length of the day was increasing—getting gradually longer and longer. But how long has this been going on? Yesterday was shorter than to-day. The day which Homer had was shorter than our day, but not indeed to any appreciable extent. There can be no doubt, however, that a million years ago the day was appreciably shorter than the day is at present. He wished to conduct them back to an exceedingly remote period, to a critical epoch in the history of the earth. That epoch must have been more than fifty millions of years ago, but how much more he could not tell. At that extremely remote time the day was greatly less than it is at present. It was only, indeed, a fraction of its present amount, being only from two to four hours long. He would trace back the moon to the same remote epoch to which he had conducted the earth. The tides in the earth are forcing the moon gradually away from us at present. The moon was therefore formerly nearer to us than it is now. Millions of years ago the orbit of the moon was much less than it is at present. The time of the moon's revolution was much smaller and the moon must have been quite close to the earth, and whirled round the latter in a period of from two to four hours equal to the period of the earth's revolution on its axis. Such, then, is the primeval condition of things to which the tracing of tidal evolution conducted. Antecedent to this critical epoch they could hardly go with any degree of certainty. After explaining Darwin's theory in reference as to the supposed rupture of the earth at a very remote period of time, and the consequent formation of the moon, the lecturer proceeded to speak of the surprise with which astronomers realized that the small interior satellite of Mars revolved on its axis in less than a third of the time —nearly 24 hours—which the primary occupied in revolving on its own axis. He also spoke of the tremendous forces in action at remote periods when tides rose to a height of a thousand or two thousand feet, scouring rocks and carrying enormous quantities of matter to the sea, and when that action caused so much comparatively rapid manufacture of strata.

MR. DARWIN ON DR. HAHN'S DISCOVERY OF FOSSIL ORGANISMS IN METEORITES.

Dr. Hahn's discovery, of which an elaborate account was given in No. 50 of SCIENCE, has stirred up a lively discussion of this highly interesting subject. Dr. Hahn has taken steps to enable Prof. von Quenstedt, the renowned Tübingen geologist, and all others who expressed the desire to examine his microscopic preparations. It is understood that all those who have availed themselves of the opportunity thus offered have become convinced of the genuineness of Dr. Hahn's discovery.

It is very interesting to note the position taken by the greatest of living evolutionists in this controversy, if it can still be called such. Charles Darwin, on receipt of Dr. Hahn's work, wrote to him:

" . . . It seems to be very difficult to doubt that your photographs exhibit organic structure . . . ," and furthermore:

" . . . your discovery is certainly one of the most important."

Not content with the mere presentation of his work, Dr. Hahn visited the veteran zoologist and brought his preparations to him for inspection.

No sooner had Mr. Darwin peered through the microscope on one of the finest specimens when he started up from his seat and exclaimed:

" Almighty God! what a wonderful discovery! Wonderful!"

And after a pause of silent reflection he added:

" Now reaches life down!"

The latter remark no doubt refers to the proof furnished by Dr. Hahn's discovery that organisms can reach our planet from celestial space. It is an acknowledgment of the relief Mr. Darwin must have felt in not being forced to a belief in a primeval "*generatio equivoca*."

As was suggested in the paper referred to, "the Richter-Thomson hypothesis of the origin of life on the earth has become a tangible reality!" R.

AN AFTERNOON ON PASSAIC RIVER.

