

The Motion of a Free Rotating Body

I SHALL feel obliged if, through the medium of your widely-circulated journal, you will allow me to point out an extraordinary mistake into which Mr. Radau has fallen, in a memoir inserted in the *Annales Scientifiques de l'Ecole Normale Supérieure* tom. vi. 1869, in which he criticises certain of my conclusions about the representation of the motion of a free rotating body contained in a paper published by me in the "Philosophical Transactions" for 1866. In his preamble, M. Radau says, speaking of the theory of rotation in connection with the names of Poinsot, Rueb, Jacobi, and Richelot:—"Tout récemment M. Sylvester a essayé d'appliquer au même sujet des considérations nouvelles qui l'ont conduite à des résultats intéressants, à côté d'autres dont l'exactitude peut être contestée."

Later on in his memoir M. Radau points out, and accompanies with very biting (albeit toothless) criticism, the nature of his objection, which is, in short, that I suppose Poinsot's ellipsoid, under the influence of an original impulse, to roll without slipping by virtue of its friction against the plane with which it is in contact. My answer is, that of course I do. And why not? when I suppose the plane "indefinitely rough" (see p. 761 of "Philosophical Transactions," 1866), and have actually determined the friction and pressure at each point of the motion, so that by solving a maximum and minimum problem of one variable, the extreme value of the ratio of one of these forces to the other, or if we please to say so, the limiting angle of friction, or, in other words, the necessary degree of roughness of the plane may be analytically determined for every given case. M. Radau falls into the school-boy blunder of making the *ratio between the friction and pressure constant throughout the motion*, confounding the actual friction with its limiting maximum value! It is, indeed, surprising that such a perversion of the facts of the case should have found insertion in a serious journal, such as that published by the Ecole Normale Supérieure, and I might fairly have expected from M. Radau the courtesy habitual with his adopted countrymen, of applying to me for information on anything in my paper which might have appeared to him obscure or erroneous, before rushing into print with such a *mare's nest*.

But out of evil cometh good. M. Radau says:—"Mais M. Sylvester va plus loin; il pense que le problème pourrait se résoudre par l'observation directe du mouvement d'un ellipsoïde matériel tournant sur un plan fixe en même temps qu'il tournerait autour de son centre également fixe. On ne se figure pas facilement par quel artifice on fixerait le centre d'un ellipsoïde matériel."

In a future number of your esteemed journal (as time at present fails me) I propose to show how, by the simplest contrivance in the world, a downright material top of ellipsoidal form may be actually made to roll, with its centre fixed, on a fixed plane and so exhibit to the eye the surprising spectacle of a motion precisely identical *in time*, as well as in its successive displacements of *position*, with that of a body, turning round a fixed centre, but otherwise absolutely unconstrained.

This mode of representation, which flashed upon my mind almost instantaneously when my eye first lighted upon M. Radau's objections, is the compensating good to the evil of being made the victim (to the temporary disturbance of my beloved tranquillity) of so hasty and futile a criticism as has been allowed insertion in the "Scientific Annals" of so great an institution as the Ecole Normale de Paris.

The *bureau de rédaction* must surely have been nodding when they allowed such observations, so easily refuted by turning to the original memoir, to pass unchallenged. It was only within the last few days that I received M. Radau's paper.

Athenæum Club, March 8

J. J. SYLVESTER

"Engrais Complet"

IN England many people have no faith in simple remedies with simple names, such, for instance, as brimstone and treacle; but make the same materials into a jam, disguise its flavour, and call it, say, the "Universal Purgative Extract," and then believers in its efficacy will soon be reckoned by the thousand. It seems from a review in a recent number of *NATURE*, that farmers in France are similarly incredulous on the subject of manures with intelligible names, that they require what is really useful to be mixed with something useless, and called "Engrais Complet," before they will apply it to their land. The English idiosyncrasy benefits a large number of patent medicine vendors, and I presume this French variety of it benefits the manure merchants. Let us hope, however, that English farmers will continue to mix

their own "Engrais Complet," obtaining, as heretofore, their nitrogen from farmyard manure, guano, and nitrogenous salts; their phosphorus from guano and superphosphate; their potash from organic excreta and potash salts. Under ordinary circumstances, with the Norfolk four-course system, the "Engrais Complet" for barley is left on the land by sheep feeding off roots and oil-cake; that for roots is farmyard manure and superphosphate; that for wheat is clover roots, with a top-dressing of guano and salt. Clover requires little from the land but potash and good cultivation; but every crop should be fed well enough to leave something handsome for its successor.

Pray excuse my homely comparisons, for although a reader and I hope a student of *NATURE*, I am still

ONLY A CLOW

The Preservation of Mollusca

THE notice in a recent number of the use of creosote by M. Holbein for the preservation of mollusca, &c., leads me to remark that I have found it of great value for the preservation of coleoptera and other insects. The solution of creosote and water appears to be quite as effectual a preservative as alcohol, and does not harden the tissues or cause discoloration. After an immersion of about a week the solution should be drained off, and the insects placed in tins and covered with sawdust. Probably small reptiles, &c., could equally well be preserved in this way, which would save the danger of leakage and breakage which now ruins so many consignments.

Cambridge.

J. R. CROUCH

Frankland and Duppa on the Action of Sodium on Acetic Ether

IN their recent communication to the Royal Society, reported in the last number of *NATURE*, Messrs. Frankland and Duppa ascribe my not getting hydrogen by the action of sodium on the acetic ethers to the high pressure existing in my sealed tubes.

How could there be a high pressure in my tubes unless I had first developed a large quantity of hydrogen? How then could it possibly be high pressure which prevented my getting any hydrogen? The pressure could not be due to the tension of the vapours of the acetic ethers, for in one experiment I employed acetate of amyl, which boils at 140° C., whilst I heated only to 100° C., and in this case, instead of getting 250 c.c. of gas, I got not a trace of gas. Moreover, the experiment with potassium was made in an open vessel.

On the other hand nothing is plainer than that Frankland and Duppa were operating upon alcohol as well as upon acetic ether, and hence their hydrogen.

London, March 3

J. ALFRED WANKLYN

Sir W. Thomson and Geological Time

I AM curious to know in which of his writings Sir W. Thomson makes the assertion "that there was a time when the earth rotated too swiftly for the existence of life." I cannot see how the assertion, even if it were true, could be of the least use in determining questions as to the length of time during which the earth has been habitable. Certainly it has not the slightest connection with Thomson's argument as to the date of consolidation of the earth, founded on its figure and on the retardation of its rotation by tidal friction. Yet the assertion is distinctly ascribed to Thomson—first in the *Pall Mall Gazette*, May 3, 1869, and secondly in the *Edinburgh Review* for January last.

If the passage quoted, or at least something resembling it, cannot be found in Thomson's writings, I am anxious to know whether the charge is due to simple stupidity on the part of the critics (or critic?), or whether it proves more?

G. H.

Little Gull (*Larus minutus*)

IN the proceedings of the Royal Physical Society of Edinburgh, as reported in *NATURE*, July 17, Dr. Smith notices the capture of a specimen of the Little Gull (*Larus minutus*) in Scotland, and remarks that it is a rare straggler to Scotland, only some two or three specimens having been previously recorded. Although rare in Scotland, it is by no means uncommon on the Yorkshire coast during the autumn and winter, and specimens are frequently shot during these seasons near Flamborough Head and along the Bridlington coast. This winter they have been more than usually plentiful. Mr. Richardson, of Beverley,