PHOTOGRAPHIC NOTES.

IMPROVED DEVELOPERS.

Stock Solution No. 1, which will keep:

Water....................10 ounces.
Saturated solution of *free* bromine in water..........60 minims.

The bromine solution is first mixed with the water, and then

Pyrogallic acid....................120 grains

is added. The solution is now ready for use. Care should be taken to avoid inhaling the fumes of bromine when mixing it with water.

Stock Solution No. 2.

Water....................2 ounces.
Liquor ammonia, 880°....................1 ounce.
Bromide of potassium....................180 grains.

This solution must be kept in a tightly corked bottle.

Stock Solution No. 3.

Water....................20 ounces.
Stock solution No. 2....................3 drachms.

To develop a quarter plate take seven drachms of No. 3, to which add sixty minims of No. 1; flow this over the plate; and the image will develop gradually free from fog. A. L. Henderson, of London, England, originator of a new formula for cold gelatine emulsification, regards the above developer as superior to all others for gelatine plates.

A modification of the above developer has been found to work well.

Two stock solutions, one a saturated solution of washing or sal soda, and the other a saturated solution of pure sulphite of soda in water, should be made.

To develop a 4 x 5 plate, take:

Water....................1 ounce.

to which add

Saturated solution sal soda....................1 drachm.
" " sulphite soda....................1 drachm.
Bromo pyro solution No. 1 (as above)....................4 drachms.

Flow and develop in the usual manner.

The formula may be simplified as follows:

Stock Solution.

Water....................32 ounces.
Saturated solution sal soda....................4 ounces.
" " sulphite soda....................4 ounces.

To develop a 4 x 5 plate, take ten drachms of the above, to which add four drachms of the bromo pyro solution No. 1 (as given above).

If the plate has been under-exposed, more saturated sal soda solution should be added; if over-exposed, the developer should be immediately poured off into a measure, the plate flooded with water, then drained, and the developer returned, diluted slightly with water, and a few drops of a 10 per cent solution of bromide of ammonium added. The image will then develop out more slowly, and gain the desired intensity.

Plates developed with this developer are soft, quick printing, clear in the shadows, and possess every good quality of a wet plate.

The employment of sal soda as a developing agent has the advantage over ammonia in that it is more stable. The solution keeps clear but red, and from three to four plates can be developed one after the other at one time.

A GOOD INTENSIFIER FOR GELATINE PLATES.

Solution No. 1.

Water....................8 ounces.
Saturated solution bichloride of mercury....................1 ounce.
Saturated solution bromide of potassium....................1 ounce.

Solution No. 2.

Water....................8 ounces.
Nitrate of silver....................75 grains.
Cyanide of potassium, C. P....................75 grains.

To make No. 2, divide the water into two parts, dissolving the silver in one, and the cyanide of potassium in the other. Then pour the potassium solution into the silver; a precipitate of cyanide of silver will be formed, which will be mostly redissolved by agitation; a slight excess should remain at the bottom of the bottle.

After the plate has been fixed and thoroughly washed, immerse it in the mercury solution; the length of time depends upon the amount of intensity required. If great intensity is desired, let the plate remain until the surface has bleached white. Then wash the plate thoroughly under the tap and immerse in solution No. 2 until the white tint is changed to a deep violet black, which occurs very rapidly. If the plate is left too long in the cyanide solution, the density of the negative is weakened. The trays holding the solution should be rocked to and fro to insure uniform action on the plate.

When the proper time for removal has arrived, wash the plate thoroughly and dry. Among the advantages of this intensifier are that it works quick, gives clear shadows (valuable in line work), and an unequaled brilliancy of color to the negatives.

The Greely Colony Relief Party.

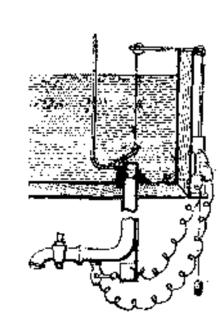
It will be remembered that the party sent to Greenland last summer to carry supplies to the party of observation stationed at Lady Franklin Bay returned without accomplishing their purpose, turned back by impassable fields of ice. As the colony was provisioned for two years only, it becomes imperative that relief shall be got there before the end of the current year.

The selection of the members of the new relief party devolves upon General Terry, of the Department of Dakota. From a list of 200 volunteers or more, there has been selected a detail of one commissioned officer and four enlisted men whose long service in the Northwest has inured them to hardships of the sort to be encountered in their Arctic quest.

