

With these facts before us, we read without surprise the note by Professor O. Stone in our last issue, in which he says of a recently published "Record of the Progress of Astronomy during the year 1879," by Mr. Deyer, of Dublin, one-third of the memoir is devoted to the result of astronomical work done in the United States.

An article on this subject would be incomplete without a reference to the very perfect work of Messrs. Alvan Clark & Son, of Cambridge, Mass., who appear to have distanced both the English and the Continental opticians in the excellence of their objectives, and who have secured to the United States the honor of supplying the objective for the great equatorial about to be manufactured for the Russian Government, to be used in the Pulkowa Observatory by the distinguished astronomer, Otto Von Streuve. We also notice that of the forty observatories recognized by the Smithsonian Institute, seventeen have telescopes made by this firm. In regard to the work now in progress at the Messrs. Clark's establishment, it may be stated without exaggeration that the world awaits with eager expectancy the result of their labors.

We record with pleasure the very perfect harmony with which American astronomers co-operate and work, which has doubtless been a leading point in gaining the successes that have been attained. This is in strong contrast with the constant bickering among members of the Royal Astronomical Society and many English astronomers, some of whom have not thought it humiliating to charge the Astronomer Royal with ignorance, and a stubborn adhesion to error, and to allege that members of the council of the Royal Astronomical Society suppress the papers of their fellow members from personal and unworthy motives.

Of American astronomers, it might seem invidious to make a personal reference to particular men, but the names of Newcomb, Hall, Eastman, Holden, Stone, Burnham, Draper, Swift and Rutherford are familiar in all civilized countries, and respected wherever the science of astronomy is appreciated.

M. MASCART has been making some observations at the College of France, on atmospheric electricity, with a Thomson quadrant electrometer, the deflections of the needle being transmitted to a pencil. The two pairs of quadrants are kept at equal potentials of contrary sign by two poles of a battery which communicate with the ground; the needle is connected with a vessel letting flow a continuous stream of water into the outer air. Generally the potential of the air, always positive, is found much higher, and more uniform by night than by day. From 9 P. M. to 3 A. M., it varies little, falls at daybreak, reaches a minimum about 3 P. M., and rises rapidly to a maximum about 9 P. M. It is commonly thought that there are two maxima, viz. morning and evening, and two minima, one in the daytime, the other at night. M. Mascart believes that insulation has been too much neglected.

A NEW ELECTRIC PILE DEvised BY M. REYNIER.

Translated for "SCIENCE."

M. Emile Reynier, the electrician, and inventor of an electric lamp, which we have more than once had occasion to present to our readers, and which its author has never ceased to improve and perfect, with the view of making its use more satisfactory, more convenient, and more economical, has now arranged a pile, which is at the same time powerful and economical. This apparatus is composed of a glass vessel in the form of an oblong square, in which is immersed a sheet of copper bent upon itself, as shown in Fig. 1. Upon the bottom of this copper hook rests a cup of parchment, into which the zinc plate is placed, as shown in Fig. 2.

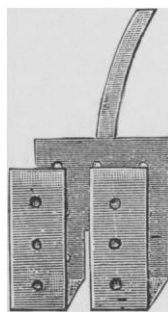


FIG. 1.

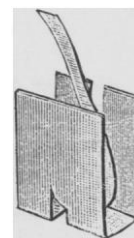


FIG. 2.

FIG. 1.—THE COPPER PLATE OF THE PILE OF REYNIER.

FIG. 2.—THE ZINC PLATE OF THE PILE OF REYNIER.

This vessel or porous diaphragm has this peculiarity, that it is made up of a conical sheet of parchment, and that corresponding with the rectangular or octagonal form, just as may be chosen, it is folded upon itself (Figs. 3 and 4) as indicated by the tracings of the diagrams (Figs. 5 and 6). The strongly marked lines in the figures represent the folds of the angles, the figures indicating the faces, whilst the lighter lines represent the intermediate folds which insure the stability of the system.



FIG. 3.



FIG. 4.

FIG. 3.—PARCHMENT DIAPHRAGM OF THE HEXAGONAL FORM.

FIG. 4.—PARCHMENT DIAPHRAGM OF THE RECTANGULAR FORM.

When the different parts are thus mounted, forming the group known as an element (Fig. 7), a solution of caustic soda is turned into the porous cup containing the zinc; into the outer vessel, a concentrated solution of the sulphate of copper. The two electrodes, zinc and copper, being placed in relation by the conductors, a constant chemical decomposition begins. This pile, which M. Reynier qualifies as

hydro-electric, is superior, as a working electro-motor, to the Daniell pile, of sulphate of copper and sulphate of zinc; of equal size, and is about twice as powerful as the ordinary Bunsen pile of the laboratories, and is only surpassed by the special form of the Bunsen pile, devised by Ruhmkorff.

