines, the pipe can be brought to any degree of heat that is necessary, and special bends made without the introduction of U joints or couplings, as heretofore has been the practice. Long lengths of pipe, with joints which can be relied upon, can thus be laid in the streets of the various cities for conveying cold from the refrigeration apparatus to consumers. Great demands are being made upon the company from various quarters for apparatus for these purposes. The works of the welding company, at Lynn, are crowded to the utmost to supply machines on orders received.

Roebling's Sons & Co., of Trenton, N. J., have made contracts with the welding company for seven additional machines, to be run from a central dynamo for welding copper wire. This is in addition to the plant which they already had in constant operation day and night since December, 1888. Contracts have been made with the United States government for a complete welding plant for boiler tubes, bars, rods, etc., for the New York navy yard, and also a similar plant to be applied to ship construction at the Norfolk yard. Several plants are in successful operation in carriage and wagon works in the West, and other plants for the purpose will soon be installed. There are many new developments of the electric welding process which will soon be made public. The welding machine for shell, shrapnel and other projectiles is now completed, and arrangements will soon be made by the company for producing these in large quantities.—*Electrical Engineer.*

Domestic Uses for Ammonia.

A little ammonia in tepid water will soften and cleanse the skin.

Spirits of ammonia will often relieve a severe headache.

Door plates should be cleansed by rubbing with a cloth wet in ammonia and water.

If the color has been taken out of silks by fruit stains, ammonia will usually restore the color.

To brighten carpets, wipe them with warm water in which has been poured a few drops of ammonia.

One or two tablespoonfuls of ammonia added to a pail of water will clean windows better than soap.

A few drops in a cupful of warm water, applied carefully, will remove spots from paintings and chromoes.

Grease spots may be taken out with weak ammonia in water; lay soft white paper over, and iron with a hot iron.

When acid of any kind gets on clothing, spirits of ammonia will kill it. Apply chloroform to restore the color.

Keep nickel, silver ornaments, and mounts bright by rubbing with woolen cloth saturated in spirits of ammonia.

Old brass may be cleaned to look like new by pouring strong ammonia on it, and scrubbing with a scrub brush; rinse in clear water.

A tablespoonful of ammonia in a gallon of warm water will often restore colors in carpets; it will also remove whitewash from them.

Yellow stains left by sewing machine oil, on white, may be removed by rubbing the spot with a cloth wet with ammonia, before washing with soap.

Equal parts of ammonia and turpentine will take paint out of clothing, even if it be hard and dry. Saturate the spot as often as necessary, and wash out in soap suds.

Put a teaspoonful of ammonia in a quart of water, wash your brushes and combs in this, and all grease and dirt will disappear. Rinse, shake, and dry in the sun or by the fire.

If those who prespire freely would use a little ammonia in the water they bathe in every day, it would keep their flesh clean and sweet, doing away with any disagreeable odor.

Flannels and blankets may be soaked in a pail of water containing one tablespoonful of ammonia and a little suds. Rub as little as possible, and they will be white and clean and will not shrink.

One teaspoonful of ammonia to a teacupful of water will clean gold or silver jewelry; a few drops of clear aqua ammonia rubbed on the under side of diamonds will clean them immediately, making them very brilliant.

THE rapid increase of the wealth, business and prosperity of the United States during the past ten years, says the Boston *Manufacturers' Gazette*, is simply marvelous. According to the published figures, the total wealth of the country is now $71,459,000,000, equal to nearly $1,000 per capita. This is an increase in ten years of $18,000,000,000, or 42 per cent. England's wealth in 1885 is given at $50,000,000,000. The average of wealth per head in England is $1,545, in Scotland $1,215, in Ireland but $565. The total wealth of France is estimated at $36,000,000,000. England exacts in taxes $20 per head of population, while each individual in the United States pays but $12.50. America will produce 7,000,000 tons of iron this year, while England's greatest production is 8,600,000 tons.

The Locust Tree.

