Correspondence.

Forest Preservation—Water Flow of the Mohawk.

To the Editor of the Scientific American:

As touching the practical side of the question of the necessity for preserving our Adirondack forests, my recollection of the Mohawk at Cohoes goes back to 1844. Any comparison of the average flow of water now and then in the river bed opposite the great Harmony cotton mills, just below the falls, would be obviously misleading, except it were made for like periods, when the factories were stopped and not drawing water from above the upper dam. It is rather by considering the flow below the lower or State dam, after it has reached its final descent before entering the Hudson, that a good comparison can be made, and the matter is one not only of correct judgment, but calls for such association of facts as will give definite and positive aid to the recollection.

I know positively that during the summers from 1850 to 1853 the North Branch used to afford a pleasant swimming resort for boys of twelve to fifteen, through July and August, in places where now the bowlders are everywhere seen except in times of freshet. My recollection is more clear and positive from the fact that, at that time, though there was enough water to make a clear swim across, against a moderate current, it was by no means pleasant to try and rest a moment by "touching bottom" on the rough bowlders.

The present stream, at the same place, and at a corresponding time of year, would not afford a respectable wading place. I would make a somewhat similar estimate as to the lessened discharge through the South Branch, but have not so clear a fact in mind to aid my recollection.

Very respectfully,

OLD COHOESER.

New York, December 28, 1883.

Movement of the Magnetic Pole.

To the Editor of the Scientific American:

"A. W.," a correspondent in search of scientific truths, asks the following in your issue of November 10, page 298: "What time in years it takes the magnetic pole to make one revolution round its circle, and the radius or diameter of that circle as near as it has been discovered?" I would humbly vouchsafe the following information, trusting it will be received in the same kindly spirit in which it is given: In 1657 the magnetic pole was due north, moving westward until 1816, when its maximum was reached; it is now being steadily diminished, which condition will continue until 1976, when it will again point due north, after a space of 319 years, which is the time required for the magnetic pole to make one revolution round its circle.

J. W. VAN SICKLE, LL.D.

Springfield, Ohio, December 18, 1883.

Storing Wind Power.

To the Editor of the Scientific American:

I have read with interest the articles published in your valuable paper about storing wind power, but I have never heard of any one advancing the idea of applying it to vessels, where, it seems to me, it is most adapted to be used. It is my opinion that a great deal of wind power is lost on board of a ship that could be stored and used in time of a calm. Let *the sail* or *sheets* be *made fast* to a cleat, and have them also made fast to a lever, which lever serves to wind up a spring to be used for running machinery to propel the vessel. That could be done, perhaps, in this way: We all know that wind blows in gusts; connect a reverse spring with the lever, to throw it back when the sheet is slackened by a lull; *then* the lever is in place to wrench up the spring at each gust. Say a vessel should start from New York with a light breeze. The first day that breeze could be used to wind up the springs a little; the next day, say the wind increased, the spring is wound up a little more, and so on until the wind increased to a gale and the springs are wound up to their utmost power. After a gale comes a calm; then the spring would come in play to run an engine to propel the vessel into port. The power now lost on board of ships could certainly be made to wind up a spring, and in the case of a gale of wind a pretty strong one could be used.

Very respectfully,

N. V. TIBBETTS.

Stereoscopic Pictures with a Single Camera.

To the Editor of the Scientific American:

The recent interesting article, "Stereoscopic Portraits by a Single Camera," on page 262 of the SCIENTIFIC AMERICAN, leads me to describe my method for taking stereoscopic landscapes by a single camera, which gives me excellent results. My camera is one of the smallest, just big enough for stereoscopic views; and wishing to use it for that purpose I inserted a slide between the tripod head and the bottom of the camera, upon which the camera can be moved three inches or more in a horizontal line at right angles with the line of sight, while the tripod remains stationary. The slide is a strip of black walnut about three inches longer than the width of the camera, fastened to the top of the tripod head, and grooved at the edges to receive guides of the same material, which are screwed to the bottom of the camera. I expose one plate while the camera is at the left end of the slide, and then press the camera a proper distance to the right and expose the other.

I have never tried this plan for portraits, but I think the only modification required would be, that, in using a lens of short focus, the sitter being so near the instrument, it would be necessary to rotate the camera a little before taking the second picture, in order not to throw the image off the plate by the movement to the right. In field work the greater distance of the object renders this unnecessary.

