

These pinions are worked by the lever, P; there is a pin in each lever, and also a perforated plate, P', in which the pin fits. These are the principal details; the operation is as follows:—

The log to be worked up into stripes is previously cut of the right length and suspended between the two frames, as shown by the arrow; it is removed in the engraving, as it would hide important parts of the machine. The entire frame, B, and all its fixtures runs on the friction rollers, C, said motion being given by the rack and pinion, D; of course this carries the log up to the saws, which are supposed to be rapidly revolving; they each take a cut, one horizontally and the other vertically, which, in meeting, separate a strip from the log. This strip falls on to the ways, Q, where the hinged pawl, Q', seizes it, and, as the carriage continues to advance, pushes it off clear of the gearing below; for this pawl is so arranged that it lifts up when the carriage runs back, but engages with a strip through the agency of the teeth on its under side when the carriage advances.

The back-and-forth motion of the carriage, B, is obtained by the dog, R, and lever, S. The lever connects with a horizontal bar, S', which in turn works an arm, T, carrying slides and rollers inside of the frame. These rollers press against the belts, U and V, which drives the carriage one way, and on the return of the carriage the roller is thrown in contact with another belt, V, also inside the frame; these belts run in opposite directions, of course, and by the alternate pressure of the rollers which work "fast and loose" on each belt in turn, the carriage and log is moved up to and from the saw. The lever, S, has two catches on a bar projecting from the side, and these catches engage with spring dogs, W, and hold the roller inside the frame in close contact with the belt, making it hug the pulley tightly; as the carriage is run along, the stop, R, strikes the dog, W, and throws the roller clear of the belt, thus leaving the carriage free to return when the other roller is thrown against the other belt. By the stop, W, the lever is always returned to a vertical position by the action of the springs and cords, X.

The carriage can be set at any point to accommodate logs of any length, by unscrewing a bolt in the heads of the clamps, Y, and sliding the uprights along to the desired point, and the log is adjusted after strips have been cut from it all around, by lowering the centers, N, with the rack and lever. The operation thus goes on until the work is completed.

The various parts of this machine are arranged most ingeniously to attain the desired end. It does not appear to be a combination of half a dozen different inventions, but the inventor seems to have started with a purely original idea, and has carried out the same in a practical manner.

This machine was patented by Isaac W. Bowers, Ovid Center, Mich., August 25, 1863, through the Scientific American Patent Agency. For further information address the inventor at that place.

PHOTOGRAPHY IN THE PAST YEAR.

[From the London *Photographic News*.]

The past year has been in many respects a successful one for photography. Commercially its applications have been extending, and its professors have been generally prosperous. The art itself has been progressing and expanding. Well understood processes have been acquiring greater stability and excellence. Some new principles in the other processes have received recognition, and specific improvement has been made. General activity, increased scope and usefulness, and steady improvement, are amongst the facts to be recorded in this year's chronicle of the art.

Perhaps dry-plate photography presents some of the most noteworthy modifications. The value of certain alkaline conditions, which, at the commencement of the year was beginning to obtain hesitating recognition, is now an accepted fact of great importance. The idea seems to have been of such uncertain and gradual growth, that it is difficult to trace it to its origin. Although Mr. Bartholomew's alkaline gelatine process appears to contain one of the earliest distinct indications of the value of alkaline conditions, nothing further of a very definite kind seemed to proceed from it. The starting point of fresh experiment appears to have been the American practice of fuming the tannin plates before exposure. From this,