There is not in Europe a more interesting tree for Americans to visit than the venerable locust in the garden of the Museum of Paris. The first of its race to grow in the soil of Europe, it has survived for more than two centuries and a half the wars of the elements and the social cyclones which have swept over it. The seed from which it sprung was planted in 1635 by Vespacian Robin, gardener of Louis XII., in the Jardin du Roi, now called the Jardin des Plantes. Vespacian Robin was the son of a gardener more famous than himself, Jean Robin, who had charge of the Royal Gardens under Henry of Navarre; and it was for the elder Robin that Linnæus, more than a century after his death, named the genus Robinia to which our locust tree belongs. Little is left of the old tree but the shell of the trunk and a few feeble branches which clothe themselves year after year with leaves and flowers, testifying to the wonderful vitality of the locust tree and to the care which has been bestowed upon this specimen by the authorities of the garden, the most interesting in the world, perhaps, in its historical associations with men famous in the annals of botany.

The locust tree (*Robinia Pseudacacia*) has excited, from a cultural point of view, more interest than any other inhabitant of the American forests. There is no other North American tree about which whole volumes have been written, and no other of our trees has been so enthusiastically praised or so widely scattered by cultivation.

The earliest account of the locust tree was published in 1640 by Parkinson, in his classical "Theatrum Botanicum," it having been cultivated in England about that time by the Dutchman John Tradescant, a great traveler and botanist, who held the position of gardener to Charles I. Evelyn, in his "Sylva," published in 1664, records the fact that the Virginia acacia thrives in the king's new plantation in St. James Park; while his great French contemporary, Duhamel, gave a few years earlier specific directions for its cultivation. A hundred years later the locust had so grown in esteem in Europe that something was said about it by nearly every writer who discussed rural economy or the possibility of increasing national wealth through the cultivation of exotic trees. The first book devoted entirely to the locust was published in Paris in 1803. It is a small octavo of 314 pages, and is entitled "Lettre sur le Robinier connu sur le nom impropre de faux Acacia." It was written by M. N. Francois de Neufchateau, a senator and member of the Institute. This work contains the essence of all that had been previously published about the tree in France, and a great deal of information relative to its culture and uses. A translation of portions of Monsieur Francois' essay is published in an English book on the locust, which appeared from the pen of W. Withers, of Holt, in Norfolk, in 1842, under the title of "The Acacia Tree: Its Growth, Qualities, and Uses." William Cobbett, however, better known perhaps as the vituperative political essayist, Peter Pindar, than as an enthusiastic and successful planter of trees, did more by his writing and example than any other man to make known the value and spread the cultivation of the locust tree.

Cobbett, during a forced residence in the United States from 1817 to 1819, occupied himself in farming on Long Island, where he established a small nursery for the propagation of fruit and timber trees. It was at this time that he came to the conclusion that "nothing in the timber line could be so great a benefit as the general cultivation of the locust." On his return to England he carried a small package of the seeds of this tree home with him and began the systematic raising and selling of locust trees, his total sales amounting to more than a million plants. This he tells us in his book called "The Woodlands," which in some respects is the best book on tree planting which has been written in the English language. The author in his preface gives his reasons for having written it: "Many years ago," he says, "I wished to know whether I could raise birch trees from the seed. I looked into two French books and into two English ones without being able to learn a word about the matter. I then looked into the great book of knowledge, the 'Encyclopædia Britannica'; there I found in the general dictionary, 'Birch tree, see Betula, Botany Index.' I hastened to Betula with great eagerness; and there I found, 'Betula, see Birch tree.' That was all; and this was pretty encouragement to one who wanted to get, from books, knowledge about the propagating and rearing of trees." There are tree planters of the present generation who turn to the literature on the subject with results which are hardly more satisfactory. Cobbett's book has long been out of print, but no other work gives such clear and specific direction for rearing and planting trees, and there are portions of it which might well be reprinted for general circulation.