First Lieut. Ernest A. Garlington, Seventh Cavalry, who has been selected to command the expedition, was born in South Carolina, and graduated from the Military Academy in 1876. The others of the detail are Sergt. John Kenny, Troop I, Seventh Cavalry; Corp. Frank Elwell, Company E, Third Infantry; O. F. Morits, Company A, Seventeenth Infantry; and Private J. J. Murphy, Company F, Eleventh Infantry. Three of these have been chosen with special reference to their physical qualifications. Lieut. Garlington is less than 30 years old, above the average height, with a strong, well built, soldierly physique. He is intelligent and possesses more than ordinary quickness and energy. He is considered by all who know him to be especially adapted for such a command. In addition to Lieut. Garlington and the men mentioned above, four others have been selected, and with two men from the Signal Corps and a medical officer, will comprise the party. It is proposed that the expedition shall leave St. John, Newfoundland, about June 15 next, so as to take advantage of all favorable conditions of ice, and if possible, reach Discovery Harbor. Should this not be possible the vessel will land the party and stores at Life Boat Cove and return southward. The party will then establish itself for the winter, and endeavor to open communication with Lieut. Greely by sledges and assist him in his retreat from Lady Franklin Bay, if such retreat should be necessary. The desire is to maintain the station at Lady Franklin Bay at least until 1884, in order to realize the full purpose for which it was established.

Preventing Water Pipes from Bursting in Frosty Weather.

A simple method of preventing the bursting of water pipes during frosty weather has recently been patented by Drs Buxton and Ross, and was exhibited at the late Electrical Exhibition at the Crystal Palace. A valve of special construction, called by the inventors a ventilating valve, is screwed or soldered into the end of the house main service-pipe in the cistern, and a piece of string or wire conducted from it to any convenient spot, and fastened to a nail or hook. When frost is expected, all that is needful is to unhook the spring, when the valve falls upon its seat, and air being admitted through the small pipe which rises above the surface of the water, the pipes can be emptied by simply turning on the tap at the lowest point in the house service, the water in the cistern being saved. To obviate forgetfulness on the part of servants, the inventors have called in electricity to their aid. A thermometer of special construction is so arranged that when the temperature falls below 33°, a current is sent through an electro-magnet, which releases a catch, causing the valve to fall upon its seat, and at the same time opening a small pet cock at the lowest point in the house service and draining the pipe. The battery is cut out by the fall of the catch, and when the valve is raised again, that water may flow into the pipes, the connection is made good. The electrical part of the apparatus is by no means an *essential* feature, but simply saves trouble, and prevents the possibility of allowing the pipes to remain full during frost, as the contrivance is rendered automatic by its agency.—*The Building News.*



How Divers Work under Water.

The submarine work of the new Folkestone pier, Eng., is executed by two divers, who, in reply to the questions of the reporter of the *Engineer*, have given the following particulars as to their experiences: "On first beginning to work as divers we felt as if our heads were stopped up; the pressure was felt chiefly in the ears. The increase of depth of water when we are descending is perceptibly felt; the difference of level between high and low water is clearly appreciable. Eight or ten fathoms—48 feet or 60 feet—is a reasonable depth to work in; divers are said to have gone down 220 feet; if so, we should not like to do it ourselves. At 10 feet depth we feel the pressure, and at 20 feet can feel the increase, but do not feel quick or slow variations of but 4 feet or 5 feet. In deep water we feel the pressure all over the outside of the body, and some divers are said to have borne a pressure of 18 pounds or 20 pounds to the square inch. At the present extension of the Folkestone pier we are working at a depth of six or seven fathoms at high water. We then feel the pressure on the outside of the body a little, but not enough to hinder us in our work. When working in shallow water, there is not so much pressure in a diving dress as in a diving bell, because we can regulate the pressure better inside the dress by turning the tap so as to give a larger orifice for the escape of the air. We cannot see far through the glass of the helmet; when the water is exceptionally clear we can see about 20 feet, but usually cannot see beyond 5 feet or 6 feet. Fishes sometimes come to look at us, and mostly from above our heads, because we stir up the bottom, and where the water above is rather clearer they wait on the lookout for any food they can get. If we lift a hand toward them, they are off like a shot. Flat fish near the ground are too quick when we try to catch them with the hand, but we can spear them sometimes with our crowbar. We have never seen any large fish near; the largest which one of us ever saw was a conger eel, about 2 feet 6 inches, which came near about a week ago. He came alongside quietly, and when the crowbar was raised toward him he was off.

