

Hence 1.072 grammes of peas gained 3.369 grammes of organic matter in ninety-nine days of growth during the warmest months of the year; and we find that the azote in the seeds sown was more than doubled in the produce.

2. From a field of clover sown in the preceding year, the author selected several plants of the same height. The adhering earth was removed from the roots by careful washing in a fine stream of water; the plants were then dried by pressing them with blotting paper and by exposure to the air during several days. Three of them were retained for analysis, and three others were immediately planted in sand recently calcined and moistened with distilled water, and placed so as to be sheltered from dust. They at first languished, but soon afterwards became remarkably vigorous. In the course of a month their height was doubled; the leaves had a good colour, and they appeared as well as those of the plants which grew in the open field. About the 8th of July the flower began to appear, and by the 15th had assumed a flesh colour. The watering was discontinued on the 1st of August that the plants might dry.

The roots were very little extended, their extremities were very hairy, but the knotty portion which constitutes the body of the root had made no progress. The plants were gathered, cleaned, dried, reduced to powder and analysed in the same manner as were the peas.

The author afterwards treated several plants of oats in the same cautious manner, and we thus sum up the results of his experiments.

1. Peas planted in a soil absolutely sterile and watered with pure water, acquire complete development, pass through all the phases of vegetation, and produce fruit perfectly mature. Azote constitutes one of the aliments derived either from the water or the air, and assimilated by the plant.

2. Clover taken from a fertile soil, and afterwards cultivated without the presence of dead organic matter, likewise gained an accession of azote.

3. Oats taken from a manured soil and placed in the same condition as the clover, acquired from the air, carbon, hydrogen, and oxygen without assimilating any azote; the analysis, on the contrary, indicating a slight loss of that principle.

The researches I have undertaken appear then to prove that under various conditions certain plants are disposed to derive azote from the atmosphere. But in what circumstances, and in what state azote becomes fixed in vegetables, is a question which we are yet unable to decide.

In fact, azote may enter directly into the organism of plants, if their green vessels are adapted to its combination; or it may become a constituent in them, through the water which always contains air and which is inspired through the roots. Finally it is possible, as many philosophers are of opinion, that there exists in the air an infinitely small quantity of ammoniacal vapour.

Annals de Chem., Dec., 1838.

Geology of the Moon.

Capt. Portlock, President of the Geological Society of Dublin, being of opinion that information as to the original condition of the surface of the earth might be obtained by an inquiry into the condition of some other planetary body, wrote to Dr. Robinson, of Armagh, on the subject; the following is the Doctor's interesting reply:—

Observatory, Armagh, Feb. 7, 1839.

MY DEAR SIR,—My general notion is, that you are quite right in refer-

ring to the moon as evidence of the absence of weathering. The sharpness of its rocks and peaks is quite surprising; for every angle and edge stick out with a ruggedness that is, perhaps, the thing which first strikes an observer with a sense of the wide difference between that globe and the earth. It alone would show that air and water are absent, had we no other evidence. But you are, I think, in error, when you infer from the great height of lunar mountains, the probable quantity of the wearing down which our earthly peaks have suffered. The moon has less attractive force than belongs to our planet, so that the same elevating force would do about twenty times as much work; and there is every reason to believe that the elevating forces were far more energetic. Indeed, I regard the appearance of the moon as strong presumption against Mr. Lyell's notion, that the energy of volcanic action is as powerful now as it was in the primeval epochs of our planet. No volcanic action is now at work in the moon; but we see that it was once raging with uncontrollable fury, and on the most prodigious scale. There it has actually worn itself out; here, I think, we may assume that it has merely expended most of its force. I may here tell you some of the matter which I see, or think I see, on the surface of our satellite. The mountains of earthy shape are some pretty high, the highest peak of the said Apennines being, according to the best authority, something under 17,000 feet above the plains from which it rises; but this is a rare instance, and very few reach 6000. They are of astonishing steepness. But the Ring mountains, or craters, are much stranger affairs. Take, for instance, Tycho, that bright spot in the south-east quarter, from which the rays seem to run. It is fifty miles in diameter, and 16,000 feet deep, surrounded by broad terraces within, and with a central mountain about 5000 feet high.