Cobbett's enthusiasm for the locust tree, and his zeal in propagating it, caused it to be planted generally in England in his time, and the fashion, as is often the case with English fashions, crossed the Atlantic, and fifty or sixty years ago no tree was so often planted in this country. Remnants of these old plantations may be seen up and down the Hudson River and in the neighborhood of all our seaboard cities; and the locust is now fairly naturalized in a large part of the country east of the great plains, although originally its range was a comparatively restricted one, it being found only in the forests of the Alleghany Mountains, from Pennsylvania to northern Georgia, and, doubtfully, in a few isolated stations west of the Mississippi River. So far as the United States is concerned, however, the locust tree has not fulfilled the hopes of the early planters. It is preyed upon in this country by a horde of insects who bore into the trunk and destroy the trees or the value of their timber, and the prophecy of the younger Michaux, that the locust tree would become more common in Europe than in its native country, has probably been fulfilled.

It is, however, one of the few American trees, if not the only one, which has become really naturalized in Europe, and there is no other exotic tree which travelers in central Europe see more frequently. This is due, in part, to the fact that it has been planted everywhere along the lines of railroads to hold the soil on the embankments, and because it is the favorite tree for the embellishment of the grounds surrounding the stations.

Long cultivation of this tree has given birth to many varieties, and of these the one known as the Parasol Acacia, with a dwarf, compact, spherical head, usually grafted as a tall standard, is one of the most popular ornamental trees in Europe, where it lines countless miles of roadside and adorns innumerable villa gardens.

The great value of the locust tree is found in the wood which it produces. This is heavy, exceedingly hard and strong, very close grained, and capable of withstanding for a long time the effects of decay, when placed in contact with the ground. This makes it one of the best woods known for fence posts; it has many uses in ship building, and is preferred to the wood of all other trees for treenails, for which purpose it is largely used. It grows rapidly from seed, which is produced in the greatest profusion, and it will adapt itself to almost every kind of soil. The rapidity of its growth is great, and thanks to the lightness of the shade cast by its compound leaves, it does less injury than most other trees to crops growing beneath its branches. The locust is a good hedge plant, too, and the fragrant white flowers are very beautiful. These are the qualities which have made the locust popular, and were it not that it is so liable to the attacks of insects, the planters of the present day would be able to indorse all that Cobbett claimed for it.—*Garden and Forest.*

Colors.

The great chemist Michel Eugene Chevreul, who recently died at the ripe old age of 103 years, terms his research in the realm of colors as the philosophy of natural phenomena. About all the knowledge we possess in this vast and beautiful field is due to this grand old man.

Chevreul's genius has demonstrated that the harmonies of color are submitted to immutable laws which he has revealed, and the certainty and fruitfulness of which he has demonstrated by calculation.

There are but three primary colors generally recognized—blue, red, and yellow. These are called primary because they cannot be produced by compounding any other colors. Then we have the secondaries—green, purple, and orange. These are called secondaries because blue and yellow make green; red and blue, purple; red and yellow, orange. From these we derive the tertiaries—olive, citrine, and russet. Purple and green make olive; orange and green, citrine; purple and orange, russet. Thus we have the three classifications denoting all the colors proper extant. From these are derived the hues, tints, and shades. A hue is obtained by the combination of any of the primaries. The hue may vary according to the predominating influence of one color over another. To obtain a "tint" we simply add white to any of these colors; and to form a "shade" we add black or any of the dark colors.

So from the above we have the alphabet of colors. The variety of tones, tints, hues, or shades to be obtained from this alphabet are as kaleidoscopic in their possibilities as the alphabet of letters. The hand of man or the skill of the artist will never exhaust them.

We have still another term we use in relation to colors which bears its own significance also, and that is "tone." While we have our three primaries to start from, yet we have no standard "tone" from which we shall start our secondaries. There are many different kinds of red, yellow, and blue, and we signify the difference as "tones," the same as we apply the term to different instruments of the same kind. You will say that this piano has a much better tone than that piano. So we will find in selecting our primaries. While some of the "high-toned" reds will produce a much more beautiful tint, yet they are too fugitive to use for exterior house painting; so, too, with the greens and yellows, while some are quite permanent. Below we give a list of formulas for mixing colors which will be of service to the amateur house painter and to ladies who decorate their own "bric-a-brac."

