I do not wonder at these omissions, since unfortunately the Italian language is very little understood out of our country.

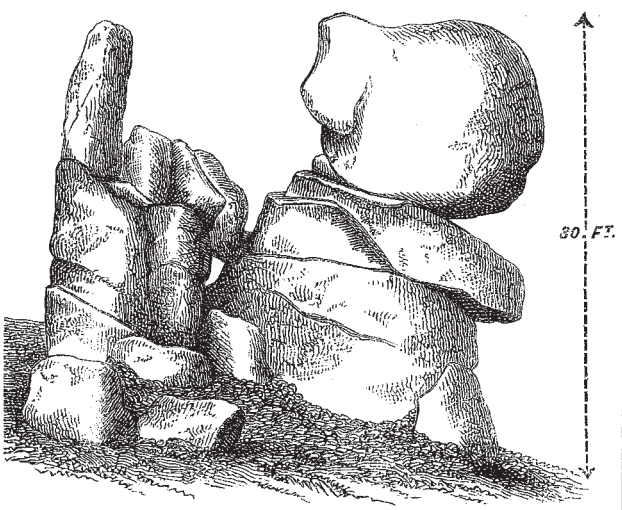
Rome, February 24 P. R. SECCHI

P.S.—On the 15th of this month I obtained a sight of the spectrum of Borelly's Comet. It was composed of a bright line very large in the green, another *more* refrangible in the blue, and another *less* refrangible in the yellow (?) but this was narrow and faint. Their figure was approximately as follows :—

I could not determine them better. The lines, especially the central one, were pretty brilliant.

"Stone Rivers"

THE interesting account of the mode of formation of "Stone Rivers," given in a late number by Sir C. Wyville Thomson, recalls to my mind some apparent moraines which I observed, and somewhat similarly explained, some years ago in the Hartz Mountains. In a paper read before the Geological Society of Dublin in 1872,[1] I thus speak of them : "The first thing that one notices on entering this valley [the 'Ockerthal'] from the north is that the bed of the stream is crowded with granite pebbles and boulders, which become of greater size as we proceed up the valley. The boulders are soon so large—many of them some tons in weight—and are situated so far up the slopes on each side, that the first idea is, we have here the morass of a former great glacier. I looked diligently for ice marks, but could see none; and I soon found that the causes which have the effect of scattering huge blocks of rock on the slopes and on the bed of the river are now at work and are slowly, but surely, altering the contour of the adjoining granitic mountains. . . . . All over the sides and upon the summits of these mountains are scattered the most fantastic piles of immense boulders. Some of them are over thirty feet in height and form conspicuous objects in the landscape; others, again, are deep in the forest, away from pathways, and are not to be seen until one climbs quite up to them. . . . . It is quite clear that the contiguous



A pile of granite rocks on a mountain overlooking Ockerthal.

surfaces of the blocks in these piles are undergoing a slow decomposition, that the joints are becoming gradually looser, and in consequence the cohesion of the component pieces less and less. Sooner or later the upper portions must either slip off or topple over, and roll down the mountain side. And this is not mere theory, for I hear that every now and then a boulder does fall and comes crushing down the hill until quietly deposited near the bottom. It would appear that while the surrounding rock has been decomposed and has fallen down in the manner indicated, these heaps have the longer resisted. But they are yet to follow in their turn; when the atmospheric agencies have sufficiently done their work, gravity will come in and lower the whole."

Instances of the turning over of the edges of slaty strata from the weight of the superincumbent mould and vegetation are common in the Hartz. I find in an old note-book the following entry :—"I was interested at seeing the upper slates on the left wall [of a quarry near Goslar] bent so much over that [their dip has become 75° to the north [the regular cleavage dip of the district is about 40° *south*]. Whether this is due to the weight of the ground above, to a landslip, or to the action of a glacier, I am not quite sure. I incline, however, to the first theory, for, although the slope of the hill is not high, the constant weight of the superincumbent earth and rubbish, bearing downwards for ages, would, it seems to me, be enough to cause such a result."

Scientific Club PHIN. S. ABRAHAM

[1] "Notes on the Geology of the Hartz," by P. S. Abraham, M.A., B.Sc., &c. Plates VIII. to XI. Journ. R. Geol. Soc. of Ireland, vol xiii. Pt. 3, p. 92. 1873.

The Measurement of the Height of Clouds

AMONG the various parallactic methods for determining cloud heights, one of which Mr. Malloch has put in practice (NATURE, vol. xv., p. 313), the use of the cloud shadow as a second station seems worthy of notice, as it requires very simple apparatus and observations.

