

Spring Dynamometers

In a former brief communication of mine on the subject of dynamometers (NATURE, vol. xiii. p. 385), suggested by an incidental remark made by Mr. Bottomley, I observed that "about three years ago Prof. Ball when introducing the C. G. S. system of units into the course of mechanics in this College had a series of dynamometers in absolute measure specially constructed for him." In reference to this statement, Dr. Ball's successor in the chair of mechanics, Prof. Hennessy, points out, in a letter to NATURE (vol. xiii., p. 466), that "the system actually employed is not that referred to by your correspondent; I generally employ the kilogram, metre, and second, and sometimes the foot, pound, and second, to measure a dynam or unit of force." It is, however, evident that the few words in my former letter did not question the merits of any particular system of units; whether the use of a mixed system of kilogram-metres and foot-pounds be an improvement upon a system now generally coming into use is a matter of opinion. And though the subject can hardly be one of much interest to your readers, I may, perhaps, remark that so far as my statement concerns Dr. Ball it is perfectly accurate; he was in the habit of using the C. G. S. system in his classes here, and I was unaware any change had been made in this respect, the following statement occurring in Prof. Hennessy's own syllabus for the present as well as last session:—"The unit of force employed is the 'dyne,' or that force which, acting uniformly upon one gramme for one second, will give it a velocity of one centimetre a second." Even if reference had been made to Prof. Hennessy, one would naturally have concluded that the printed syllabus, authorised by the Department, was the one "actually employed."

Passing on to Dr. Ball's dynamometers, Prof. Hennessy remarks that "they cannot be depended upon to results within the tenth of a kilogramme"—finer readings when necessary could, no doubt, be taken by the eye, but that is really only a question for the maker, and the special purpose for which these instruments were designed: then follows the strong assertion that "spring dynamometers are totally unfit for measuring units on the C. G. S. system." As several instruments of precision depending on the tension of a spring recur to one's mind, instruments that only require proper precautions to yield extremely delicate and trustworthy results, it would be interesting to know upon what grounds Prof. Hennessy bases his emphatic and reiterated assertion. If it be merely a question of individual opinion, upon this subject hardly any authorities that could be quoted would carry such weight as Sir W. Thomson and Prof. P. G. Tait, who speak thus in their treatise on "Natural Philosophy," p. 127. "Spring balances we believe to be capable, if carefully constructed, of rivaling the ordinary balance in accuracy, while for some applications they far surpass it in sensibility and convenience."

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W. F. BARRETT

The Meteors of April 20th

BETWEEN ten and twelve o'clock on the night of April 18th, Mr. W. L. Taylor, a member of the junior class in the State University, with several other gentlemen, observed an unusual number of shooting-stars. These gentlemen were returning in an open waggon from Ellettsville, eight miles north of Bloomington. No count was kept of the number of meteors observed, but the appearance was so frequent as to attract the attention of all the company. Mr. Taylor thinks the number noticed could not have been less than twelve or fifteen. From the descriptions given of the meteor tracks, I find that they were nearly conformable to the radiant of the Lyraids. The meteors were remarkably brilliant, apparently equal to stars of the first or second magnitude.

At my request Mr. Benjamin Vail, a student of the University, made observations on the nights of the 19th and 20th of April. Both nights were so cloudy, however, that a continuous watch would have been useless. About eleven o'clock on the night of the 19th, three meteors were seen in the north-west, where the sky at the time was partially clear.

Bloomington, Ind., April 26

DANIEL KIRKWOOD

American Mocking Bird

AN American mocking-bird, about a year old, which I had brought from Tennessee, has, for the past three or four weeks, been affected with an irritation round the eyes, causing the

feathers to fall off and the flesh to swell; the bird is otherwise in a healthy condition, but has not sung since it has been affected with the soreness; it has the proper food supplied, and its cage is kept in a clean state; could any correspondent kindly inform me the cause and cure of the disease? M. C.

An Unusual Optical Phenomenon

THIS morning, a little after nine o'clock, the ordinary solar halo, radius about 22°, was seen. It was bright, and the red very distinct.

On turning to the north to find the direction of the cloud drift, a white band was seen extending to the north-east in one direction, and on to the west and south in the other. Its width was about that of the halo near the sun. A pair of compasses and a protractor gave the altitude of this circle about 45°. This being about the sun's altitude, the plane of the circle was no doubt parallel to the horizon and passed through the sun. I believe the circle above described to be but rarely seen.

JOSEPH GLEDHILL

Mr. Crossley's Observatory, Halifax, May 3

OUR ASTRONOMICAL COLUMN

THE BINARY λ OPHIUCHI.—An examination of the recent measures of this star, shows that neither of the orbits computed some 25 or more years since by Mädler and Hind at all represents the later course of the companion, a circumstance mainly attributable, as it appears, to error in one, if not in both, of Sir W. Herschel's measures. Struve at first considered that the angle of 1783 required a correction of 180°, but at a later period he was inclined to apply a similar correction to the angle of 1802, and Dawes also believed it was the latter measure which required alteration, in order to render any orbit possible. It is upon this supposition that the orbits of Mädler and Hind have been calculated: the two sets of elements are subjoined:—

	Mädler.	Hind.
Peri-astron passage	1790°31'	1791°21'
Period of revolution in years	89°01'	95°88'
Node	32° 42'	30° 23'
Angle between the lines of nodes } and apsides on orbit	126° 4'	135° 24'
Inclination	49° 25'	49° 40'
Excentricity	0°4530'	0°4772'
Semi-axis major	0°842'	0°847'

Mädler's orbit was published in "Untersuchungen über die Fixsterne-Systeme, Erster Theil." The second orbit was founded upon observations to about the same year, 1849. The projection of the measures since this epoch, however, makes it apparent that the real orbit must be materially different from the above, and the star may be recommended to the attention of those who are interested in the determination of elements of the revolving double-stars.

Sir W. Herschel's papers containing his measures of double stars communicated to the Royal Society, not being always of easy access, the following extracts from his notes on λ Ophiuchi may perhaps prove useful:—

From the *Phil. Trans.*, vol. lxxv., p. 62:—

"I. 83; 1783, March 9. A very beautiful and close double-star, L. w.; S. blue; both fine colours. Considerably or almost very unequal. With 460, $\frac{1}{2}$ or $\frac{3}{4}$ diameter of S.; with 932 full $\frac{1}{2}$ diameter of S. Position 14° 30' n. following."

From the memoir of 1804—

"May 20, 1802, position was 20° 41'. The position March 9, 1783, was 14° 30', north following. The difference in nineteen years and seventy-two days is 6° 11'. May 1 and 2, 1802, I could not perceive the small star, though the last of the two evenings was very fine. May 20, 1802, with 527, I saw it very well, but with great difficulty. The object is uncommonly beautiful, but it requires a most excellent telescope to see it well and the focus ought to