This is the type of the principal part of the lunar mountains; some are 200 miles diameter, and one nearly of this latter size, 22,000 feet deep. What a paroxysm it must have been that hollowed out this monstrous crater. Observe that all these craters are depressed below the lunar surface, the elevation of their walls above it being in general but half their depth below it; and the question is, what becomes of the immense quantity of materials that must have been blown out of them. Schroeter thought that the walls, if demolished, would fill the cavities; but this (in Tycho, for instance) is certainly not always the case, and we do not recognise heaps of debris in the vicinity. But we do find a curious appearance sometimes—those rays to which I have already alluded as diverging from particular craters. They are peculiarly bright, but not at all elevated above the lunar surface, and give the idea of a fluid which had run out in currents, and produced some chemical change in the soil over which it passed. As these rays are themselves bristled with craters, these latter must have been of subsequent formation. The long lines terminating in those dusky places, which we sometimes hear called seas, have perchance been rivers; but as they generally seem to originate in some crater they were more probably the track of volcanic fluids, which, however, must have been quite different from our lava, and, perhaps, have played some part in the absorption of the lunar at-

mosphere, and the removal of its seas. In general the large craters are far more brilliant than the other parts of the moon, and the comparative obscurity of the seas arises from the scarcity of volcanic action there. On earth, I believe, our present volcanic products are but little reflective; it is otherwise there; but it may be remarked, that the small craters, which subsequently broke out on the greater and older ones, are much less bright, as if the expiring action had been more analogous to that of our own planet. But this at least is clear, that since the invention of the telescope the moon has been undisturbed. But I must stop by assuring you that I am yours sincerely.

T. R. ROBINSON.
Mining Jour.

Mechanics' Register.

The Daguerreotype.

A curious application of the Daguerreotype, is to be made at the opening of the railroad to Courtrai, Belgium, if the weather be favourable. The camera obscura is to be placed on an eminence commanding the royal pavilion, the locomotive engine, the train of wagons, and the major part of the *cortège*, and is to be brought into action exactly at the time of the delivery of the inauguration speech. A discharge of cannon is to be the signal for a general immobility, which is to last the seven minutes necessary for obtaining a good representation of all the personages present. The plate is afterwards to be enclosed in lead and deposited under the first stone of the foundation of the station at Courtrai.

Mining Jour.

Elkington's Patent Mode of Gilding by Immersion.

The ordinary gilding process is well known. An amalgam is formed by rubbing together gold in a comminuted state, and quicksilver. With this amalgam the article to be gilt is covered, and being then exposed to heat, the mercury exhales, and the pellicle of gold remains. The mercurial vapour is condensed, and, thus recovered, is again and again applied to use. By the new process, the gold is dissolved in what the older chemists used to denominate *aqua regia*, with which is mixed one of the combinations of potash. The solution is heated, in order, we suppose, that it may suspend a greater quantity of metal than it would do if cold. At the model room a small spirit lamp was used for the purpose. The copper, or other article, is cleaned by successive washings in acids of diminishing strength, and, lastly, in pure water; it is then dipped in the saturated solution for a few seconds, again washed, as before, and in half a minute the entire process is over, and it is presented to the spectator, beautifully gilt. The gold is deposited on the same principle that crystals shoot upon a rod or string. For single gilding one dipping is required, when a thicker coat is necessary, the dipping and rinsing is repeated.

Lond. Mech. Mag.

The Italian Scientific Association: Meeting at Pisa, October 1st to 15th, 1839.

All the members of the Italian Scientific Association are admitted to the privileges of membership without any pecuniary payment. An open field is granted to them in the sectional meetings of the Association for the com-