The advantages of this method over that with double camera are:

1. Two pictures of same size and focus.
2. Field equipment much lighter.
3. Camera and plates less expensive.
4. Horizontal displacement can be varied to give best results according to character of view, distance of object, and power of lens.

The only disadvantage is the liability of animate objects to change position in the interval required to move the camera and reverse the plate holder.

S. F. PHILLIPS.

East Chatham, N. Y., October 31, 1883.

Fast Trains of the Canada Atlantic Railway.

To the Editor of the Scientific American:

Attention has been directed by a friend to an article in your issue of November 10, signed S. Castner, challenging certain statements which have gone the round of the press anent the Canada Atlantic Railway fast trains, and giving a time table on the Pennsylvania Railroad for train leaving Jersey City at 4:08 P.M., reaching Trenton 5:10, making 56 miles in 62 minutes, or 54 miles per hour. If the uncontradicted table of the railway guides be correct, this train arrives at Trenton at 5:12 instead of 5:10, making the run in 1:04, equal to 52·05 miles per hour. A more ingenuous comparison would have given the entire run to Philadelphia, as follows: Leave Jersey City 4:08, arrive Philadelphia 6:00; distance 90 miles, time 1:52, equal to 48·03 miles per hour, with two stops, and would have debited a proportion of the "stop time" to first part of the run.

On the same unfair comparison a better showing is made for the Canada Atlantic than has even been claimed for that road, as follows (see the inclosed time table):

Maxville to Ottawa 43·09 miles, time 50 minutes, equal to 53 miles per hour.

Alexandria to Eastmans 44·04 miles, time 50 minutes, equal to 53·02 miles per hour.

South Indian to Eastmans 11 miles, time 11 minutes, or 60 miles per hour.

The entire run from Coteau to Ottawa, 78·04 miles, with three stops, one of which is for taking water, gives a record of 54½ miles per hour, allowing 6 minutes for the stops.

Perhaps it may interest your correspondent to learn that the official report of this train, for a full calendar month, gives 27 trips in consecutive order, 1:34$\frac{5}{27}$ minutes average time on a schedule of 1:34.

When it is borne in mind that railway superintendents do not permit of running ahead of time, the regularity of this train's arrival is worthy of note.

MECHANIC.

Ottawa, December 9, 1883.

Effect of Furnace Gases on Iron.

There are exhibited in a museum in Darmstadt, Germany, some samples of round bar iron which have suffered a very peculiar change. These bars of iron were formerly placed within a large chimney at the Frankfort gas works to serve as footholds in case it became necessary to ascend the chimney. For several years they were exposed to various gases at a high temperature, and probably there was among them plenty of carbonic oxide. At last the chimney began to bend and twist, rendering an investigation necessary, when it was found to be due to the increase in size of these bars.

They consisted originally of bars 2·3 centimeters (about 1 inch) in diameter, but have grown to be 3·3 or 3·5 centimeters (1⅜ inch) in diameter. One was examined and found to have within a core 2·1 centimeters thick, surrounded by this external envelope that had been changed and enlarged. The *Gewerbeblatte for the Grand Duchy of Hesse*, from which we gain this information, does not venture any theory as to the probable changes or their causes.

Cleaning Water Pipes.

As is well known, cast iron pipes used for conveying water under pressure generally become incrusted in a longer or shorter time, according to the quality of the water; the deposit consisting for the greater part of oxide of iron and carbonate of lime. A thorough cleansing is of great importance, and three methods, says the *Centralblatt der Bauverwaltung*, have been suggested: 1. Taking out the pipes from time to time, heating them, and scraping out the deposit that is loosened by the heat. 2. Cleaning them with brushes and scrapers before the deposit gets hard. 3. Dissolving the deposit with acid. The second method has been used with great success in Nuremberg and Carlsruhe. A brush that nearly fills the tube is run backward and forward in the pipe while in use, and the muddy slime is washed out immediately by the flow of water. In Carlsruhe the network of pipes is 14 miles long, having diameters of 4 to 13 inches, and they were all cleansed within seventy-eight days in this manner. The expense was £115, or about 1¼d. per yard. For the purpose of introducing the brushes, the pipes are provided with manholes suitable distances apart.

Progress in the Size of Telescopes.

At the end of the 12th century Herschell gave a very great impulse to physical astronomy. His amazing manual dexterity, his activity, his patience, led to the great works which made of him one of the greatest minds that England ever possessed.

