

His advocates, however, and he himself in his later papers, appeal to pressures within the earth enormously greater than those obtained by the mechanical contrivances used, and consider that proportionately greater heat may be evolved.

My "Remarks" at the Geological Society, now published in *The Journal*, were primarily framed with reference to Mr. Mallet's paper as it stood, although I think they are a tolerably satisfactory reply even to the theory as now extended. I have, however, lately gone into the question on first principles, and have satisfied myself that, accepting the conditions lately assumed by Mr. Mallet as a basis, the theory can be shown to be untenable. I hope that a paper containing the grounds of my conclusion will shortly appear.

I am unable to understand how Mr. Green proposes to account for the development of forces as productive of heat through means of "the gravitation of the whole mass" (of the earth) "to itself," otherwise than by "the gravitation of the surface upon a retreating nucleus;" because, unless room be given by a retreating nucleus for the parts to descend, there can be no motion, and consequently no heat. O. FISHER

P.S.—Upon further consideration of Mr. Green's letter, it strikes me that he has misunderstood my meaning in a way that I did not at first perceive. He says that I "object to the possibility of assuming high local temperatures to be produced by the transformation of tangential forces into heat within the earth's crust;" as if I objected to any localisation. What I did object to was, not a localisation of work and heat, but a localisation within a localisation, such that the heat of crushing a certain localised volume should fuse a further localised portion of the crushed volume.

Harlton, Cambridge, Sept. 11

Important Discovery of Remains of *Cervus megaloceros* in Ireland

DURING 1847, when draining a bog at Kellegar among the Dublin mountains, as many as thirty heads of *C. megaloceros*, together with a perfect head and antlers of a Reindeer, were discovered in a cutting of about 100 yards, by 3 yards in breadth. They were found as usual in the marl and clay under the bog. I visited this locality in March last, and from the aspect of the ground and evidence of a farmer who remembered the spot where the above were dug up, it seemed probable that by running a series of trenches parallel with the original ditch made in 1847, fresh exuvie might be discovered. The subject was accordingly brought to the notice of the Royal Irish Academy, and a grant of 25*l.* obtained. The result has been the finding of about thirty additional heads of *Cervus megaloceros*, besides numerous detached bones not yet fully determined.

Mr. R. J. Moss, Keeper of Minerals in the museum of the Royal Dublin Society, who volunteered to conduct the explorations, writes to me that he found the remains embedded in about two to three feet of clay, and often either lying on or impacted between blocks of granite as if they had been drifted into the above situation. A log of oak three feet in length was discovered among the bones in the same stratum of clay. In this instance, as generally obtains in Ireland, the cervine exuvie are met with around the margins of the bogs, and not in the middle, as if the animals were mired in shallow water, or else their carcasses had drifted with the winds or currents to the sides and outlets of the lake. Mr. Moss had to stop excavations in consequence of the grant having become expended, so that doubtless many more remains await further explorations.

This is not the only case known to me of the accumulation of carcasses in a small space. I just lately examined a large assortment of skulls and bones of *C. megaloceros* dug out of a bog on the property of Mr. R. Usher, of Cappagh, near Dungarvan. These were collected in a space of about 100 yards in length and 70 yards in breadth. They include heads and cast antlers of no less than fifteen individuals of the great horned deer (*i.e.* thirteen male and two female skulls), besides the cast antler of a Red Deer. The above were likewise found more towards the side than the centre of the marsh.

It seems difficult to account for these accumulations of deers' carcasses, unless we suppose that a herd was mired on attempting to cross the lake. The fully developed burr of the antler so generally observed on this deer's horns discovered in the mud of ancient lakes might indicate that their owners perished in autumn during the rutting season, when doubtless many far grander scenes than those depicted in the "Challenge" and Wolf's "Race

for Life" occurred along Irish lakes. The Bear and Wolf being the only large carnivores in Ireland during the Pleistocene period may account for the abundance of *C. megaloceros*; moreover, we have it on historical evidence that the Wolf was extremely common during the seventeenth century, and it is probable, having neither the Hyæna nor the large Felidæ to compete with, that it might have hunted the great horned Deer into the lakes, where many would have got mired in the deepening mud along their margins. A. LEITH ADAMS

Magnus's "Elementary Mechanics"

WITH reference to the favourable notice of my "Elementary Mechanics" which appeared in last week's NATURE, I shall be glad if you will permit me to state that the second edition of my book is already in the printers' hands, and that the few errors, chiefly clerical, in the answers to the examples, which you were good enough to point out, are therein corrected.

London

PHILIP MAGNUS

Sanitary State of Bristol and Portsmouth

YOUR correspondent, Dr. Black, in accounting for the uniformly low death-rate of Portsmouth, has, I venture to suggest, omitted two somewhat important coefficients. The one is a thorough and well-planned system of drainage and outfall, completed some few years since at a cost of about 150,000*l.*; the other is the presence of a floating population of several thousand healthy adult males in the shape of the garrison and the sailors. E. J. E.

Lancaster Gate, W., Sept. 11

OUR ASTRONOMICAL COLUMN

BINARY STARS.—Mr. J. M. Wilson has communicated measures of Σ 2107, 44 Bootis, and ζ Aquarii, made at the Temple Observatory, Rugby, in 1871-75, from which the following are selected:—

| | | Pos. | 210° 0 | Dist. | 0" 77 |
|-----------------|---------|------|--------|-------|----------|
| Σ 2107 | 1872.49 | " | 207.5 | " | 0.7 est. |
| | 1873.48 | " | 208.4 | " | 0.7 est. |
| | 1874.65 | " | 215.5 | " | 0.5 est. |
| | 1875.58 | " | 240.6 | " | 5.3 |
| 44 Bootis | 1873.25 | " | 335.1 | " | 3.58 |
| ζ Aquarii | 1873.79 | " | | | |

The binary character of the first of these stars is well supported by Mr. Wilson's measures; the angular velocity appears to have regularly increased since about the year 1850, due allowance being made for the difficulty of the object. Struve's first epoch (a correction being made to the time as printed in "Mensuræ Micr.") is

1829.01 Pos. 148° 6 Dist. 1" 127

A discussion of the elements of the orbits of σ Coronæ, τ Ophiuchi, γ Leonis, ζ Aquarii, and 36 Andromedæ, by Dr. Doberck, of Col. Cooper's Observatory, Markree, forms Part 19 of volume xxv. of the *Transactions of the Royal Irish Academy*. Dr. Doberck employs the graphical method proposed by Sir John Herschel, which has been so generally applied, at least in the earlier part of the work. Correction of the approximate elements thus obtained by equations of condition will lead to satisfactory results where there are reliable single epochs, or a sufficient number of contiguous ones, to enable us to form normals. It may be questioned whether the additional labour of calculation which some of the methods of calculating double-star orbits that have been proposed necessarily involve, is rewarded by more satisfactory results than can be obtained by the application of Herschel's graphical process in the first instance, following up by equations of condition.

THE ZODIACAL LIGHT.—During the past week has appeared *Zodiacallicht-Beobachtungen in der letzten 29 Jahren 1847-1875*, by Prof. Heis, forming the first special publication of the Royal Observatory of Münster. It contains in considerable detail, but on a systematic plan, the particulars of the numerous observations made by