Force and Energy

I HAVE been under the impression that the supposed magnetising power of the more refrangible of the solar rays, as first examined by Mrs. Somerville in 1826, had been long ago disproved by the researches of Moser and Riess. This appears, however, to be a mistake, for I see from the report (in a recent number of the *Illustrated News*) of a lecture on Force and Energy lately delivered at the Royal Institution by Mr. Charles Brooke, F.R.S., that the lecturer is stated to have quoted the results of Mrs. Somerville's experiments to "show the interchange of light and magnetic energy."

Is it too much to ask that the editor of a popular treatise on natural philosophy will give us his authority for a statement so contrary to general scientific opinion? EXACTITUDE

Pangenesis

DOUBTLESS it is owing to a slight misprint in my communication in your number of May 11 that your correspondent, Mr. Meldola, has mistaken the gist of my objection to the theory of Pangenesis. I wrote, "a seed borne upon the graft would certainly be affected by the gemmules arising in the root and stem of the stock;" this was printed "a bud borne," &c. Now although it seems to me that much has been done to show that the stock will occasionally affect parts of the scion—and this my former letter does not for a moment contest—no evidence whatever has been brought to show that the sexual elements produced upon the scion have ever been affected by the stock without any intermediate change in the parts of the scion which may have borne the affected pollen grains or ovules.* And this certainly ought to be shown before it is assumed that every bud and every sexual element is formed by the aggregation of gemmules from all parts of the parents. Instead of which, in the vast majority of instances, we know that seeds borne upon the scion spring true to the scion. And if any instances to the contrary could be shown, it would then have to be proved that the part of the scion that bore the reproductive element was not a graft-hybrid. I may especially refer your readers to an interesting article by Dr. Masters, in the *Popular Science Review* for April, on "Grafting, its consequences and effects."

A. C. RANYARD

SIR JOHN HERSCHEL

FOR nearly one hundred and fifty years Europe has not seen a more accomplished philosopher than the great and good man whose mortal remains were last week consigned to their tomb in the national mausoleum, finding there a significant resting-place close to the grave of Newton. In sorrow and friendly reverence they were followed thither by nearly all that England values as the most eminent in the various domains of those many sciences which he, through a long life, had adorned and advanced.

John Frederick William Herschel was born at Slough, in the early part of 1792, being the only son of that great philosophical astronomer, of whom it were difficult to decide, and one cares not to inquire, whether the father was or was not even more illustrious than the son. Thus the boy was nurtured within sight of that remarkable telescope, wonderful indeed for the day of its construction, which, though in reality among the least of Sir William's achievements, had probably contributed the most to render the name of Herschel famous among men. His education was conducted chiefly at home, or at all events under home influences, and mainly in the society of persons considerably advanced in years; and it is probably to this circumstance that we may attribute much of that singularly retiring, though kindly and affectionate disposition, for which he was so greatly esteemed by all who had the privilege of his acquaintance.

In 1809 he was removed to St. John's College, Cam-

bridge, where there are still retained among a few of its oldest members some curious traditions of his scrupulous attention to the duties of his position. Certain specified selections from the "Principia" of Newton formed of course a portion of the curriculum of study; in that day they came to the student in the form of manuscripts, translated and somewhat modified from the Latin text; John Herschel, however, conceived it his duty to read the entire work just as Newton had left it. We mention this circumstance solely because it furnishes us with an early indication of that staple quality of mind without which no true greatness is ever attained, namely, thoroughness of work. It is not surprising that such a man carried off the highest honours in the University examination, and that in 1813 he graduated as Senior Wrangler of the year; the first among a little phalanx of eminent men, than whom the University of Cambridge has seen nothing superior and not much that is comparable since.

His early lot at Cambridge was cast in times of a scientific transition. To the majority of Englishmen the Continent had long been sealed, and our few men of science were for the most part unacquainted alike with the languages and with the learning of the rest of Europe; indeed, it is scarcely too much to say that the science of mathematics in England had made very little advance beyond what had been known in the later years of Newton. John Herschel, however, possessed the great advantage of living in a house where the chief languages of the Continent were understood, and in which relations with abroad were still maintained. To the late Prof. Woodhouse the honour is due of having introduced to the notice of the Cambridge mathematicians the higher methods of analysis which had long been practised on the Continent, and he was soon ably seconded in his efforts by the young mathematician. In conjunction with his friend Mr. Peacock, who afterwards became the well-known Dean of Ely, John Herschel, in the year 1816, produced a Treatise on the Differential Calculus, for the use of the University, by recasting rather than by translating a valuable work by Lacroix on that important subject, which hitherto had been studied in England solely to the most meagre extent, and encumbered by the unwieldy garb of the fluxional notation. This work was written in 1816, and before Herschel had taken his master's degree. In 1820 the translation of Lacroix was followed by another and more original work, containing a set of admirable examples and comments on almost all the more important methods of analysis by which mechanical and astronomical science had been so greatly extended by Newton's real successors, such as Euler, Lagrange, and Laplace. In this work Herschel was assisted not only by Mr. Peacock, but also by Mr. Babbage, who wrote that part of it which treated on functional equations. This admirable introduction to the higher forms of analysis is scarcely superseded even at the present day, and in some respects it remains unique. Thus John Herschel was instrumental in the promotion of that great reform in mathematical culture at Cambridge, which has never since ceased to bear most notable and excellent fruit.

It was shortly after his degree that we find the elder Herschel in one of his latest communications to the Royal Society referring with evident satisfaction to the fact that he had a son who was now capable of taking an important part in those astronomical, or rather as they may more properly be called, those cosmical researches which had formed the successful pursuit and the delight of his own life; and before his death he had the pleasure, we might not improperly call it the reward, of seeing his son in the year 1820 become one of the honorary secretaries of the newly-formed Astronomical Society. For fifty years and more he continued to be one of its most constant and loyal supporters, employing some of the last conscious moments of his life in compiling for its service a complete list, or, if we may be allowed the expression, a complete natural

* I should much like to learn if the *Bizaria orange* can be propagated by seedlings. *Cytisus Adami* is, I believe, always sterile.