PHOTOGRAPHIC NOTES.

A New Method of Mounting Prints.—The *British Journal of Photography* explains the following method of mounting prints on thick paper:

Part of the process consists in thoroughly damping the mount as well as the print, which in the case of a solid paper does not present the same difficulties as in the case of a built-up cardboard; while the mount is undergoing the damping process it is an easy matter to submit it to a little extra washing, or, if necessary, chemical treatment, in order to remove the impurities if such be suspected. Or the danger to the print may be at least lessened by applying a more or less impervious varnish to the mount, which, while not preventing the absorption of water, forms a protective coating when dry. Such a varnish is found in bleached lac dissolved in aqueous solution of borax. If this be applied to the paper mount before damping, it will dry without leaving any gloss, and when the mount is subsequently soaked any excess of borax will be removed, and when dry the impurities will be isolated from the print.

The method of mounting consists in immersing the mounting paper previously cut roughly to size in clean water, assuming that any necessary preparation has been already effected. When perfectly limp, the sheets are taken out of the water and, as required, blotted off between blotting paper. The wet prints are similarly treated, and then both print and mount—the latter over such part only as the print is to occupy—well impregnated with the mountant. If the print only be treated, it will in all probability peel off at the edges on drying. Nothing answers so well for mounting as arrowroot paste made pretty thick and allowed to cool, then squeezed through fine cambric to remove lumps. It should be used fresh, as it soon becomes watery, in which condition it loses its adhesive power.

A convenient plan for applying the mountant to the center of the mount consists in making a mask from stout, smooth paper, or perhaps, better still, from thin sheet zinc of the outside dimensions of the mount with a central aperture a little larger—say an eighth of an inch each way—than the print. If this be laid on the damp mount, the arrowroot is easily applied to the proper portions with a sponge, and the print can be laid down in its position before removing the mask. The narrow strip of arrowroot extending beyond the edges of the print may be removed by means of a damp sponge after the print is rubbed down, but this is scarcely needful, as it dries perfectly matt, and is only likely to show on a colored mount.

With regard to the rubbing down, this is not so simple a matter with gelatine-surfaced papers as with albumen or platinotype, but all difficulty is surmounted by interposing a sheet of the thin paraffine-wax-saturated tissue paper sold for wrapping or waterproof purposes. This, while it adheres closely to the gelatine surface during the rubbing, comes easily away from it when it has served its purpose.

We next come to the drying, which is the most important part of the process if perfection of result is desired. It will be noticed that in order to avoid "cockling" of the dried print the mount as well as the print has been moistened so that each may swell and shrink equally; but this is not alone effective. If left to dry alone, the edges of the mount will dry first, the extra thickness of the print-covered portion remaining damp for a considerably longer period, and taking a saucer shape from the contraction of the surrounding portions. To obviate this, the print as soon as mounted may be pinned to a flat board, or laid on a sheet of glass and the edges of the mount turned over and stuck at the back. But by far the better plan is to have a quantity of sheets of clean blotting paper slightly larger than the mounted prints. Let these be thoroughly dried by exposing them for some time in a hot oven, then packing in a mass, and wrapping in tinfoil until required.

The prints are allowed to become partially dry, but before they lose their limpness, or show any tendency to curl, they are taken singly and placed between the blotting pads, at least two sheets of drying paper intervening between each pair of prints. In the case of gelatine-surfaced prints a sheet of waxed tissue paper is also necessary. If the pile of interleaved prints be now placed under gentle pressure for a few hours, they will be found perfectly dry, and as flat as if they had been rolled. It only now remains to trim the mounts to size, and if desired, to apply a "plate mark" by giving the print a "squeeze" in a copying press between folds of paper or in the copying book, a plate of zinc of the proper size, and with its edges slightly beveled, being laid over the face of the print.

Such prints are equally suitable for framing, for binding, or for keeping loose in a portfolio. For the last two purposes, indeed, this method of mounting is more convenient than any others we have tried.

THE wire rope made by the Washburn Iron Manufacturing Company, Worcester, Mass., in 1890, for the Denver Tramway Company, Denver, Col., discounts the Glasgow cable. It is six miles long, and is made of crucible steel wire.

Correspondence.

"Was It a Telephone?"