On any partially cloudy day at the sea-side, an observer with a sextant may, from a cliff, easily determine cloud heights by the following elements :—A. Altitude of a given point of cloud above the horizon, allowing for dip. B. Depression of the shadow of the same point on the surface of the sea. C. Sun's altitude. D. Lineal elevation of observer above sea-level. The measurements should be taken when the cloud, the sun, and the observer all lie in a perpendicular plane; *i.e.*, when the cloud shadow is seen on the sheen of light reflected from the wavelets; otherwise azimuth observations, and less simple calculations, must be applied. Full moonlight might also be used at night.

On practically trying this method in September, 1875, the time of day was selected when the sun was in the direction to or from which the wind was blowing; thus the cloud shadows slowly sailed along the sheen on the sea, and could be followed by successive timed observations for half-an-hour or more, so that their velocity, and any variation in their height, could be ascertained.

The results are of course most accurate when both clouds and sun are at considerable altitudes, and I believe that this method will give results quite as accurate as the photographic process. The rounded forms are the greatest trouble, and measurements of the centres of little isolated masses of cloud are the best. The height of the observer above the sea is of course easily obtained by the angular width of a base measured on the beach.

The same method might be employed with shadows on land, by using a theodolite and a map; and though it is only applicable to one or two classes of clouds, yet its simplicity may induce some of your sea-side readers to make such observations.

Bromley, Kent W. M. FLINDERS PETRIE

The "Hog-Wallows" of California

MY friend, Mr. Thomas Belt, F.G.S., has kindly sent me the following extract from a paper by Prof. Joseph Le Conte, in the *American Journal of Science* for 1874 (p. 366), in which an explanation is given of the above-named formation (NATURE, vol. xv. p. 274) and of similar mounds farther north. It will be seen that Prof. Le Conte refers them wholly to "surface-erosion," but it is not clear whether he means "pluvial" or "aerial" erosion, or the two combined. More explanation seems required to account for the *removal* of the eroded matter over a surface thirty miles wide without producing any continuous ravines or other water channels :—

"*Prairie Mounds.*—The irregularly ramifying grassy glades or prairies already described as existing at the southern extremity of Puget Sound are studded over as thickly as possible with *mounds* about three to four feet high and thirty or forty feet in diameter at base." . . .

"The whole country between the Dalles and the upper bridge of Des Chutes River, a distance of about thirty miles, is literally covered with these mounds." . . . "The true key to their formation is given here, as it was not at Mound Prairie, by the great variety of forms, sizes, and degrees of regularity which they assume. They vary in *size* from scarcely detectable pimples to mounds five feet high and forty feet in diameter at base, and in *form* from circular through elliptic and long-elliptic to ordinary hill-side erosion-furrows and ridges." . . .

"No one, I think, can ride over those thirty miles and observe closely without being convinced that these mounds are wholly the result of surface-erosion, acting under peculiar conditions. The conditions are a *treeless country* and a *drift soil* consisting of two layers, a fine and more movable one above and a coarser and less movable one below." . . . "The necessary condition, I believe, is the greater movableness of the surface soil compared with the sub-soil." . . . "Surface erosion cuts through the finer superficial layer into the pebble layer beneath, leaving, however, portions of the superficial layer as mounds."

"Similar less conspicuous mounds, under the name of 'Hog-wallows,' are well known to exist over wide areas in middle and southern California."

The words in italics are so in the original.

ALFRED R. WALLACE

SCIENCE AT CAMBRIDGE, MASS.

THERE is marked activity in all scientific pursuits in and about Harvard University. The Agassiz Museum has at last had its management fully turned over to the University, the transfer being effected by permission from the State Legislature. At present the estimated worth of the property is $322,000; the land and buildings being valued at $100,000, and the collections at $60,000; the rest being trust funds. By the transfer, Harvard will have the use of the collections for educational purposes, and the Peabody Museum of Archæology will erect an edifice connected in plan with the Agassiz Museum. The Peabody trust provides for a Professorship of Anthropology, as well as for collections and a building. The Agassiz Museum is arranged so as to display types of the whole animal kingdom in their natural classification. Great facilities are already furnished to students and specialists, and these facilities will now be further increased. The force employed in the Museum is sufficient not only for the care of the specimens, but also to aid in new research.

