Mohl's "Primordial Utricle."

I SHOULD like to inquire, through the medium of NATURE, whether the way in which botanists now use Mohl's term "primordial utricle" is strictly accurate? In Sachs' "Lehrbuch," and in the English translation, it is applied to the *parietal layer of protoplasm* found in plant cells which are old enough to have a large central vacuole, and this practice is now generally followed by English botanists.

Now, in Hensley's translation of Mohl's "Principles of the Anatomy and Physiology of the Vegetable Cell," it appears to be used in a different sense. On pp. 36-37 we have a description of the *young cells* of plants, in which the "primordial utricle" is spoken of as "a *very thin granular membrane*," which by appropriate methods becomes "*detached from the inside of the wall*," . . . "and consequently removes all the contents of the cell, *which are enclosed in this vesicle*, from the wall of the cell." (The italics are mine.) After this Mohl briefly refers to the nucleus, and then goes on to say that "the remainder of the cell is more or less densely filled with an opaque, viscid fluid of a white colour, having granules intermingled with it, which fluid I call protoplasm."

Thus even in *young cells*, Mohl recognises not only the protoplasm and the nucleus, but a "primordial utricle" also, and save that he says it is granular, one might take it as the equivalent of what we now speak of as the ectoplasm.

Proceeding with his description, Mohl describes, on p. 38, how as plant cells become older, a large vacuole is gradually formed in the interior of the protoplasm, which then becomes differently distributed. In the result he tells us, "the protoplasm is then accumulated at one side in the vicinity of the nucleus; on the other side it coats the inside of the primordial utricle." (Italics again mine.)

Thus in the older cells, as well as the younger, we have a clear distinction drawn between the protoplasm and the "primordial utricle," a distinction which recent writers seem to ignore.

It is possible, though scarcely likely, I think, that Hensley has not faithfully reproduced Mohl's conception of the "primordial utricle," or it may be that my interpretation of the above passages is at fault. In any case, it would be an advantage to have the opinions of our leading botanists on this point, as it is one which, to my own knowledge, brings some perplexity to students.

THOMAS HICK.

Owens College, June 14.

Hailstones at Cleveland, Ohio.

A REMARKABLE hailstorm occurred at Cleveland, Ohio, on the afternoon of Thursday, May 17, of a character to be remembered but probably not repeated during the present generation. Larger hailstones are rarely seen than fell on that day, and very likely few, if any, people living in this part of the country have ever witnessed a more severe bombardment.

The air was intensely sultry up to twenty-eight minutes past three o'clock in the afternoon (sun-time), when it commenced to rain. Hailstones of moderate size rattled down in profusion, and it soon appeared that an ordinary thunderstorm had begun. At the east end of the city the wind increased rapidly in force, and it grew very dark. Presently the hail became violent, and for about twenty minutes the streets and lawns presented a most animated appearance. The impact of the icy bullets against the roofs of houses sounded like the rattle of musketry. The snow-white balls glistened upon the close-cropped lawns, where they kept up a lively dance, and in the street were shattered against the flags and paving stones.

The stones, many of which were as large as billiard balls, and some of the size of goose eggs, weighed from one to five or six ounces, and probably many that fell were much heavier than this. Their shape was very various, some being spheroidal, others discoidal or exceedingly irregular. The accompanying figures represent to some extent the forms of two stones which fell on the Adelbert College lawn, and were picked up by some of our students.

A hailstone was found by Prof. F. P. Whitman to weigh nearly an ounce and a half after it had melted considerably. Its measurements were $2\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{1}{2}$ inches. The surface was fissured and raised into tubercles, while many others had an exaggerated mulberry appearance, suggesting a composite structure. Sections of such stones showed, however, that they were as a rule formed about a single nucleus, and were not the result of the regelation of a number of separate pellets.

NO. 1286, VOL. 50]

The specimen represented in Fig. 1 measured three inches in length, two in breadth, and about one in thickness. There were two opaque central masses, the larger of which contained the original nucleus, while the smaller spot probably represents a stone which became welded to the larger and older one.

A somewhat flattened, or discoidal form, which was very common, presented a beautiful agate-like core, embedded in a clear mass. A section of one of the stones, which was sawn in two, is shown in Fig. 2. There is a central ball of snow-ice,

Fig. 1.—Outline of hailstone two-thirds natural size. Dimensions $3 \times 2 \times 1$ inch.

