likewise some reason to suppose that Foss's bed of hematite in Dover, N.Y., may once have constituted a bed in mica slate.

In all the Northern States, the beds of this ore occur along the western base of high mountains; and from the description of the gentleman above named I understand this to be the case in the middle and Southern States. Prof. Henry D. Rogers imputes this fact to the southern direction of the currents in the great ocean by whose waters the iron and the clay were deposited, and to the greater depression of the valley on its south-eastern side. Prof. Rogers is the only geologist I believe who speaks decidedly of the deposition of this ore from the ocean. By this supposition he comes so near representing this formation as tertiary, that it would have needed only a bed of carbonaceous matter, such as occurs at Brandon, to have brought him upon that ground. Not improbably, now that the Brandon bed is known, similar ones may be found associated with the ore of other localities: for how long has it remained unnoticed at Brandon!

Thus does the discovery of the Brandon brown coal deposit enable us to add to American geology a tertiary formation nearly 1200 miles long, which may appropriately be placed upon our maps.

V. *This deposit probably belongs to the Pliocene, or Newer Tertiary.*

1. So far as we know, it lies immediately beneath the drift.

2. It is destitute of any consolidated beds, save the nodules of hematite, which is not true of any of our miocene or eocene deposits.

3. The brown coal of continental Europe, to which ours corresponds closely in appearance, belongs to the newer tertiary.

I confess that these arguments are not sufficient to remove all doubts from my mind as to the part of the tertiary group to which this formation should be referred. All geologists, however, I think, will say that it has marked peculiarities, which distinguish it from all the tertiary deposits of our country hitherto described; and we may at least say, that the presumption is strongly in favour of its being pliocene. It is rather remarkable, if it was an oceanic deposit, that no marine remains have been found in it. I believe, however, that this is very much the case in Germany; though, unfortunately, the papers of Horner, Von Dechan, and others, on the brown coal are not within my reach.

Photographic Landscapes on Paper.

32, Harley Street, Dec. 7.

Allow me to request your insertion in the *Athenæum* of the annexed communication, on the subject of Photography, in the form of a letter to myself from my brother-in-law, Mr. John Stewart, resident at Pau; who has been singularly successful in his application of that art to the depiction of natural scenery,—and whose representations of the superb combinations of rock, mountain, forest and water which abound in the picturesque region of the Pyrenees, are among the most exquisite in their finish, and artistic in their general effect, of any specimens of that art which I have yet seen. The extreme simplicity of the process employed by him for the preparation of the paper, its uniformity, and the certainty attained in the production of its results, seem to render it well worthy of being generally known to travellers. It need hardly be mentioned that the "air-pump" employed may be one of so simple a construction as to add very little to either the weight, bulk, or expense of the apparatus required for the practice of this art. The obtaining of a *very perfect* vacuum, for the imbibition of the paper, being a matter of little moment,—a single barrel (worked by a cross-handle by direct pull and push,) furnished with a flexible connecting pipe, and constructed so as to be capable of being clamped on the edge of a table, would satisfy every condition.

I remain, &c., J. F. W. HERSCHEL.

Pau, Pyrenees.

My Dear Herschel,—Thanks to the valuable indications of Prof. Regnault, of the *Institut*, I have been enabled to produce, what appear to me, most satisfactory results in *Photographic Landscapes on Paper*. In this remote corner (so deficient also in resources for experiment) I feel that I am but very partially acquainted with the results obtained and the progress making in the great centres, Paris and London; but I think that, in detailing the simple process and manipulation I now adopt, indications of some value, and suggestive of further improvement to fellow-labourers in the art may be found; and if you are of the same opinion, you will perhaps facilitate the communication of these details to our photographers at home.

The following observations are confined to negative paper processes, divisible into two—the *wet* and the *dry*. The solutions I employ for both these processes are identical, and are as follows:—

Solution of Iodide of Potassium, of the strength of 5 parts of iodide to 100 of pure water.

Solution of Aceto-Nitrate of Silver, in the following proportions: 15 parts of nitrate of silver; 2 glacial acetic acid; 150 of distilled water.

Solution of Gallic Acid, for developing, a saturated solution.

