LETTERS TO THE EDITOR.

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Identification.

PERMIT me to make in your columns a few remarks on the following topic :—

It is now well known that the Council of the British Association have lately memorialised the Secretaries of State for the Home Department, Army, Navy, India, and the Colonies, expressing an opinion that the Anthropometric methods for Identification in use in France and elsewhere, deserve serious inquiry, as to their efficiency, the cost of their maintenance, their general utility, and the propriety of introducing them, or any modification of them, into the Criminal Department of the Home Office, into the Recruiting Departments of the Army and Navy, or in the Indian and Colonial Administration.

In connection with this suggested inquiry I have some very recent information to give as regards the inclusion of finger prints among the records that admit of being usefully employed in *bertillonage*. This convenient term has been coined to express the principle of the French system, invented and directed by Alphonse Bertillon, of so classifying anthropometric records that each can be sorted into its own natural group, just as each surname falls into its alphabetical place in a common directory. There may be many Smiths, but every Smith will be found among the Smiths and not among the Browns. There may be doubt about the exact spelling, and the Smythes will have also to be searched, but the range of uncertainty as to where to look for the required name will always be narrowly limited. So it is with the ordinary anthropometric records; so also it is with finger prints, which are as yet unused in the French system. Those who have read my book on the subject will recollect that the index letters for finger prints are limited to *a, u, r, or w*, as the case may be, for the two fore-fingers, and *a, l, w*, for the remaining eight digits. These produce such combinations of ten letters as *ral, ull; wl, ll*, which are arranged alphabetically. The test of the efficiency of this system lies, *first* in the sureness with which different (instructed) persons assign the same index letters to the same indifferently printed set, and *secondly* in the degree to which the sets are differentiated by their classification. Now I possess and have examined some thousands of well printed sets of students and others at my laboratory; but until very recently I had no large collection of *ill*-printed sets of *prisoners*. This want has been at length supplied in the following manner, by which I am able to confirm previous conclusions. Lieut.-Col. Surgeon Hendley, whose energetic furtherance of science and art at Jeypore is well known, was in charge last year of the Maharajah's magnificent contribution to the Imperial Institute, and, having visited my laboratory, became much interested in finger prints, and promised to send me a collection taken from the goals of Jeypore. It arrived not very many days ago, too late to be alluded to in my recently issued supplementary chapter on the Decipherment of Blurred Finger Prints. It contains nearly a thousand cards, each card bearing the impressions of all the ten digits of a different person. They were printed by pressing the finger first on the pad used for inking the office stamp and then on the card. This method, as I have recently had occasion to point out, gives far inferior results to that of printers' ink. So far as the Jeypore collection shows favourable results, a similar collection printed in the way always used in my laboratory would give still better ones.

Consequently, the Jeypore collection is particularly serviceable for arriving at moderate conclusions; moreover, their number is sufficiently large to justify them. My assistant marked the appropriate index letters on each card, and I compared them with my own independent determinations. The result was very favourable; our readings practically agreed, and although most of the prints were faint, or blurred, or otherwise imperfect, it was possible to classify nearly all of them. This affords a strong confirmation to my formerly expressed belief that the method of finger prints must, in time, come into use as an important and supplementary aid to *bertillonage*. The process of taking the impressions is extremely simple after it has been learnt and the small but necessary equipment is at hand. At the same time, there is no

undressing necessary, and nothing else of a humiliating character to be undergone during the brief act of making the prints.

I shall not here enter upon the unique and extraordinary power of finger prints in enabling us to determine, irrespectively of age and growth, whether two clear impressions, taken at different dates, were or were not made by the same finger. It does not depend on that general pattern of the print which is the basis of classification, but upon the numerous forks and other details in the ridges that compose the patterns. This has been fully discussed and proved in my two books, and I have nothing new to say, except that in my laboratory I have now upwards of 300 complete duplicate sets to work upon, the two members of each of which were taken at times separated by various intervals ranging between one and three years. These intervals are too short to be of much value, but the collection will increase in importance as the years go by, and further repetitions of prints from the same fingers shall have been made.

My letter is already long, so perhaps you will permit me on another occasion to recur to the action of the Council of the British Association, and to indicate the character of the information regarding the efficiency, cost, and utility of *bertillonage*, that might be gained with little trouble officially, but which is almost beyond the reach of any private person to obtain.

FRANCIS GALTON.

The Publication of Physical Papers.

MR. SWINBURNE in his letter on this subject has omitted to recognise the existence of a society which is older and quite as important as the Physical Society, I mean the "London Mathematical Society."

For reasons which it is unnecessary to enter into, I fear that an impression has unfortunately got abroad that the London Mathematical Society is an institution which exists solely for the advancement of *pure* mathematics. No greater error could be made; for whatever may have been the case in the earlier days of the society, the council for some years past have been fully alive to the importance of doing everything they can to encourage mathematical physics, and to induce physicists, whether members of the society or not, to communicate papers on mathematical physics. In short, the policy of the council at the present time is to endeavour to hold the balance evenly between the two branches of mathematics, and not to favour the one more than the other.

The policy of the society is still further exemplified by the fact that on the last two occasions the De Morgan medal has been awarded alternately to a mathematical physicist and to a pure mathematician; and during the discussion which took place in connection with the last award to Prof. Klein, several members of the council expressed a hope that this practice would be followed in future years.

A scientific newspaper like NATURE is scarcely suitable for the publication *in extenso* of papers relating to mathematical physics; but it may be well to point out that the London Mathematical Society presents contributors of papers with twenty-five *gratuitous* copies, whereas the proprietors of the *Philosophical Magazine* refuse to present gratuitous copies or to remunerate contributors in any way whatever. Moreover, the Proceedings of the Society can be purchased by the public, whilst (according to Mr. Swinburne) those of the Physical Society cannot. Also abstracts of papers read at the meetings of the London Mathematical Society can always, if the author wishes it, be published in NATURE, and can thus be at once brought before the notice of the scientific public.

It will thus be seen that the London Mathematical Society offers greater advantages to contributors than the Physical Society or the *Philosophical Magazine*; and when this fact is once recognised I venture to hope that physicists will not stand aloof from the Society in the way that many of them have hitherto done.

A. B. BASSET.

A Simple Rule for finding the Day of the Week corresponding to any given Day of the Month and Year.

MR. H. W. W., in NATURE, vol. xlvii. p. 509, gives a simple rule for finding the day of the week corresponding to any given date. It seems that this rule could be made still more simple. Thus, let

A = number of the given year.

B = number of the day in the year.

C = number of leap years from A.D. 1 to the beginning of

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.

Mariäschin, 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.

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,"