

the given year—viz. $(A-1) \div 4$, neglecting the remainder. Add these numbers together, and from the total subtract $D =$ the number of secular years, which were ordinary years (100, 200, 300, 500, &c.). The sum is then divided by 7, and the remainder is the day of the week.

Example: June 18, 1815. $1815 + 169 + 453 - 14 = 2423 \div 7$. The remainder = 1. Therefore the day is Sunday.

This method holds good for any century according to the Gregorian Calendar. For the Julian reckoning, the rule is the same, only we must omit the number D , and write -2 in its place. The rule is then good without any change for any century.

Example: Oct. 14, 1066. $1066 + 287 + 266 - 2 = 1617 \div 7$. The remainder = 0 = 7th day, Saturday. C. BRAUN.

Mariaschein, Bohemia, June 15.

The Fundamental Axioms of Dynamics.

PROF. LODGE (NATURE, p. 174) maintains, in opposition to my correction, that your report of his recent paper on dynamical axioms was accurate in making the following statement:—"Dr. MacGregor objects to the author's definition of energy as the name given to 'work done,' and contends that this definition assumes conservation." He cites in proof the first two pages of my paper in the February number of the *Phil. Mag.* These pages, however, contain no reference to this definition, but a discussion of his definition of energy as *the effect of work done*. The definition of energy as a name given to work done is discussed on the fourth page, where the following will be found:—"In a second version of the above argument Newton's third law and contact action are the only assumptions made. . . . The definition of energy in this argument is quite different from that of the earlier paper:—"Energy is that which a body loses when it does work; and it is to be measured as numerically equal to the work done." There is here no reference to working-power. Loss of energy is simply a synonym for work done by, and gain of energy for work done on."

J. G. MACGREGOR.

Royal Society, Edinburgh, June 23.

Artistic Rows of Elms.

IN your Notes, p. 182, June 22, you say that "a correspondent desires to know where to find any celebrated and artistic hedges of elms within about thirty or forty miles of London."

If he will travel down to Sittingbourne, which is about forty-five miles by rail, and five miles less by road, from London, he can see some fine elms on the south and west bounds of the Murston Rectory Pastures, locally known as the Park.

The southern toll of elms is a triple row about 130 paces in length, the western toll of elms is on Gaze Hill, and is a double row about 212 paces in length. These elms must have been planted before this century. Being on elevated land they are well seen from considerable distances in the neighbourhood. Singularly enough they do not belong to the globe. The southern toll, however, belongs to the patrons of the living, and the western toll to my predecessor, the Rev. J. S. Hoare, who purchased them, with the land they stand on, from the late Mr. Twopenny, of Woodstock, Tunstall. I have not yet been able to persuade the patrons of the living to purchase them from the present owner. ALEX. FREEMAN.

Murston Rectory, Sittingbourne, June 27.

Soaring of Hawk.

THE rest-house in which I now am stands close to the edge of a precipitous descent. There is a covered verandah in front, and we are nearly 9000 feet above the sea. I have just seen a hawk, or vulture hawk, circle round three times over the precipice. The whole time its wings were motionless (to the sight). Its first circle was on a level with me, the second was higher, the third was unquestionably higher still. As I sat I could see both the complete first and second circles. To see the last I should have had to go to the edge of the verandah. This appears to be a clear case of rising circles without (apparent) motion of the wings. I have seen the same thing from the plains, but have not been so sure of the fact observed. There is a light wind blowing, scarcely moving the trees.

NO. 1236, VOL. 48]

The part of the circle near me was, in the first and second cases, within a few feet of where I sat, the third was *over* the roof of the verandah, and out of my line of sight.

Changla Gali, May 25.

F. C. CONSTABLE.

Carrier Pigeons.

PROF. MAREY states in his "Animal Mechanism," p. 214, "that a bird which has traversed in a single flight a distance of fifty leagues (which it seems to do without taking any food) weighs only a few grammes less than at its departure." I shall be grateful to any of your readers who will inform me where evidence of this is to be found. The enormous amount of food consumed by birds would seem to show that the processes of loss and repair go on in their bodies with great rapidity.

F. W. HEADLEY.

Haileybury College, Hertford, June 27.

A Method of obtaining Glochidia.

THE Glochidia of Anodon are not always easy to obtain. They appear to be retained, and shed only when fish are swimming near.

Tadpoles have the same influence as fish, and a good supply of Glochidia may be obtained by examining the tails of tadpoles swimming in a dish in which a few Anodons have been placed.

G. P. DARNELL-SMITH.

60, St. Michael's Hill, Bristol, June 26.

A NEW STATUE OF ARAGO.