French Red.—This color is simply Indian red, lightened with vermilion and glazed with carmine.

Chocolate Color.—Add lake or carmine to burnt umber; or take Indian red and black to form a brown; then add yellow to bring about the desired shade.

Yellow Lake.—Take of umber and white equal parts and Naples yellow and scarlet lake; glaze with yellow lake.

Olive Brown.—Mix one part of lemon yellow with three parts burnt umber. Change proportions for different shades.

Clay Drab.—Raw sienna, raw umber, and white lead, equal parts; then shade with chrome green.

Bismarck Brown.—Take carmine, crimson lake, and gold bronze, and mix together. If a light shade is desired, use vermilion in place of carmine.

Jonquil Yellow.—Mix flake white and chrome yellow, and add vermilion to carmine.

Medium Gray.—Eight parts of white to two of black.

Lead Color.—Eight parts of white, one of blue, and one of black.

Light Buff.—Yellow ocher, tinted with white.

Deep Buff.—The same, wth the addition of a little red.

French Gray.—White shaded with ivory black.

Gold Color.—White and yellow, shaded with red and blue.

Pearl Color.—White, black, and red in proportions to suit taste.

Canary Color.—Five parts white and three parts lemon yellow.

Oak Color.—Five parts white, two of yellow, and one of red.

Olive Color.—Eight parts of yellow, one blue, and one black.

Snuff Color.—Four parts of yellow and two of Vandyke brown.

Rose Color.—Five parts of white and two of carmine.

Bottle Green.—Dutch pink and Prussian blue for ground; glaze with yellow lake.

Salmon Color.—Five parts white, one yellow, one umber, one red.

Brown.—Three parts of red, two black, and one yellow.

Copper Color.—One part red, two of yellow, and one of black.

Lemon Color.—Five parts of lemon yellow and two of white.

Straw Color.—Five parts of yellow, two of white, and one of red.

Fawn Color.—Eight parts of white, one of red, two yellow, and one of umber.

Flesh Color.—Eight parts of white, three of red, and three of chrome yellow.

Chestnut Color.—Two parts of red, one of black, and two of chrome yellow.

Wine Color.—Two parts of ultramarine and three of carmine.

Green.—Blue and yellow or black and yellow.

Maroon Color.—Three parts of carmine and two of yellow.

Tan Color.—Five parts of burnt sienna, two yellow, and one raw umber.

Pea Green.—Five parts of white and one of chrome green.

Stone Color.—Five parts of white, two of yellow, and one of burnt umber.

Citron.—Three parts of red, two of yellow, and one blue.

Drab Color.—Nine parts of white and one of umber.

Lilac.—Four parts red, three white, and one blue.

Purple.—The same as lilac, but differently proportioned; say two parts of blue.

Violet.—Similar, but more red in than purple.

Cream Color.—Five parts white, two yellow, and one red.

Claret.—Red and black, or carmine and blue.

Dove Color.—Red, white, blue, and yellow.

Light Gray.—Nine parts white, one blue, and one black.

Willow Green.—Five parts white, two verdigris.

Peach Blossom.—Eight parts white, one red, one blue, and one yellow.

Bronze Green.—Five parts chrome green, one black, and one umber.

Carnation Red.—Three parts lake and one white.

Grass Green.—Three parts yellow and one Prussian blue.

Brick Color.—Two parts yellow ocher, one red, and one white.

Portland Stone.—Three parts raw umber, three yellow ocher, one white.

Plum Color.—Two parts white, one blue, and one red.—*S. Paris Davis, N. W. Builder and Decorator.*

THE baryta deposits on McKellar's Island, Canada, are now being worked. Experts pronounce this to be the finest deposit in America.