Mr. Leahy and Major Russell, each independently, arrived at alkaline development. The latter gentleman had added to the claims he has upon photographers, by the assiduity with which he has worked during the year, to secure certainty in the application of this and other principles to dry-plate photography. The use of a simply bromized collodion, proposed ten years ago for the wet process, and but little used, is now likely to come largely into use in the wet process. In the year 1853, we find J. F. W. Herschell remarking, when speaking of the hard black and white effects of iodized collodion, that "iodine must be thrown over board or limited in its use *comme qui couste*, if photography shall ever satisfy the desires of the artists," and he then adds: "A new photography has to be created, of which bromine is the basis." It is possible, in dry photography at least, that this remark may still become true. It is a somewhat singular fact as bromine played such an important part in the first, most successful and beautiful dry process—that on silver plates—that its value in other dry plates should have been so tardily discovered or acknowledged. We have not heard much of hot development for tannin recently; but some of the charming instantaneous pictures sent by Col. Stuart Wortley, at the last year's Photographic Exhibition, were produced on tannin plates, and with the aid, we understand, of hot development. The addition of various substances to the tannin solution, to increase the sensitiveness of the plate, has been largely discussed; but the utility of such additions still remains an open question. The idea enunciated by Mr. Bartholomew, and further worked out by Mr. Hannaford, of adding silver to the albumen solution in Fothergill plates, has been revived by Mr. Fothergill, and the results are highly spoken of. The new principle discovered by M. Poitevin, that tannin, and similar oxidizable substances, act as sensitizing agents to insensitive iodide of silver, and supply the place of free nitrate of silver, is most important, and may probably be of great value in reducing to definite form the many vague ideas at present prevailing on dry-plate photography.

Printing processes have occupied considerable attention during the year. The introduction of enameled papers for securing a surface registering perfectly all the detail in the finest negative, was at first hailed by many photographers as a boon. When the sample of paper was good, the prints were certainly very delicate, and in many respects beautiful; but the uncertainty of the results, arising chiefly out of the imperfect preparation of much of the paper and some other causes, have tended to give the enameled papers a short-lived popularity, and they are now, we believe, rarely used. From the same cause, imperfect preparation, a paper which promised many advantages, for large pictures, in its freedom from gloss, and yielding fine vigorous prints, introduced under the name of amorphous albumenized paper, has been condemned as unsatisfactory. Gold toning processes have again been under examination, and amongst many photographers a decision in favor of the bath containing chloride of lime has been given, on the ground that it is simple, economical and satisfactory in use. Fixing processes have been reconsidered, and M. Meynier's proposal to supersede the troublesome and readily decomposed salt now used, hyposulphite of soda, by the more stable sulphocyanide of ammonium, has excited much attention, but the latter salt has not yet come into any extended use. One of the earliest objections made, the high price of the salt, has disappeared, as M. Meynier is now enabled to manufacture it at about one shilling and three halfpence per pound. One of the chief theoretical objections to its use arises out of the fact that the double sulphocyanide of ammonium and silver, formed in the process of fixing, is decomposed by the addition of water into sulphocyanide of ammonium and sulphocyanide of silver; the latter salt not being soluble in water, some traces of it are probably left in the print. This is, however, a point which will probably be decided better by practical experience than theory. We have prints in our possession, fixed with sulphocyanide of ammonium, and some fixed with sulphocyanide of potassium, eight months ago, perfectly free from all signs of fading or decomposition. This fact furnishes an argument in favor of sulphocyanides as fixing agents. Their stability, and the little danger which exists in their use of the liberation of any sulphuretted agent, and several other arguments, are strongly in favor of giving them a fairer

trial than they have yet received. We hope, during the coming year, the subject will receive all the attention it deserves.

In connection with printing, the subject of weak silver baths has excited considerable attention. For some years past, until recently, a strong feeling has prevailed in favor of strong printing baths. A variety of good arguments in their favor exist, and it has been rightly held that they give greater certainty of good results than weak baths. An inquiry has been made during the year as to whether this certainty might not be obtained with a less expenditure of silver, and in many practical hands an answer seems to have been obtained that it might. We now find many extensive practical printers using thirty or forty grain baths, who, until recently, used seventy or eighty grain baths, and as they declare with equally good results. We here simply note the fact without entering into the general argument, which is too wide a subject for treatment in a glance at the year. The same remark is true of the proposed addition of nitrate of soda to the printing bath, and of Mr. Anthony's proposed bath of oxide of silver, dissolved in a solution of nitrate of ammonia. They are subjects which demand more full and careful consideration.