"The zinc is not amalgamated," says M. Reynier in his note to the Academy of Sciences, "nevertheless, it is not attacked when the circuit is open by the alkaline solution which bathes it; consequently, the quantity of zinc consumed must give precisely the measure of the amount of elec-

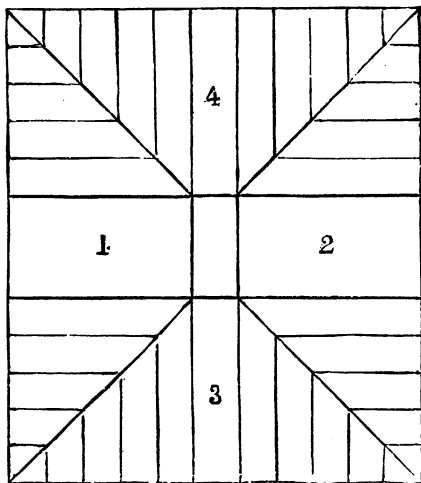


FIG. 5.

FIG. 5.—PARCHMENT SHEET TRACED FOR THE RECTANGULAR FORM.

tricity disengaged. The new pile" he adds, "does not send off volatile products; hence the materials employed are not subject to waste. It is therefore possible to regulate the products of the chemical changes, and they may even be restored to their original state. It is necessary, to do this, to cause a quantity of electricity a little greater than that which has been disengaged by the pile, to traverse the exhausted liquids, dissolving the copper displaced, and removing the zinc dissolved. This renewal of the materials of the pile restores its electro-motor qualities. When elec-

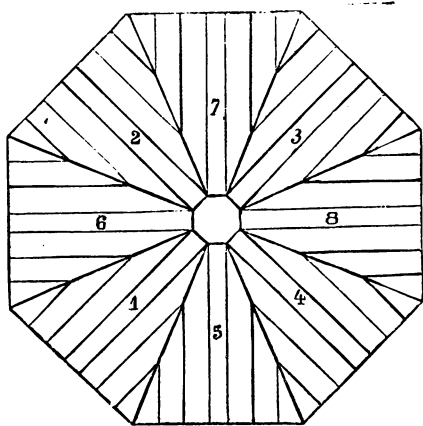


FIG. 6.

FIG. 6.—PARCHMENT SHEET TRACED FOR THE HEXAGONAL FORM.

tricity is thus produced by the aid of a powerful machine, it will be found to be stored up in the solutions and metals, in a state of energy, and can thus be readily set free or transported. The indirect transportation of electricity by this apparatus would be in most cases, of more practical use and more convenient than the direct transmission by cables.

"In fact, when fresh solutions only are used, the new couple has the advantage of a noticeable economy of material and manipulation over the ordinary nitric acid couple. Regarding the practical realization of the process of regeneration which must make my pile economically applicable to small electric motors and to private illumination, there are still certain obstacles of a practical nature which appear to me to be by no means insurmountable."

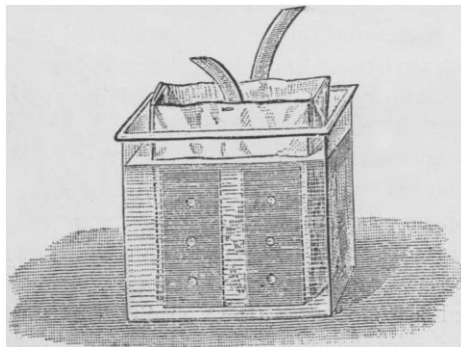


FIG. 7.

FIG. 7.—REYNIER'S PILE COMPLETE.

M. Reynier's pile has been submitted to repeated trials, notably by the *Société Française de Physique*, with fifty couples or elements; the inventor operated successively a voltmeter, the electric motors of Gramme and of Deprez, a large Ruhmkorff coil, and an electric lamp with Serrin's regulator. A platinum wire 65 centimetres in length and half a millimetre in diameter, was maintained at a white heat for more than an hour, while the galvanometer failed to show the slightest decrease of power in the pile.—*La Science pour Tous*.

M. POINCARÉ presented to the Academy of Sciences, Paris, the results of an investigation of butcher's meat, in which he found cylindrical pointed elements with cuticles crossed by lines which seem outlines of cells, and which appear granulated. He thinks they may be phases or metamorphoses of tænioides, causing tænia in some eaters of raw meat.

DR. J. LAWRENCE SMITH has determined and named the new mineral Peckhamite found on the outer surfaces of the remarkable meteorite whose fragments were sown across the borders of Dickenson and Emmet Counties in north-western Iowa. By an average of two of Dr. Smith's analyses it contains 49.55 per cent. silica, 16.44 per cent. ferrous oxide and 32.76 per cent. magnesia. By calculation of the oxygen ratio the formula $\text{SiO}_2\text{RO} + \frac{1}{2}(\text{SiO}_2\text{R}_2\text{O})$ would represent its composition, suggesting two atoms of Enstatite or Bronzite plus one atom of Olivine. This is one of the most interesting meteorites known. Over 5,000 fragments of it weighing about 30 kilograms, have been collected from over a distance of eight miles long by one-half mile wide. Although the lumps have been lying on the wet prairie for nearly a year, they are not in the least rusted, and bear a great resemblance to nuggets of platinum. Dr. Smith surmises the rapid passage of the meteorite through our atmosphere caused its disintegration, pulverizing the stony part completely and leaving the nodules of neckiliferous iron untouched. This hypothesis is novel and plausible.