To the Editor of the Scientific American:

I remember reading when a boy of the discovery of mining operations under the walls of a besieged town by the commander placing a cup of water on a drum head, and noticing the effect produced on the water by the vibrations of the earth beneath the drum and thus locating the exact position of the mine. May not this be the plan referred to in your article with the above caption in No. 4 of your paper?

T. J. W. R.

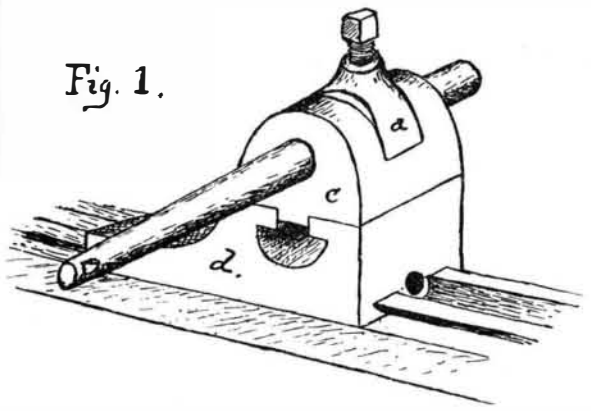
Washington, D. C., January 22, 1891.

A TOOL HOLDER THAT HOLDS.

To the Editor of the Scientific American:

Every lathe hand knows how exasperating it is to have a turning or boring tool slip while trying to fasten it, or, worse yet, after it has been set to work. It is a common thing to find a great many tool supports in the condition shown in sketch, Fig. 2. This is evidently one of the weak points of a lathe; no blame, however, should attach to the tool builders. The usual appliance is sufficiently strong for all ordinary purposes. It is when long tools are used, such as those for boring articles in a chuck, that difficulty arises in holding the tools securely. Not unfrequently ungainly braces or wedges are employed to prevent the tool from slipping. We remedied this defect on a lathe we were running a number of years ago. The sketch, Fig. 1,

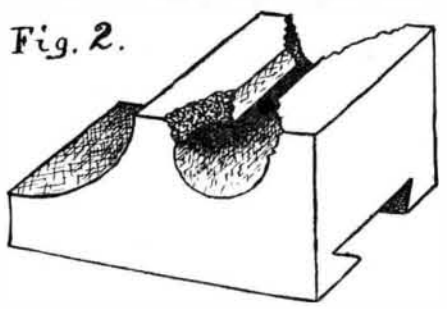
Fig. 1.



shows the contrivance employed. The block, *c*, was of cast iron, and the holder, *a*, of best refined iron, the lower end being gibbed into the rest, *d*, and a hole through the center sufficiently large to allow the boring bar to pass without touching, so that when the set screw was tightened, the whole was made fast to the lathe rest, *d*.

It was a source of satisfaction to know the boring bar could not swivel around and make a tapering hole.

Fig. 2.



The adoption of this device or something similar would save much trouble. It is difficult to duplicate a lathe rest, and almost impossible to repair one satisfactorily.

Chattanooga, Tenn., January 1, 1891. QUIRK.

An Ascent of Pike's Peak by Railway.

The autumn has been partially spent by your correspondent in the Rocky Mountains, crossing the "Great Divide," penetrating canons, climbing passes, prospecting gorges where walls soared thousands of feet above the beaten trail, traversing picturesque valleys, pausing at rich mining camps of gold and silver, visiting Indian reservations, in short, familiarizing myself with peaks, plains, lakes, rivers, canons, and mesas, the difficulty being, not where to go, but what to omit.

This mid-continent region, as is well known, possesses the finest scenery in the world.

But, after all, the most enjoyable experience was my ride to the top of Pike's Peak over the new so-called "cog wheel railroad," recently opened to tourists. It is the most novel railroad in existence. Compared with it, those of Mt. Washington, N. H., and of the Rhigi, Switzerland, are insignificant. The winding and curving necessary to attain three miles of altitude make the road ten miles in length. Its cost was a half million of dollars. The road bed is twenty feet wide, the culverts are of solid masonry, and the bridges and rails are of the heaviest steel, with a double cog rail in the center. The track is substantially anchored at short intervals into the solid rock.