Carbon printing processes have made some progress, especially in the printing-ink process of M. Pouncy. In this process we have well marked gradation and half-tone in photographs obtained direct from the negative, the image being composed of printing ink. This in itself is a startling and important fact. That improvements in detail are desirable, in order to secure pleasing and artistic prints, is doubtless true; but it is equally true that these improvements are in progress, that there is much to hope for from the process. M. Poitevin's new principle in carbon printing is also important. Instead of rendering a soluble substance insoluble by light, he works in the contrary direction. Carbon being mixed with gelatine is spread upon paper, is then rendered insoluble by the action of perchloride of iron and tartaric acid. The action of light upon such a film is to render it insoluble, and when exposed under a transparent positive, the lights are rendered soluble in water, and the half-tones become soluble in just such proportion as they have been acted upon by light. In this process M. Poitevin sees a better mode of obtaining half-tone than by the reverse method before adopted.

In photo-engraving the process of Mr. Dallas is the great fact of the year. The present number contains a specimen of the process and some remarks thereon. Photo-lithography has progressed rather in the extent of its application than in any special point of practice. Mr. Lewis has contributed some valuable hints on the subject to our pages. In France, two or three processes have been invented and patented. Two of these, one by M. Morvan, and the other by M. Marquier, are nearly identical in principle, and so far as we understand them, in no essential point different to the method of Messrs. Cutting and Bradford, patented in this country several years ago. Mr. Osborne is in Berlin experimenting for the improvement of his own process, and some of the specimens we have received from him are as delicate and perfect as subjects in line well can be.

In the wet collodion process there has been very little change; bromo-iodized collodion and iron development are almost universally used. Iodized collodion with pyrogallol acid and formic acid developer, as used by Mr. Claudet, has attracted some attention, as yielding very rapid results, but the process does not seem to have superseded that in common use to any extent. The double sulphate of iron and ammonia, originally proposed as a developer in our columns, has come into considerable and satisfactory use. The method published by Mr. Blanchard, of using a weak solution of iron with an equal part of citric acid, for intensifying, has been largely adopted.

Enlarging processes have been steadily improving. Mr. Stuart has, by his improvement in the solar camera, materially reduced the time of exposure for direct sun printing. Mr. Sydney Smyth has by the use of a tinted paper, and by the occasional use of a modified plan of development, been enabled to get very artistic and fine results by development printing. And Mr. Aldis has succeeded in applying the oxyhydrogen light in solar camera printing with great success.

An important question in the economy of the art

has received considerable attention during the year, we mean the recovery of silver from waste solutions and residues. It would form a very startling calculation, if it could be made with approximate correctness, to estimate the thousands of ounces of precious metal which have been thrown into the sewers, there to form an argentiferous lining, where it is gradually thrown down as sulphides, carbonates, chlorides, and other insoluble salts, or to be swept away into the rivers, and finally to the ocean, and form an immense bath of iodide, bromide and chloride of silver dissolved in sea water. Attention has at length been called to the importance and economy of recovering the silver from this waste. As only two per cent of the silver used in its preparation is found in the finished print, it is but reasonable to suppose that a very large proportion of the original expenditure in silver may, by judicious care in collecting residues and recovering the metal therefrom, be saved from waste.

The applications of photography have been extending, in its use for ornamental purposes of various kinds, for book illustration, &c. In some instances the illustrations given are worthy of the art, but in too many instances we have to regret the use of poor, coarse, hard reproductions, in the place of good photographs.

The discovery of certain pictures, alleged to be photographs, produced during the last century, has excited much attention and much discussion, the details of which have been recorded in our columns. The subject is still open, and will shortly be further debated, when we hope evidence sufficiently definite to warrant a satisfactory decision will be forthcoming. The matter will be duly reported to our readers.

The Copyright Act, intended for the protection of the property of photographers in their own productions, has repeatedly been enforced during the year; and although the decisions in some instances have been far from satisfactory, there can be no doubt that the Act has put a serious check upon piracy.

The rage for card-portraiture appears undiminished, and the quality of the pictures of this class has on the whole become decidedly better. The production of landscapes in large sizes has not been so extensive, the cabinet size of about 7 inches by 4½ inches, introduced by Mr. Wilson, having become a very favorite size.

Abroad photography appears to be progressing, several new societies have been established and journals published, in countries which had been hitherto almost destitute of photographic literature. In this country, societies in the provinces appear to be somewhat on the decline in numbers and activity, but prosperous in London. The literature of photography has received various additions, and the appliances of the art various minor improvements, but not such as require comment here. The exhibitions of the year have been more excellent in contributions than remunerative in result.