Fig. 2.—Section of hailstone, two-thirds natural size.

and this is surrounded by alternating light and dark layers of varying density, and by a very much thicker clear, outer envelope, unshaded in the drawing, showing that the stone had passed through at least two distinct regions of condensation. There were also usually one or two thin superficial strata.

A stone which was examined by one of the observers at the United States Signal Office, was $3\frac{1}{2}$ inches long, 3 inches wide, 2 inches thick, and measured $10\frac{1}{2}$ inches in circumference. Another, which fell near Board of Education Building on Euclid Avenue, was weighed and measured by Principal Theo. H. Johnston. It was oval in shape and measured $3 \times 2\frac{1}{2} \times 2\frac{1}{5}$ inches, and weighed, after some melting, $4\frac{1}{2}$ ounces. The surface of this stone was deeply pitted as by impact of warm rain-drops. A second, brought in by one of Mr. Johnston's pupils, weighed 5.5 ounces. It had a large pear-shaped snow-iced centre.

The hailstorm was restricted to a belt a few miles in length, and formed a part of a general westerly storm, which was felt in this region for four or five days. During the thunder and hailstorm of May 17, the air-pressure remained nearly constant, the temperature fell from 84° to about 64° F. At the beginning of the storm the wind was south, and blowing at a rate of ten miles an hour, and increased to a rate of only 24 miles an hour. On the same day a destructive cyclone occurred at Kunkle in the north-western part of the State, in which a number of people lost their lives.

Everything in glass exposed to the brunt of the storm, when not of the strongest kind, was destroyed. Electric light globes, photograph galleries, and greenhouses suffered most. Canvas awnings were riddled. Flowers were cut down, and fruit and shade trees badly injured in many places. Horses and other animals, often too terrified to stir, winced under the stinging shot which they could not avoid. A few cases occurred of persons who were cut or stunned by the falling stones or glass. A man at the Winton Bicycle Factory was struck in the head as he stooped to pick up an unusually large stone, and was brought into the workshop in an unconscious condition. The stone went through his straw hat, and cut into his scalp.

FRANCIS H. HERRICK.

Adelbert College, Cleveland, Ohio.

Finder Circles for Equatorials.

ON p. 64 of the current volume of NATURE, I find a paragraph on "Finder Circles for Equatorials," which demands

notice on my part because it impugns not only the verbal statements made to many astronomers who have inspected the instruments of the U.S. Naval Observatory, but also the correctness of an official report made by me to the Superintendent of the Naval Observatory, and appended by him to his report for the year 1893, printed copies of which have been distributed to nearly all the observatories in the world.

The paragraph in question is based upon an illustrated article in the *Zeitschrift für Instrumentenkunde*, 1894, 14 Jahrgang, pp. 128-130, which purports to be a description of the 12-inch equatorial telescope of the Georgetown College Observatory, and in which it is asserted (1) that the instrument was constructed nearly three years ago by Mr. Geo. N. Saegmüller, of Washington, D.C.; (2) that its principal novelty is a pair of star dials, or finding circles; and (3) that similar instruments have been constructed by Mr. Saegmüller for the U.S. Naval Observatory at Washington, and for other institutions which are named. From these statements the writer of the "Astronomical Column" very naturally inferred that Mr. Saegmüller constructed these dials, or finding circles, three years ago, when in reality he did nothing of the kind. The facts are as follows:—The idea of these finding circles first occurred to me while the question of building a 12-inch equatorial mounting for the U.S. Naval Observatory was under consideration, and in the specifications for that instrument, which were dated May 20, 1891, I embodied it in these words: "Connected with them (the quick motions) and arranged so as always to face a person operating them, suitable indicators shall be provided for showing automatically the right ascension and declination of the point to which the telescope is directed." Mr. Saegmüller got the contract for building that mounting, and the details of these indicators were arranged between us. The erection of the mounting at the Naval Observatory was completed in November 1892, and almost immediately thereafter Mr. Saegmüller put an exact copy of its indicators upon the Georgetown College telescope, which he had erected some time previously. Finally, the two woodcuts which illustrate the *Zeitschrift's* article are not pictures of the Georgetown College telescope, but of the Naval Observatory telescope, which differs from the Georgetown instrument in many details.

WM. HARKNESS.

Washington, D.C., June 7.

On the Use of Quartz Fibres in Telescopes.