Guinand and Fraunhofer led to the realization of large objectives by the progress they instituted in the manufacture of optical glass, while a mechanism of clockwork compelled the glasses and telescopes to follow the diurnal movement of the stars. All modern instruments are mounted in this manner. The tendency is toward enlargement, so that telescopes have reached such a size that some possess mirrors of 1·20 meters in diameter (Paris and Melbourne), with refractors 0·65 meter aperture (Washington), of 0·75 meter and even one meter in diameter.

Is this mania for enlargement justified? Arago, when he asked from the Chamber the credit necessary for the construction of an objective of 0·38 meter, believed that, by raising the enlargement of the glasses to 6,000 times, objects upon the moon 20 meters in length or 2 meters in width should be seen, the causeway of a railroad, fortifications, and monuments. The single difficulty in the way of realizing this hope lies in the deficient luminosity of the images. It is yet impossible to determine to what extent the increase of the optical power of a lens or of a telescope is more than compensated by the increase of special aberration, the difficulty of manipulation, the instability, and deficiency of light.

To give a more exact conception of the fineness of details that are attained in a good instrument, we may recall that Schiaparelli, in his observations upon Mars, made at Milan with a lens of Merz, of 0·218 meter aperture—Mars being distant 14 million leagues during the opposition of 1877—could distinguish a round spot 137 kilometers wide. From Mars an island such as Sicily, a lake of the size of Lake Ladoga or Tshad, could have been seen, a zone of 70 kilometers would have been visible, and Jutland, Cuba, or Panama would have been seen.

The lens of Washington, of 0·65 meter, would show details but one-third the size, that is 44 to 24 kilometers; upon the moon the lowest dimensions would be 315 meters in size, upon the sun 177 kilometers, upon Venus 36 kilometers, upon Jupiter 555 kilometers. Experience proves that the most useful aperture is from 0·38 meter to 0·40 meter.

The following is a table of instruments of which the greatest diameter is 0·92 meter. The number of lenses whose diameter is greater than 0·245 meter does not exceed 62.

Observatory.	Aperture in centimeters.	Builder.
Lick, in Cal	91·5	A. Clark & Son.
Pulkowa	76·0	A. Clark & Son.
Nice	76·0	Henry Bros., of Paris.
Paris	73·5	Martin, of Paris.
Vienna	68·5	Grubb, Dublin, 1881.
Washington	66·0	Clark, 1873.
McCormick, Chicago	66 0	Clark, 1879.
Newall, Gateshead	63·5	F. Cook & Son, York, 1868.
Princeton, New Jersey	58 5	Clark, 1881.
Strassburg	48·5	Merz, 1879.
Milan	48·5	Merz, 1881.
Dearborn, Chicago	47·0	Clark, 1863.
Van der Zee, Buffalo, N. Y.	46·0	Fitz.
Rochester	40 5	Clark, 1880.
Madison	39·5	Clark, 1879.
Lord Lindsay, Aberdeen	39·5	Grubb, 1875.

—*Revue Scientifique.*

A New Alkaline Developer for Gelatine Plates.

Joshua Smith, of the Chicago Photographic Association, recently explained before that body the advantages which he had discovered in the use of lime water over ammonia in the development of gelatine plates.

He first slakes 1½ ounces of lime by covering it with water over night, in a wide mouthed bottle. He then pours it into a mortar and grinds the lime to a paste, which is next diluted with water and the whole decanted into a two gallon bottle. Any remaining sediment can be ground, diluted, and decanted in the same way. When the whole has been added, the two gallon bottle is filled to two gallons with water, the solution is shaken well and allowed to stand for an hour to settle. It is then filtered and is ready for immediate use. The strength of the solution should now be tested, which is done by first making a solution of water 3½ ounces and acetic acid one-half ounce.

Into 2 ounces of the lime water (in which is placed a piece of blue litmus paper) 1 drachm and 20 minims of the acid solution is poured.

This should just turn the litmus paper red, and will be a standard test. The strength of the lime solution will remain uniform, no matter what the temperature may be—a point of great importance.

The solution will keep any length of time. To prepare the developer, for one or two days' use, take 40 ounces of the filtered lime water and add 1 ounce of an 80 grain solution of bromide of ammonium. To develop, pour into a graduate 6 ounces of the bromo lime water, add a small mustardspoonful of dry pyrogallic acid, shake, and pour over the plate laid ready in the developing tray. The image will soon appear and gain strength. If the plate was overexposed, add a few drops of the bromide ammonium solution and a few grains of pyro.

Very clean, clear, chocolate colored negatives are produced with this developer. Any tendency to fog may be overcome by the addition of a little more bromide of ammonium.