IN this country the prevailing opinion is that the works of a man of science furnish the best monument to his memory. Though something can be said in favour of that principle, the restriction of its application to students and interpreters of nature is by no means justifiable. But a "look around" at the statues, and tablets, and other marks of public appreciation, shows that a man's greatness is, in general, not measured by his scientific labours. They do these things better in France. Those who honour a man and his works desire to proclaim his fame in the market-place, so that all may know that he was a giant among men. Passers-by are thus brought to a knowledge of deeds that they wot not of, and they see that a life devoted to science is one to be emulated. Thoughts of this kind forced themselves upon us when it was announced a few weeks ago that a statue to Arago had been unveiled in Paris.

Fourteen years ago a statue to Arago was erected at Perpignan, near his birthplace, and in 1886 it was decided to commemorate the centenary of his birth by raising the funds for erecting a statue at Paris. A committee, having the late Admiral Mouchez for its president, was then formed, and an appeal for subscriptions was made. Thanks to the contributions from the State and the Municipal Council of Paris, the necessary money was soon raised, and M. Oliva was commissioned as the sculptor. The statue has been completed for some time, and it would have been unveiled last summer but for the death of the artist, and later, of Admiral Mouchez, who was the prime mover in the matter.

The inauguration of the statue at the back of the Paris Observatory took place under M. Poincaré, Minister of Public Instruction, on June 11. Among those present were M. E. Arago, French Ambassador at Berne, and son of the renowned astronomer; M. Tisserand, the director of the Paris Observatory; M. Cornu, M. Huet, representing the Prefect of the Seine; and M. Muzet, vice-president of the Municipal Council of Paris. Each of these gentlemen dwelt in eulogistic terms on the career of Arago as a public man as well as a man of science. "Arago introduced physics into astronomy,"

said M. Tisserand, "and gave it a permanent place. Before him, astronomers concerned themselves chiefly with the movements of stars and members of our planetary system, seeking to explain them in their minutest details by the law of gravitation. Arago studied the nature of heavenly bodies, and the character of the phenomena continually exhibited by them. The polariscope showed him that the glaring surface of the sun is gaseous, and gave him important information as to the light of comets. Another application of physical methods furnished him with a precise means for measuring the diameters of planets or determining their magnitude. Nothing is more ingenious than his explanation of the scintillation of stars, founded upon the remarkable properties Fresnel found to be possessed by rays of light. Arago ought truly to be considered as the founder of a branch of astronomy—physical astronomy—that has since been remarkably extended, for it was he who pointed out the importance that would accrue from the application of photography to the study of celestial bodies. He was not able to foresee the day, however, when chemistry would enter into the domain of astronomy, and we should be able to discover their constitution; spectrum analysis has only been discovered, in fact, since the death of Arago."

"An example will give an idea of the perspicacity of Arago. It is generally known that about the end of last century France took the initiative of the metrical system and made it an international thing by connecting the metre with the size of the earth. But our globe is cooling and contracts, little by little, in the course of centuries, so that the unit of length is rendered liable to slight changes. Arago thought that a minute study of the light-rays that come to us from the sun and stars might furnish a rigorously constant unit of length, connected not with the earth, but with the stars—a sidereal metre of some kind. Well, this beautiful idea was realised a few months ago by Mr. Michelson, at the American Bureau of Weights and Measures." M. Tisserand also dwelt upon the influence that Arago exercised upon his pupils and the comprehensive character of his literary works. M. Cornu followed with an account of Arago's investigations in experimental physics, and after stating his work in connection with the *experimentum crucis* of the emission and wave theories of light, said, "If we come to terrestrial physics, meteorology, or industrial applications of steam and electricity, we always find Arago in the front rank with new ideas. Of an indefatigable activity, in science as in government, he was present with all the resources of his powerful spirit, with the ardour of his generous heart, especially where there was a great work to direct, a just cause to defend, a social evil to fight, and, at the call of duty, a peril to face."

The character of the statue, which is in bronze, is shown in the accompanying illustration from *La Nature*. Arago has his face turned towards the observatory. The pedestal on which the figure stands is also in bronze, and bears the simple inscription "FRANÇOIS ARAGO, 1786-1853. SOUSCRIPTION NATIONALE." Men of science throughout the world respect the name, and their French *confères* revere it. Those who have done homage to the man by thus assisting to perpetuate his memory are themselves honoured in the act.

MODERN MYCOLOGY.¹

IT is not often that a great and industrious investigator lives to see his chief work so far completed as Prof. Brefeld has done; and still more rarely to find an enthusiastic exponent of all his views so willing and so capable of putting them before the public as Dr. von Tavel here proves himself to be.

It is hardly thirty years ago since the late Prof. de Bary of Strasburg showed that the study of the fungi,



up to that time a chaos of statements in which the student usually lost himself hopelessly, was capable of being made not only a very scientific and important branch of Botany, but also a very interesting one, and that there were already workers in the field—especially the Tulasnes—who were showing how to do this, by patient and thorough investigations of each species that could be properly studied.

De Bary himself founded a school of exact inquirers,

¹"Vergleichende Mor. holog. e. der Pilze." By Dr. F. Von Tavel (Jena: Fischer, 1892.)