"In laying the foundations of the present pier we first level the sea bed; sometimes it is pretty flat, and sometimes we have to dig away 1½ feet or 2 feet. The concrete is slightly damped right through, not much, before it is sent down to us in bags by means of the crane overhead; some of the bags contain 2 cwt. We lay the concrete, bags and all, and the average thickness of the concrete along the bottom is about 15 inches. Only one of us works at a time. When the concrete is laid, the blocks of artificial stone are slowly lowered down to us, and we guide each one into its place; this is all the more easily done because they weigh so much less in water than in air. They are not cemented together beneath the water. They are not always permanently placed at the first attempt; perhaps the bed is not at the right level, so that the block has to be raised again while we level it. We then take the wooden plugs out of the lewis holes of the block, and twist the lewis round with a spanner; when the lewis is thus freed, it is drawn up by the crane. The bottom block may take ten minutes or more to fix, and in exceptional cases as much as an hour. The blocks in the second tier are all placed in ten minutes, including the freeing of the lewis, their bed being necessarily all right. Currents retard the operations.

"When the weather is rough, we cannot work at all, neither can we work at the time of high spring tide, even when the water is smooth, the current being too strong. During the summer we have been able to work here about three days a week. We have a dressing room, and when in full costume out of water are a source of attraction to the small boys of Folkestone, who follow us from the dressing room as far as they are allowed to go along the pier; they do not throw stones. Inside the dresses we cannot hear their remarks unless they shout.

"One of us, W. Chadwick, has been a diver eleven years, and has not had a day's illness all the time. The other of us, Edward Brice, has been a diver seventeen years, and has sometimes had a little touch of rheumatism. Some men are better fitted for diving than others. Some begin to bleed at the ears at once at the depth we now work in. Several men now on these works have had a try at our duties, but gave up because they could not stand the pressure.

"While we are at work a rope with a weight of one cwt. at the bottom hangs down alongside one of the nearest piles, and in descending from the surface we go down it band over hand; this is easy, because our bodies are lighter in water. Two men are always above us in a boat, one to hold the air pipe connecting the helmet with the air pump on the pier, and the other holds the life line, by which we give signals from below. We give the signals in pulls, and they consist of from one to seven pulls. One pull means 'lower block;' two, 'stop lowering;' three, 'heave up;' four, 'turn to the east;' five, 'turn the crane to the west;' six, 'run landward;' seven, 'run seaward.' Sometimes we pull the air pipe, one pull for more air, two for less. If we shake the pipe and then give four sharp pulls, it means 'hung up,' or in other words, entangled so that we cannot get free without assistance.

"We work with Siebe & Gorman's apparatus. The pressure of the air is indicated to the men at the pump by a Bourdon gauge. The heat is great inside the dresses while we are working; much hotter than when we are at hard work on land. We are occasionally under water 3½ hours at a stretch, but the average time is about two hours; then we feel as if we want fresh air and something to drink. In spite of the air supply from the pump, that inside the diving dress acquires the smell of perspiration, and makes us feel faint. For efficient regular work, the depth of water should not be more than twelve or thirteen fathoms. A case occurred once of a diver dying from the pressure being too great at a considerable depth."

Reputation of American Engineers.

Last year, Mr. Baker, one of the foremost English engineers, designed a bridge of exceptional magnitude, it having two spans of 1,700 feet each, or 100 feet more than the span of the Brooklyn Bridge. Mr. Baker's plan was criticised by the Astronomer Royal, Sir George Airey. In his reply, after demonstrating the error of the Astronomer Royal's objections to the strength of the proposed bridge, Mr. Baker says:

"As a sample of foreign opinion, I would quote that of Mr. T. C. Clarke, the eminent American engineer and contractor, who has built more big bridges himself than are to be found in the wholeof this country, and who has just completed a viaduct 301 ft. in height, by far the tallest in the world. Referring to the proposed bridge, he writes: 'If my opinion is of any value, I wish to say that a more thoroughly practical and well considered design I have never seen.' I need hardly say that the opinion of such a man has far more weight than that of an army of amateurs."

Recalling the circumstance that only twenty years ago the New York, New Haven, and Hartford Railroad Company refused to adopt the plans of its engineer for an iron bridge over the Connecticut, until he had taken them to England and had them approved by English experts, the *Railroad Gazette* finds in Mr. Baker's testimony a good illustration of the growth in reputation of American engineers.