There is a steady increase in the number of Harvard students in the scientific courses—physics, chemistry, natural history, botany, anatomy, and physiology. Text-books are little used in these courses; students are required to handle the things themselves, in the laboratories. "Summer schools" are conducted from June to September, in which teachers from the public schools become pupils. Chemistry has been taught in these summer schools for three years, geology and botany for two years, and zoology will be undertaken this year under Assistant-Professor Walter Faxon. Prof. Shaler's Summer School of Geology is the most widely-known of these enterprises. This year it will be conducted with headquarters successively in the Connecticut Valley, the Berkshire Hills of Massachusetts, and the Helderberg or the Catskill Mountains of New York. The class will be limited to fifty members. After the school closes, a trip will be made by those who can join in it to Cleveland, Nashville, Louisville, and the Mammoth Cave. Besides the Summer Schools, there is also organised a series of four courses of lectures to teachers, which include laboratory work. These are given on Saturdays from January to May. They embrace geology, physics, botany, and zoology, and have the services of Professors Shaler, Trowbridge, Goodale, and McCrady, and some assistant-professors of special repute. There are about forty members to a class.

The Boston Society of Natural History sustains a similar series of course-lectures to teachers during the winter months. The instruction is practical, as far as it can be made so by the illustrative specimens in the Society's collection. Prof. Shaler is also organising a system to furnish teachers with selected specimens and appropriate text-books and descriptions. It is expected that this new system will be the means of inducing teachers in the public schools to make further collections for their own use and to instruct their scholars. The Harvard Natural History Society is very actively engaged in promoting scientific education, especially among beginners in such studies. Prizes are offered for the best essays of the students upon their actual observations in natural history and botany. A free course of six scientific lectures is furnished by this Society, the lecturers being eminent specialists in the University. Two scientific associations at Cambridge are also doing active work—the Nuttall Ornithological and the Cambridge Entomological Clubs. The latter is the larger of the two, and contains many members of eminence. It publishes a periodical, the *Psyche*. The Nuttall Club publishes a quarterly magazine, the *Bulletin*, edited by Prof. J. A. Allen. This list of scientific enterprises in and around Cambridge, Mass., is by no means exhaustive, but it will give a fair notion of the activity with which they are promoted at the present time. It is hoped that the present year will be marked by even greater effort than its predecessors.

NATURAL HISTORY AND GEOLOGICAL RESULTS OF THE ARCTIC EXPEDITION

THE public will, we are sure, be glad to hear that though the Admiralty have declined to undertake or assist in the publication of the results of the late British Arctic Expedition, beyond matters purely hydrographical, the natural history and geological collections brought back by the expedition are being rapidly arranged and named. The whole of the numerous collection of fossils from the Silurian (Wenlock), Devonian, Carboniferous Limestone, and Miocene rocks of the coasts of the circumpolar sea have been examined by Mr. Etheridge, the palæontologist of the Geological Survey, and found to contain several new and interesting forms, which will be described in his forthcoming paper, at the Geological Society, on the Arctic fossils brought back by Capt. Feilden, R.A., and which will accompany a paper by that officer on the rocks and general geological facts observed by him in the Arctic area.

We especially rejoice to find that Capt. Feilden has brought back a large series of notes and portions of rocks glacially scratched and scored, scratched boulders and pebbles, which will throw much light upon the manner in which this country was glaciated during the Drift period. It will be seen that stones on a headland coast can receive the greatest possible amount of glaciation by the mere impinging of floe-bergs, driven by violent gales and currents, on the breaking up of the pack. On the much-vexed question of the parallel roads of Glen Roy, light also may possibly be thrown, for terraces fringe nearly every valley flanking the Arctic coast, formed by fresh water, dammed by pack ice. These rest on marine beds of boulder clay, with sea shells, which rise to heights of more than 500 feet above the present sea-level, and prove the recent elevation of the land, which movement is still going on; the marine beds outside the ice-foot fringing the coast of to-day will doubtless ere long be elevated above the water-level, and be covered with the latest fluviatile terrace behind the pack.

To those accustomed to the magnificent results brought to England by perfectly equipped expeditions like that of the *Challenger*, proceeding leisurely through seas teeming with the luxuriance of tropical life, the collections brought back by the Arctic Expedition may appear small; but we feel sure when the specimens are fully catalogued, and the difficulty realised of carrying heavy specimens of rocks and fossils when up to the arms in snow, and of securing insects with fingers numbed by a temperature of 50° below freezing, it will be felt that the naturalists of this expedition have made excellent use of their opportunities. We may mention that the extensive series of Miocene plants associated with the thirty-feet coal-bed of Lady Franklin's inlet will be described by Prof. O. Heer, the insects (recent) by Mr. McLachlan, and the fishes by Dr. Günther, of the British Museum.