PERHAPS it may interest some of your readers to know that the quartz fibres of Prof. Boys affords an excellent material for providing the eye-lens of telescopes, and specially the instruments used in combination with reflecting galvanometers and electrometers, with threads required for their adjustment on the divisions of the scale. I thought at first that as the fibres appear, when examined with the microscope, to be semi-transparent and have a silver-grey colour, they would, when seen behind the ocular lens, not present themselves as distinct and clear lines, but as a matter of fact, when they were put at the proper distance, they showed an intense black colour, even darker than the divisions made with ink on the scale on which the instruments were focussed. I used threads of 20 microns diameters, and they can be fixed on the diaphragm without much difficulty by means of a mixture of resin and mastic applied with a heated wire, and this mixture answers better than brittle shellac. It is obvious that the threads, when laid down in the diaphragm, are at once stretched, and remain in good condition, as they are not affected in any appreciable degree by the influence of heat and atmospheric moisture.

L. BLEEKRODE.

The Hague, June 18.

Bullet-Proof Shields.

IN reply to a letter on bullet-proof shields, in the last number of NATURE, I wish to state that some preliminary experiments with spheres show that the energy of the shot is transmitted to the spheres nearly in line with the direction of the blow, to such a degree that great damage is done to the board to which the spheres are attached. This is not the case when rods are used. I hope shortly to give the details of my experiments on the subject.

FREDERICK J. SMITH.

Oxford, June 16.

NO. 1286, VOL. 50]

THE HORN EXPEDITION FOR THE SCIENTIFIC EXPLORATION OF CENTRAL AUSTRALIA.

INFORMATION has been received of the organization and despatch from Adelaide of a new and well-equipped expedition for the scientific exploration of the Macdonnell Ranges which lie about eleven hundred miles to the northward of that capital and nearly in the centre of the Australian continent. The expense of this expedition is borne by a wealthy and public-spirited colonist of South Australia, Mr. William Austin Horn, who thirty years ago carried out on his own account some explorations in the Gawler Ranges, and has since taken a very active part in the development of the mineral resources of the country, besides being a prominent member of the colonial legislature and of the Council of the University of Adelaide. Mr. Horn himself is the leader of the present Expedition, but has wisely associated with him some scientific gentlemen of great experience in Australian travel. Among them are Mr. Charles Winnecke, of the Trigonometrical Survey of South Australia, who in the performance of his duties has repeatedly traversed some of the most arid country of the continent, and has mapped out some thirty thousand square miles of its surface. With him also goes as medical officer, Dr. E. C. Stirling, C.M.G., F.R.S., of the University of Adelaide, the well-known discoverer, a few years since, of *Notoryctes*, and latterly the investigator of the *Diprotodon*-deposits, the results of which so many are impatiently expecting, though now it is clear that for them they will have to await his return from this new undertaking, the charms of which he found it impossible to resist. Besides these there are of the party, Prof. Ralph Tate, also of the University of Adelaide, and President of the last meeting of the Australasian Association for the Advancement of Science, eminent as a palæontologist, and especially as a palæobotanist, as well as Prof. Baldwin Spencer, whose name, from his connection with Owens College and Oxford, will be at once recognised by all; while there is also Mr. J. Alexander Watt, of the Geological Survey of New South Wales, to pay special attention to mineralogy and petrology. In the capacity of collecting naturalists, Mr. F. W. Belt, of Adelaide, and Mr. G. A. Keartland, of Melbourne, complete the staff of the expedition, which will be accompanied by three camel-drivers, a cook, and two prospectors sent by the Government. The Expedition was to leave Adelaide on May 3rd for Oodnadatta, and thence proceed along the telegraph line as far as Lillia Creek, where it will turn to the westward towards the Ayers Range and Goyder's Springs, after which it will make for the Palmer River, and then, deviating again to the westward towards Petermann Creek, will return to the upper valley of the Finke River, and then push on to Glen Helen at the foot of the Macdonnell Ranges. It will of course be understood that circumstances may cause this plan to be modified more or less extensively; but from the previous experience of those who have laid down the route to be taken it will probably be carried out pretty much as is intended, though some of the country to be traversed is absolutely unexplored, and much of it very imperfectly known. Wherever a prospect of doing work is found, a longer or shorter halt will be made, and as the Expedition is to be well furnished with camels—no fewer than twenty-three being taken with it—the difficulties that attend the needful supply of water will be reduced to a minimum, while it is said that owing to recent good rains in the latitudes to be passed through everything looks promising for a successful journey.

The importance of this undertaking is not easily to be over-rated. Expeditions of one kind or another to the interior of the continent have been numerous, and