It is a minor matter, but it seems a pity that the nomenclature of the species in a standard work like "Darwinism" should not be scrupulously exact. Thus (p. 17), "*Phalæna*" *graminis* should be *Charæas graminis.* "*Helisonia*" (p. 44) should be *Helisoma*, and it is only a section, or subgenus, of *Planorbis.* On p. 235, "*filipendula*" and "*jacobeæ*" should read *filipendulæ* and *jacobææ.* "*Sphinx fuciformis*," of Smith and Abbott (p. 203), is really *Hemaris diffinis*, while on p. 204, "*Sphinx*" *tersa* is a *Chærocampa*, and "*Sphinx pampinatrix*" is *Ampelophaga myron.* T. D. A. COCKERELL.

West Cliff, Custer Co., Colorado, January 22.

A Formula in the "Theory of Least Squares."

SOME time ago, having had occasion to investigate the relation between $\Sigma(x^2)$ and $\Sigma(v^2)$ in the "Theory of Least Squares," I found a simple formula which connects them, and which I have never seen given in any of the text-books on the subject. I inclose it, and hope it is worth publishing in your journal.

University of Toronto, February 1. W. J. LOUDON.

Let a number of observations be made on a quantity whose true value is T. If these observations be represented by $M_1, M_2, M_3, \ldots M_n$, then the most probable value is A, the arithmetic mean, and $A = \frac{\Sigma(M)}{n}$. If, moreover, the true errors be denoted by $x_1, x_2, x_3, \ldots x_n$, and the residuals by $v_1, v_2, v_3, \ldots v_n$, then $\Sigma(v) = 0$ by the definition of the arithmetic mean. It is required to find a relation between $\Sigma(x^2)$ and $\Sigma(v^2)$. We have—

$$\begin{aligned} x_1 &= T - M_1 &\quad \text{and} \quad v_1 &= A - M_1 \\ x_2 &= T - M_2 & v_2 &= A - M_2 \\ x_3 &= T - M_3 & v_3 &= A - M_3 \\ &\text{\&c.,} & &\text{\&c.,} \end{aligned}$$

from which $\Sigma(v) = 0$.

$\therefore$ equating equal values of $M_1, M_2, M_3, \ldots$, &c., we get—

$$\left.\begin{aligned} T - x_1 &= A - v_1 \\ T - x_2 &= A - v_2 \\ T - x_3 &= A - v_3 \\ &\text{\&c.} \end{aligned}\right\} \quad \text{or} \quad \begin{aligned} x_1 &= v_1 + T - A \\ x_2 &= v_2 + T - A \\ x_3 &= v_3 + T - A \\ &\vdots \end{aligned}$$

$$\text{and adding} \quad \Sigma(x) = \Sigma(v) + n(T - A)$$

$$\text{and} \quad \Sigma(v) = 0.$$

$$\therefore \quad \Sigma(x) = n(T - A) \quad . \quad . \quad (1)$$

Again—

$$\begin{aligned} x_1 &= v_1 + T - A \\ x_2 &= v_2 + T - A \\ &\text{\&c.} \end{aligned}$$

$\therefore$ squaring, we have—

$$\begin{aligned} x_1^2 &= v_1^2 + 2v_1(T - A) + (T - A)^2 \\ x_2^2 &= v_2^2 + 2v_2(T - A) + (T - A)^2 \\ x_3^2 &= v_3^2 + 2v_3(T - A) + (T - A)^2 \\ &\text{\&c.} \end{aligned}$$

$$\therefore \quad \Sigma(x^2) = \Sigma(v^2) + 2\{\Sigma(v)\}\{T - A\} + n(T - A)^2$$

But $\Sigma(v) = 0$; and from (1), $T - A = \frac{\Sigma(x)}{n}$;

$$\therefore \quad \Sigma(x^2) = \Sigma(v^2) + n\left\{\frac{\Sigma(x)}{n}\right\}^2$$

$$\Sigma(x^2) = \Sigma(v^2) + \frac{\{\Sigma(x)\}^2}{n}.$$

This is the exact formula; from which it may be seen that, as positive and negative errors are equally likely, a close approximation will be obtained by taking $\{\Sigma(x)\}^2 = \Sigma(x^2)$, neglecting $2\Sigma(xx^1)$.