The present year opens with every prospect of activity and prosperity in photography, and we wish each of our readers their full share of all the prosperity which is, we hope, awaiting the future of the art.

The Value of Dead Horses.

Some people will no doubt be astonished to learn that large fortunes have been made every year since the commencement of the war, out of the dead horses of the Army of the Potomac. The popular idea is that when Rosinante yields up the ghost, she is buried in some field, or left to molder into mother earth in the woods somewhere. Not so. She has made her last charge and gnawed her last fence rail, but there is from \$20 to \$40 in the old animal yet. A contract for the purchase of the dead horses in the Army of the Potomac for the ensuing year, was let a few days ago, to the highest bidder, at \$1 76 per head, delivered at the factory of the contractor. Last year \$60,000 were cleared on the contract, and this year it is thought \$100,000 can be made on it. The animals die at the rate of about fifty per day, at the lowest calculation.

At the contractor's establishment they are thoroughly dissected. First, the shoes are pulled off; they are usually worth fifty cents a set. Then the hoofs are cut off; they bring about two dollars a set. Then comes the caudal appendage, worth half a dollar. Then the hide—I don't know what that sells for. Then the tallow, if it be possible to extract tallow

from the army horses, which I think extremely doubtful, unless they die immediately after entering the service. And last, but not least, the shin-bones are valuable, being convertible into a variety of articles that many believe to be composed of pure ivory, such as cane heads, knife-handles, &c.

The Silk Manufacture in Paterson.

The Paterson *Daily Press* has an interesting article presenting the statistics of the silk manufacture in that city. The silk consumed is chiefly from China or Japan, and the fabrics produced are coat and other linings, flags, plain goods, braids, a combination of silk and mohair, ribbons, neck-ties, sewing twist and floss silks, fringes, embroidery, silks, &c. The *Press* claims that Paterson is the head-quarters of the silk manufacture in America, and has the prospect of two new first-class establishments, which will make the silk industry of Paterson equal that of all the rest of the United States. The total number of operatives employed is 1,025, exclusive of officers in charge. Three-fourths of the operatives are females, and children of very tender years are also employed. The lowest rate of wages is one dollar a week to learners, and from this point rises to \$4 for females, and \$5 and \$5 50 a week to males—the average wages being \$3 a week. The total amount paid out to operatives per annum is about \$150,000.

Versatility of American Soldiers.

There are two mills which supply our troops at Pulas, Penn., both steam flouring and saw mills. They are under the superintendence of Captain W. H. Hill, 81st Ohio, a practical miller and driving business man. In less than a month, during half of which time only one mill was running, he has furnished to Captain Carpenter, Commissary of Subsistence, over 100,000 pounds of flour. This has been done, too, by grinding usually only at night, the saw being run during the day. It is a novel sight to go through these mills. How perfectly at home are our sturdy sergeants, corporals and privates, all covered with dust and flour, as they walk about the mill on their various duties. The ease with which our troops adapt themselves to anything is a matter of surprise to the natives of Tennessee. Yankee labor is so manifestly superior to that which has been employed heretofore, that they actually want the troops to continue to run the mills. The thrift and enterprise displayed by our men make decided impressions on the people in favor of free labor.

MISCELLANEOUS SUMMARY.

THE SCREW VS. PADDLES.—The R. M. S. *Asia* and the screw steamship *City of Edinburg* recently left the Mersey in company, went into Queenstown together, left again within a few minutes of each other, and continued in company on the western passage for a period of five days, when the wind drawing ahead, the paddle ship shook off the screw steamer, and went on her way rejoicing. It will be seen that the screw ship was a match for her side-wheel consort so long as the wind was favorable, the great spread of canvas of the former in comparison to what the latter could show enabling her to keep way with and even to go ahead of the *Asia* during the day, while the breeze was strong; but as the wind almost invariably lulls after the sun goes down, the screw would always be several miles astern when daylight made its appearance.

THE HOME JOURNAL.—One of the most popular family journals published in this country is the *Home Journal*, edited by George P. Morris and N. P. Willis, Esqs. The wide celebrity which this paper has attained is a sufficient proof of its popularity, and we are happy to know that its circulation is increasing most rapidly. Not the least attraction in a mechanical point of view is the elegant new dress with which it challenges public admiration for the coming year. Mr. N. P. Willis devotes his exclusive industry to the *Journal*, and is aided by numerous accomplished contributors.