On the 25th day of last month the editor, in company with his former colleague on the *Quarterly*, Mr. J. L. Wall, escaped from the city and made a trip to the town of Belleville, on the Passaic River. A row-boat was engaged, and we proceeded to collect specimens from along the shores. Not many species of algæ were found, nor was there any great variety of animal forms, but the water-plants, so hardy and useful in aquaria, the *Anacharis Canadensis* and *Vallisneria spiralis*, were abundant. Reaching over into the shallow water, it was an easy matter to obtain perfect plants of *Vallisneria* with good roots, and we collected a number of them. The *Anacharis* grows so readily without roots that the more fresh looking stems were carried home without regard to the roots. An old can was made use of to carry home some of the river mud, in which to plant the *Vallisneria*. The mud was placed in the bottom of a tall specie jar, the roots of the plant were properly embedded, and the jar filled with water. The next morning, after the water was cleared by settling, the mud was covered with a layer of clean sand, which tends to prevent riling of the water by a slight disturbance. All the leaves of the *Vallisneria* were removed, so that a new growth might start in the aquarium. It is probable that we will thus obtain some vigorous plants of *Vallisneria* for use during the coming winter. The *Anacharis* was simply thrown into a large aquarium, where it will doubtless grow without further care. Rowing about slowly, a long, green, spiral filament was observed reaching up to the surface of the water. It was two or three feet in length, and bore a peculiar flower at the end. This was the female flower of *Vallisneria*, a very interesting object for study; it was quite a surprise to us, as the plant does not usually flower as early as July. Looking toward the shore, the water was covered with an innumerable quantity of white specs, which attracted our curiosity. Rowing up to them, we found that they were the male flowers of *Anacharis*. These are very curious flowers. The long, tubular perianth, sometimes two or three inches in length, reaches from the axil of a leaf to the surface of the water, and bears the stamens above. It would easily be mistaken for the flower-stem, but it is really the tubular perianth. These flowers were very abundant, so that the water appeared white with them. The pollen-grains were numerous, and could be seen floating about on the water in little clusters resembling snow-flakes. *Potamogeton* was abundant, in several forms, and the common arrow-plant, so named from the shape of the leaf, *Pontederia cordata*, which is also good for large aquaria. This plant should be set in a flower-pot, with suitable soil in which to root, and then submerged, either wholly or in part.

Among the algæ, two species of Oscillaricaceæ were found quite actively moving *Oscillaria tenius* and *littoralis*, and *Lyngbya majuscula*. The most interesting specimen of all, however, was a species of *Ulothrix*, a very common, filamentous, green algæ, in which the cells are about as long as they are wide. It was interesting because when we examined it, at about seven o'clock the next morning, the process of giving off swarm-spores had just begun. The entire contents of each cell in whole filaments, quickly formed into green, spherical masses, which began to move about in the confined space within the cells; soon the cell-walls ruptured, and the contents escaped as very active swarm-spores, somewhat elongated in form, and furnished with four long, whip-like appendages, or flagella, by means of which they could

swim about. They measured 5.μ8 to 8μ (.00022 to .00033-inch in diameter). After a while they become attached to some object, lose their flagella, elongate and subdivide, forming new growths of *Ulothrix*.—*The American Monthly Microscopical Journal.*

SELENOGRAPHICAL.

For the purpose of comparing drawings of lunar objects, it is proposed to circulate at frequent intervals, among observers, a portfolio containing sketches and descriptions of various formations, which will ultimately be presented to the Selenographical Society. To cover expenses, an annual subscription of 2s. 6d. will be required. Among those who have already signified their intention of joining in the movement are Rev. F. B. Allison, Mr. W. R. Birt, Mr. T. P. Gray, Rev. R. S. Hutchings, and the Rev. Dr. Richards. Those who are willing to add their names to the above list are requested to communicate with the editor of "SCIENCE."

BOOKS RECEIVED.

SEA MOSSES. A Collector's Guide and an Introduction to the Study of Marine Algæ, by A. B. HERVEY, A.M. S. E. Cassino, Boston, 1881.

We welcome this excellent book, published at a seasonable moment, which will make it doubly appreciated by the public.

To the thousands who are now making a temporary home within the sound of the surf and who love the sea, seeking its presence for rest of spirit or health of body, the present work will be found a welcome companion and guide, opening up a new channel for the pleasant passage of leisure hours. No longer need the idler watch the incoming and outgoing of the tides with listless indifference, or be weary of the beating of sleepless waves, as they go tumbling among the rocks.

The author prepares the way for another pleasure which "this great and wide sea" can give us, besides that which she offers to our fancy and our dreams. In the contemplation and study of the exquisitely beautiful flora which she nurtures in her ample waters.

If you become acquainted with these plants, their beauty, delicacy and grace, and know their names, habits and history, you will admit the sea has added a new charm to your existence.

There may be no royal road to knowledge, but Mr. A. B. Hervey has certainly selected the shortest and most agreeable path by which the tyro may acquire a practical knowledge of the department of Cryptogamic Botany, included in the study of the most beautiful of Marine Algæ, the Sea Mosses.

The publishers have done justice to Mr. Hervey's work, and have produced a handsome printed book of nearly 300 pages, with twenty full-page colored illustrations of the most beautiful of the Sea Mosses, which will be found of great value to the student engaged in these studies.

