SCIENCE:

A WEEKLY RECORD OF SCIENTIFIC PROGRESS.

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PUBLISHED AT

229 BROADWAY, NEW YORK.

P. O. Box 3838.

SATURDAY, AUGUST 21, 1880.

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All communications should be addressed to the Editor—Box 3838, P. O., New York—with name and address of writer, not necessarily for publication without consent.

Scientific papers and correspondence intended for publication, should be written *legibly* on one side only of the paper. Articles thus received will be returned when found unsuitable for the Journal.

Those engaged in Scientific Research are invited to make this Journal the medium of recording their work, and facilities will be extended to those desirous of publishing original communications possessing merit.

Proceedings of Scientific Societies will be recorded, but the abstracts furnished must be signed by the Secretaries.

Both questions and answers in "Notes and Queries" should be made as brief as possible; an answer appearing to demand an elaborate reply, may be written in the form of an article.

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Subscriptions forwarded by mail should be addressed to the Editor, Box 3838, P. O., New York, and Post-office orders made payable to "John Michels."

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AMERICAN ASTRONOMICAL WORK.

The progress of science in the United States cannot be better illustrated than by a brief review of the astronomical work now in progress, and the instruments at the command of those making observations in this country.

Taking as our authority the "Report on Observatories," published by the Smithsonian Institution, and the "Annual Record" prepared by Professor Edward S. Holden, of the U. S. Naval Observatory, Washington, we find that in seventeen States Astronomical Observatories are located, varying in degree of importance from the National Observatory at Washington, to the possessor of a two-inch achromatic telescope of its owner's own make. The work done with the latter instrument being most instructive as showing how much really good scientific work can be done with limited means when directed by intelligence well applied.

The State of New York can boast of twelve observatories, Michigan four, Pennsylvania three, Massachusetts, Connecticut, Ohio, Missouri, Iowa, each two, and Tennessee, California, Mississippi, Minnesota, Indiana, Kansas, Illinois, Maryland have each one observatory. It will thus be seen what an immense territory is covered by American astronomers, ranging from the shores of the Atlantic to the Pacific coast, and from the tropical regions of the Gulf of Mexico to Lake Superior on the North. Many of these observatories are supplied with requisite appliances of the most perfect description, while all, with one exception, have at least a good achromatic astronomical telescope.

For the benefit of those who desire to promote astronomical research, we may state that the single exception we refer to of an observatory without a telescope, is that of the Ohio State Observatory, the director of which is Professor R. W. McFarland, who states that he "was trying to get the authorities to do something," apparently with poor results.

Among the largest equatorials directed nightly to survey the heavenly bodies may be mentioned the great 26-inch instrument, by Messrs. Alvan Clark & Sons, at the Naval Observatory at Washington, under the charge of Professor Asaph Hall (who has already made such important discoveries with it), assisted by Professor Edward S. Holden; the Dearborn Observatory at Chicago possesses an 18½-inch equatorial (Alvan Clark); Harvard University employs a 15-inch equatorial by Mertz; the Allegheny Observatory, Pennsylvania, has a 13-inch instrument (Alvan Clark); the Morrison Observatory, Glasgow, Missouri, uses a 12½-inch instrument (Alvan Clark); Professor Lewis Swift at Rochester, New York, has charge of a 16-inch equatorial (Alvan Clark); the lady Professor of Vassar College, Poughkeepsie, has an excellent equatorial of 12⅓-inch (Alvan Clark), while lastly, Dr. Henry Draper at Hastings, N. Y., owns a 12-inch instrument, also by Alvan Clark.

This powerful battery of astronomical telescopes of the highest excellence might seem to be sufficient for one nation, but the national spirit of American enterprise appears to be strongly infused into this great branch of scientific research, for new astronomical telescopes of mammoth proportion and exquisite perfection are now in course of construction for United States observatories, which, in the hands of the able astronomers ready to receive them, will doubtless add to their already well-earned fame and the prestige of science in this country.

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 equitorial 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.

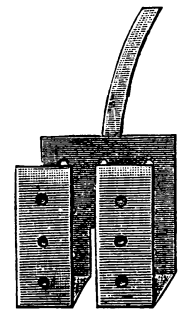

FIG. 1.

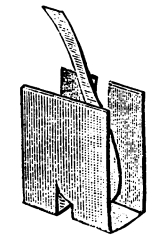

FIG. 2.

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.

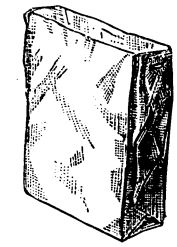

FIG. 4.

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