THE New York *Tribune's* Morris Island correspondent says the rebels have in Charleston harbor two iron-clad steamers, of close imitation to the *New Ironsides* and *Dunderberg*.

THERE were surveyed at Bangor this year 188,122,047 feet of lumber, which was thirty millions over last year, and fifty millions over the year before.

OIL CAKE.—This cake, on which cattle are fed, is nothing more than vegetable oil seeds, which have been crushed for manufacturing purposes. The spurious nuts, which grow on the top of the palm-tree, are crushed at Harburgh, on the Elbe, and the oil extracted from them is converted into a toilet soap, which is largely consumed in Germany. The crushed nuts are exported to England as oil cake for cattle. The crushed seeds of the poppy form a valuable oil cake, as it causes that tranquility and sleepiness which conduces to the rapid growth of young cattle. Walnuts are crushed extensively in France to extract a juice for culinary purposes, and the crushed nuts form a useful oil cake, but it gets rancid too rapidly to be of use when exported. Oil cake is also formed from crushed doddor, sesame and cotton seed.

THE best English railway engineers mention that a coal line, to be successful, must be capable of being worked at moderate speed, and without interference with other traffic. This is indispensable. If coal trains of forty or fifty trucks, each containing four or five tons of coals, are to be drawn at high speed, or are to be shunted at every other station to make way for fast trains, the result must be such additions to the cost of working as must preclude the possibility of railway coal traffic being worked in successful competition with the sea coal trade.

SUGAR CONSUMPTION.—The total quantity of raw sugar, foreign and domestic, consumed in the United States during 1863, was 284,308 tons, against 432,411 tons in 1862—showing a decrease of 148,103 tons. Cuba supplied the greatest quantity of any other foreign country, the amount being 137,232 tons, received at New York. The quantity of maple sugar raised last year was about 25,000 tons.

A nice sofa is thus described by an exchange:—"It is formed of solid clear blue ice, and is embellished with numerous fine pictures frozen in upon the back, the seat and the arms of the sofa, appearing as if they had grown beneath the surface of the transparent material."

THE metal called Vanadium, discovered in English pig iron, is used in the preparation of writing ink. To a solution of nutgalls is added a minute portion of vanadic acid, and the ink thus obtained is intensely black and indelible by the ordinary agents which destroy the color of the ink in common use.

CHEAP COAL GAS.—In the city of Liverpool, Eng., the price of gas has been reduced to about 86 cents per 1,000 cubic feet. It is also stated that this price pays a fair profit to the stockholders.

[It is much cheaper in the "Confederacy," for although it costs \$25 for the same amount, the money is paid in paper which is worth nothing at all.—Eds.]

A Frenchman has patented an invention for pulverizing the refuse of slate and mixing it with some substance, which produces a most durable material and which answers the same purpose as some kinds of our most valuable stone.

Most of the Continental postage stamps which were formerly illustrated with the likenesses of the rulers, have now the arms of the countries substituted instead of the heads, which are no longer of any value.

At 25 minutes to 3 o'clock, Dec. 19, one of the heaviest earthquakes was felt that San Francisco has shivered under for many years. The earthquake was felt with violence at Santa Clara and San J. se.

THE Boston *Traveler* says the Androscoggin mill is the finest cotton mill in the world. It is not the largest, but among the very largest, its capacity being 45,000 spindles, and it gives employment to 1,200 operatives.

CALICOES.—The Providence (R. I.) *Journal* states that the transactions in that city during the past year in print cloths were 3,922,800 pieces against 3,616,400 in the previous year, being an increase of 306,400 pieces.

THE daily product of coal at Cannelton, Ky., is 10,200 bushels, which, at fifteen cents per bushel, the price paid, makes \$1,520 per day, or \$474,800 per annum.

AMERICAN oysters have been planted at Havre, France, they being considered superior to the native bivalve.

PROFESSOR AGASSIZ has begun a course of lectures on the Glacial Period, at the Smithsonian Institution.