No person of intelligence residing within reach of the sea, should remain without a copy of this work.

PROF. S. P. LANGLEY has made the following calculation:—A sunbeam one square centimeter in section is found in the clear sky of the Alleghany Mountains to bring to the earth in one minute enough heat to warm one gramme of water by 1° C. It would therefore, if concentrated upon a film of water 1-500th of a millimetre thick, 1 millimetre wide, and ten millimetres long, raise it 83⅓ in one second, provided all the heat could be maintained. And since the specific heat of platinum is only 0.0032, a strip of platinum of the same dimensions would, on a similar supposition, be warmed *in one second* to 2603°C.—a temperature sufficient to melt it!

NOTES.

FAURE batteries are now made with flat plates, the rolling up of the sheets having been found to produce many cracks in the minium.

FROM exact experiments, M. Mascart finds that the intensity of current capable of producing in one second the electrolysis of the equivalent of a substance expressed in milligrammes is equal to 96.01 webers.

REMSEN has again investigated the action of finely-divided iron in inducing the formation of cyanide when nitrogen is passed over a hot mixture of carbon, iron, and an alkaline metal; he finds that freshly reduced iron induces a large formation of cyanide, but that iron after keeping for some time loses this power.

THE PHYSIOLOGICAL EFFECTS OF MATE.—Maté, or Paraguayan tea, is known to be extensively used in South America, and almost universally in Brazil, the common practice being to pour boiling water on some of the powder (consisting of ground leaves and twigs of certain species), then to suck the infusion through tubes provided with strainers. MM. d'Arsonval and Conty have recently inquired into the action of this substance, administering it to dogs, either by injecting into the veins or by introduction into the stomach, and they have observed a remarkable effect of it on the gases of the blood. It dimishes the carbonic acid and oxygen both of the arterial and of the venous blood to a large extent, sometimes a third or even half of the normal quantity. This action, which is less intense during digestion, and has no necessary relation to phenomena of excitation of the sympathetic nerve-system, is somewhat obscure as to its "mechanism," but its existence proves directly the importance and nutritive value of the aliment in question, which, consumed in such large quantities in South America, is almost unknown in Europe.

PROF. IRA REMSEN, of the Johns Hopkins University, Baltimore, has been lately experimenting as to whether the chemical behavior of a metal is in any way influenced by magnetic action, and has obtained some interesting results. The best effects were got by placing a shallow, thin iron vessel holding copper sulphate solution over the poles of a magnet. Out of the magnetic field the solution would deposit a uniform coating of copper, but in the field the lines marking the outlines of the poles were sharply distinguished as depressions in the deposit. In this case a permanent magnet was used capable of supporting 55 lbs. With an electro-magnet still more striking effects were observed. There was no deposit of copper on a narrow space marking the outline of the poles. Within this the deposit was fairly uniform, but outside the copper was deposited in irregular ridges running at right angles to the lines of force, and apparently coincident with the lines marking the equi-potential surfaces. By increasing the power of the electro-magnet, the action is intensified, and the area affected is broadened. The cause of the phenomenon has not yet been elucidated.

PROF. E. LOMMEL describes in *Wied. Ann.* a new polarising apparatus in which two plates of platinocyanide of magnesium, cut perpendicularly to the optic axis, are used as polariser and analyser, just as in the tourmaline pincette. Such a section of this crystal transmits a blue light, which, when the angle of incidence exceeds 2°, it is found to be perfectly polarised in the plane of incidence, and it therefore can be used, if tilted to that extent out of perpendicularity to the axis, as a polariser for a pencil of parallel blue rays. One curious point in respect to the behavior of a thin film thus prepared is the following: Let ordinary non polarised light be looked at through the crystal while the latter is normal in the line of sight. A white central spot, perfectly circular in form, and non-polarised, is observed in the middle of a blue field, which is polarised at every point radially. The only other crystals which can be used for polarising pincettes are the tourmaline and herapathite (iodo-sulphate of quinine); the point of difference between these and the platino-cyanide of magnesium is that while the two former (which are negative crystals) absorb the ordinary ray, and must therefore be cut parallel to the optic axis, the latter absorbs the extraordinary ray, and must therefore be cut at right angles to the optic axis.