Solution of Hyposulphate of Soda: of the strength of 1 part hypo. of soda, to from 6 to 8 parts water.

The solutions employed are thus reduced to their simplest possible expression, for it will be observed that in iodizing I employ neither rice-water, sugar of milk, diastase, cyanogen, nor free iodine, &c., &c.; but a simple solution of iodide of potassium (the *strength* of this solution is a question of considerable importance, not yet, I think, sufficiently investigated.)

For both the wet and the dry processes I iodize my paper as follows:—In a tray containing the above solution I plunge, one by one, as many sheets of paper (twenty, thirty, fifty, &c.,) as are likely to be required for some time. This is done in two or three minutes. I then roll up loosely the whole bundle of sheets, while in the bath; and picking up the roll by the ends, drop it into a cylindrical glass vessel with a foot to it, and pour the solution therein, enough to cover the roll completely (in case it should float up above the surface of the solution, a little piece of glass may be pushed down to rest across the roll of paper and prevent its rising.) The vessel with the roll of paper is placed under the receiver of an air pump and the air exhausted; this is accomplished in a very few minutes, and the paper may then be left five or six minutes in the vacuum. Should the glass be too high (the paper being in large sheets) to be inserted under a pneumatic pump receiver, a stiff lid lined with India rubber, with a valve in the centre communicating by a tube with a common direct-action air-pump may be employed with equal success. After the paper is thus soaked *in vacuo* it is removed, and the roll dropped back into the tray with the solution, and then sheet by sheet picked off and hung up to dry, when, as with all other iodized paper, it will keep for an indefinite time.

I cannot say that I fully understand the rationale of the action of the air-pump, but several valuable advantages are obtained by its use:—1st. The paper is thoroughly iodized, and with an *equality* throughout that no amount of soaking procures, for no two sheets of paper are alike, or even one, perfect throughout in texture; and air bulbs are impossible. 2nd. The operation is accomplished in a quarter of an hour, which generally employs one, two, or more hours. 3rd. To this do I chiefly attribute the fact that my paper is never solarized even in the brightest sun; and that it will bear whatever amount of exposure is necessary for the deepest and most impenetrable shadows in the view, without injury to the bright lights.

Wet Process.—To begin with the *wet* process. Having prepared the above solution of aceto-nitrate of silver, float a sheet of the iodized paper upon the surface of this sensitive bath, leaving it there for about ten minutes. During this interval, having placed the glass or slate of your slider quite level, dip a sheet of *thick* clean white printing (unsized) paper in water, and lay it on the glass or slate as a wet lining to receive the sensitive sheet. An expert manipulator may then, removing the sensitive sheet from the bath, extend it [sensitive side uppermost] on this wet paper lining, without allowing any air globules to intervene. But it is difficult, and a very simple and most effectual mode of avoiding air globules, particularly in handling very large sheets, is as follows:—Pour a thin layer of water [just sufficient not to flow over the sides] upon the lining paper, after you have extended it on your glass or slate, and then lay down your sensitive paper gently and by degrees, and floating as it were on this layer of water; and when extended, taking the glass and papers between the finger and thumb, by an upper corner, to prevent their slipping, tilt it gently to allow the interposed water to flow off by the bottom, which will leave the two sheets of paper adhering perfectly and closely, without the slightest chance of air-bubbles:—it may then be left for a minute or two, standing upright in the same position, to allow every drop of water to escape; so that when laid flat again or placed in the slider none may return back and stain the paper. Of course, the sensitive side of the sheet is thus left exposed to the uninterrupted action of the lens, no protecting plate of glass being interposed,—and even in this dry and warm climate I find the humidity and the attendant sensitiveness fully preserved for a couple of hours.

To develope views thus taken, the ordinary saturated solution of gallic acid is employed, never requiring the addition of nitrate of silver; thus preserving the perfect purity and varied modulation of the tints. The fixing is accomplished as usual with hyposulphite of soda, and the negative finally waxed.

Dry Process.—In preparing sheets for use when *dry* for travelling, &c., I have discarded the use of *previously waxed* paper,—thus getting rid of a troublesome operation,—and proceed as follows: Taking a sheet of my iodized paper, in place of floating it (as for the wet process) on