The cars, without being tilted are hung within fifteen inches of the rails, and tire pinion brakes are so arranged that, when necessary, the train can be brought to a full stop in a space of ten inches, either ascending or descending. Each passenger seat is level.

The engine was coupled at the rear and pushed the train, a desirable innovation, relieving one's eyes from the constant annoyance of cinders. Stops were frequent at all sightly points. The round trip, costing five dollars, occupied three hours, and I considered it the best investment of time and money made during years of travel.

A brief chat with Sergeant O'Keeffe, in charge of the government signal station on the summit of Pike's Peak, elicited the following facts.

The gentleman having made the rude cabin on the peak his home for five years, and being the only person ever detailed twice to that station, his information may be considered reliable.

The lowest temperature he ever experienced was 57 below zero, the highest 62 above zero. The mean highest winter temperature was 14 below zero (all Fahrenheit).

The winter zephyrs were frequently of sufficient strength to cope with and blow through the whiskers of the most able-bodied man.

In one instance a speed of one hundred and thirty-five miles per hour was indicated, at which point the wind blew the balls out of the socket and the roof from the cabin, followed by a rapid increase in velocity, continuing several hours, during which he estimated that a speed of one hundred and fifty miles per hour was attained.

Bowlders weighing tons are not uncommon near the summit, and are frequently utilized for holding the cabin roof in position, for which purpose they are more effective than chains.

Sergeant O'Keeffe pronounces the thrilling narrative of the death of his associate while on duty at the station as pure fiction, no person of the name given having ever been employed there, and no death having ever occurred. He attributes the story to the effervescing but fertile brain of some Eastern scribbler, too far removed from the "seat of war" to invent a reasonable yarn.

W. Y. B.

The Anthracite Coal Fields of Pennsylvania.

BY JOHN H. JONES.

The anthracite coal fields of Pennsylvania are situated in the eastern part of the State, and extend about equal distances north and south of a line drawn through the middle of the State from east to west, in the counties of Carbon, Columbia, Dauphin, Lackawanna, Luzerne, Northumberland, Schuylkill, Sullivan, and Susquehanna, and known under three general divisions, viz., Wyoming, Lehigh, and Schuylkill regions. Geologically they are divided into five well defined fields or basins, which are again subdivided, for convenience of identification, into districts, as follows:

Geological Fields or Basins.	Local Districts.	Trade Regions.
Northern	Carbondale, Scranton, Pittston, Wilkesbarre, Plymouth, Kingston	Wyoming.
Western Northern	Bernice	Wyoming.
Eastern Middle	Green Mountain, Black Creek, Hazleton, Beaver Meadow	Lehigh.
Southern	Panther Creek, East Schuylkill, West Schuylkill, Lorberry, Lykens Valley	Schuylkill.
Western Middle	East Mahanoy, West Mahanoy, Shamokin	Schuylkill.

The total production of anthracite coal in Pennsylvania during the calendar year 1889 was 40,665,152 tons of 2,240 pounds (equal to 45,544,970 tons of 2,000 pounds), valued at the mines at $65,718,165, or an average of 1.61\frac{6}{10}$ per long ton, including all sizes sent to market. In the above 35,816,876 tons is included unsalable sizes temporarily stocked at convenient points near the mines and tonnage loaded into cars but not passed over railroad scales, as well as waste in rehandling in the various processes of cleaning the smaller sizes. The quantity reported by the transportation companies as actually carried to market, which is the usual basis for statistics of shipments, was 35,407,710 tons during the year 1889; 1,329,580 tons were used by employes and sold to local trade in the vicinity of the mines, and 3,518,696 tons were reported as consumed for steam and heating purposes in and about the mines.

The number of persons employed during the year, including superintendents, engineers, and clerical force, was 125,229. The total amount paid in wages to all classes during the year was $39,152,124. The total number of regular establishments or breakers equipped for the preparation and shipment of coal was 342, 19 of which were idle during the year. Besides these, there were 49 small diggings and washeries, supplying local trade. There were also 18 new establishments in course of construction.—*Census Bulletin, No.* 20.

THE POPULATION OF JAPAN.—Official returns show that the population of Japan on December 31, 1889, was 40,072,020—20,246,336 males and 19,825,684 females—who occupied 7,840,872 houses.