And we obtain Gauss's formula—

$$\Sigma(x^2) = \Sigma(v^2) + \frac{\Sigma(x^2)}{n}, \quad \text{or} \quad \frac{\Sigma(x^2)}{n} = \frac{\Sigma(v^2)}{n - 1}.$$

Galls.

ADMITTING, with Prof. Romanes (NATURE, February 20, p. 369), the plausibility of Mr. Cockerell's view that galls may be attributed to natural selection acting on the plants directly, I beg leave to point out a very obvious difficulty—viz. the much greater facility afforded to the indirect action through insects, by the enormously more rapid succession of generations with the latter than with many of their vegetable hosts—oaks, above all.

Freiburg, Badenia, February 22. D. WETTERHAN.

The Cape "Weasel."

IN Prof. Moseley's account of his visit to the Cape of Good Hope ("Notes of a Naturalist on the *Challenger*," p. 153), the following sentence occurs:—"Again, there are tracks of the Ichneumon (*Herpestes*), called by some name sounding like 'moose haunt.'"

In Todd's "Johnson's Dictionary," 1827, we find: "*Mouse-hunt*, a kind of weasel;" two quotations being given:—(1) "You have been a mouse-hunt in your time" ("Romeo and Juliet," iv. 4). (2) "The ferrets and mouse-hunts of an index" (Milton, "Of Ref. in Engl.," B. 1).

Halliwell's "Dictionary of Archaic and Provincial Words" (1847) gives, on p. 564: "*Mouse hound, East.* A weasel." Halliwell denies the identity of this word with Shakespeare's mouse-hunt; and Nares ("Glossary") inclines to a similar view. But in any case it seems clear that Prof. Moseley's "moose-haunt" is a dialectical English form—mouse-hunt or mouse-hound; a general word for "weasel." E. B. TITCHENER.

3 Museum Terrace, Oxford, February 17.

The Chaffinch.

THE chaffinch sings almost throughout the year in this locality. The male bird never leaves us in winter like the female, and can be seen in large flocks daily. A singular circumstance that occurred here in December 1888 with regard to a chaffinch may be of interest. At one o'clock in the morning, during a gale, a chaffinch tapped at my study window. On this being opened, it flew into the room and roosted on a bookshelf; next morning it was liberated. This was repeated on two subsequent gales. Not only did it sing each time on being liberated, but all through the winter and spring it followed me about the garden, singing. E. J. LOWE.

Shirenewton Hall, near Chepstow, February 11.

ON THE NUMBER OF DUST PARTICLES IN THE ATMOSPHERE OF CERTAIN PLACES IN GREAT BRITAIN AND ON THE CONTINENT, WITH REMARKS ON THE RELATION BETWEEN THE AMOUNT OF DUST AND METEOROLOGICAL PHENOMENA.[1]

THE portable dust-counting apparatus, with which the observations given in the paper were taken, was shown to the meeting. The apparatus, which was described in a previous communication to the Society, is small and light. It is carried in a small sling-case measuring 8 × 5 × 3 inches. The stand on which it is supported when in use packs up, and forms, when capped with india-rubber ends, a handy walking stick, 1¼ inch in diameter and 3 feet long. No alterations have been made in the original design, and the silver mirrors which at first gave trouble and required frequent polishings, have been used every day for two or three weeks without requiring to be polished, when working in fairly pure country air.

With the paper is given a table containing the results of more than two hundred tests made with the apparatus. In addition to the number of dust particles there is entered in the table the temperature and humidity of the air, the direction and force of the wind, and the transparency of the air at the time.

The first series of observations were made at Hyères, a small town in the south of France, situated about 2 miles from the Mediterranean. The observations were made on the top of Finouillet, a hill about 1000 feet high. The number of particles on different days varied here from 3550 per c.c. to 25,000 per c.c., the latter number being observed when the wind was blowing direct from Toulon, which is distant about 9 miles.

Cannes was the next station, the observations being

[1] Abstract of Paper read before the Royal Society of Edinburgh on February 3. Communicated by permission of the Council of the Society.