

A second diagram explains this simply. Here a portion of ocean is divided into numbered squares of 25 feet, and the advance of the 25' luminous waves, 75' apart is shown in two following positions. It will be seen that spaces numbered 4 and 13 fall successively under the impulses. Similarly, in the next 25' advance of the waves, would all those numbered 12 and 15, and so on, the assumed dark spaces following in the wake of each intersection, as it pursues its diagonal course.

Beckenham, August 5

EDWARD H. PRINGLE

The Planet Jupiter

In the bright zone south of the south equatorial belt may now be seen a strange and beautiful feature like a flame—red elliptical cloud surrounded by a brilliant white aureole. I first observed it near midnight on the 14th inst., when approaching the middle of its apparent course across the disk.

In November, 1869, Mr. Gledhill discovered an elliptical figure in the same zone, but it was dark, with an interior space bright and colourless.

Gledhill's No. 2 belt (*Ast. Register*, April, 1870), which was a most striking feature for some years, disappeared in 1874, reappeared in May, 1875, again disappeared, and is now again faintly visible. It is *under* (north of) the north equatorial belt.

The south equatorial belt seems of a slate-blue, the north of a russet or dark red colour. The bright central space is crossed by dark, irregular bridges slanting from south-west to north-east—the invariable direction of all the oblique formations that I have ever remarked on Jupiter.

The north polar region seems occupied by a number of apparently close, narrow belts. The south has a pretty similar appearance, but the belts here are not so numerous nor so distinct.

JOHN BIRMINGHAM

August 15

Twenty-nine Gleams of Sunshine, August 7, 8, 9, in Nine Hours

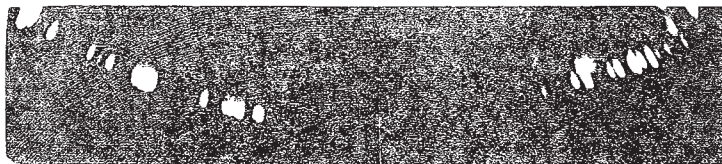
In a paper, about weather, written by Mr. Ellis, of Greenwich Observatory, and published in *NATURE*, vol. xx. p. 313, mention is made of work done with an instrument for registering sunshine, which I contrived, got made, and gave to the Observatory. It consists of a glass sphere, a stand for it, and a metal bowl. The spherical surfaces have a common centre, and radii so measured that the focal cone of sunshine condensed by the glass is cut, by blackened cardboard fixed in the bowl, at the same distance, and at right angles, whatever the sun's position may be in the visible sky. The temperature near the point is at least 700° when the weather is clear. The sun's circular image describes a circle about the common centre, and it burns a trace on cardboard when the sun shines clearly. I can think of nothing better or simpler for the purpose of registering sunshine and counting clouds daily.

The inclosed printer's block was engraved in the focal cone of a cast glass sphere. The flat surface, blackened with shoe-

blackening, was set roughly parallel to the plane of the equator, and the hot point was brought to bear upon it, at about 1 P.M. on August 7. Thus arranged the section of the cone is not circular, but is an ellipse, which is longer or shorter in proportion to the clearness of the atmosphere. The ellipse describes a circle on the boxwood plane. Hollows burned out by it print white, the surface left prints black. Clouds which crossed the sun's path may be counted between white oval spots. There are twenty-nine spots, the rest was cloud. In common weather parlance the morning of the 7th was "sunny," but the blue sky was veiled by a broken roof of thin detached clouds, moving eastward. They hindered heat waves. Between them were narrow clearer openings. When one of these passed the sun the cone of sunshine burned the block instantly. Afternoon about two, the broken cloud roof mended, rain fell, and the evening was dark and sunless. The night was wet. The morning of the 8th was "cloudy." Not a patch of blue sky was visible big enough to make a pair of breeches for a Dutchman. But the weather "looked as if it might clear up." The sun was "trying to shine." Birds sung notes which forecast a fine day,

2 P.M.

10 A.M.



and the day was "fine." The official forecast was "cloudy" and the day was very cloudy. The sun was seen "wading through mist" at intervals. At 10 A.M. one brighter gleam burned a mark; but that was all the bright sunshine that reached this garden. For a great depth the air was full of water condensed into the shape of the burning glass. Each spherical drop acted on sunshine as the bulb of a spirit thermometer acts—in "absorbing heat," in stopping, refracting, and dispersing waves of solar radiation. There was more shade than sunshine at the ground. The morning of the 9th was sunny, hazy, and cloudy. But large patches of very pale blue sky were visible. Birds foretold a fine day, and they were true prophets. The sun's image came on the block at 9.30 A.M., and it was set carefully at 10, and left till 2 P.M. The air was "thick" all day, the blue of the sky was very pale, and the sunshine "watery." The record shows when brighter gleams occurred during the time of exposure. About noon, as commonly happens, clouds gathered and hid the sun. The brightest time came after noon.

This bit of "thermographic wood engraving" may give readers in brighter climes some notion of the dismal cloudy sky of this abnormal English summer. There has not been a cloudless day since the year began. The blue of the sky never has been the dark indigo of Egyptian and Californian skies.

The cause of this excess of cloud I take to be excess of solar radiation, and consequent evaporation to our westward. Condensation has been in proportion along the European Atlantic coasts, where the ground was chilled by a late and severe winter, and has been little warmed and dried since by sunshine. According to casual and official weather reports, public and private, the heat has been great in America, on the Atlantic, in Spain, in the south of France, in Eastern Russia, in Egypt, and on the

Red Sea. The sun shines fiercely upon the ground beyond the edge of a great cloud which has come persistently from the Western Ocean to overshadow our islands, and to drench and batter them with rain and hailstones. Our shadow is the result of sunshine. Our grass is green, our health is good, our gardens are gay in spite of the clouds, or because of them.

Believing in this theory I am going eastward in search of brighter weather, and I send this record of watery sunshine for your acceptance before I start.

J. F. CAMPBELL

Niddry Lodge, Kensington, August 9

Electric Clocks

THE various contrivances for electric clocks all depend on producing contacts with the pendulum, which is confessedly undesirable; and they nearly all produce these contacts when the pendulum is at rest at the highest point, which is the worst position.

There seems no reason why a pendulum with a coil-bob traversing over a short permanent magnet, as is usual, should not be independent of contacts. While descending the lower part of the stroke it reaches the magnet, and a current is thus excited in the coil, which is conveyed out at the knife-edges and works a switch; this sends a battery current through the coil for a short period while the pendulum is beginning its ascent, and so drives it forwards by repulsion from the magnet. The same process is repeated in the back stroke. The interval between the production of the excited current and the battery current, and also the duration of the battery current, may be regulated by a small pendulum whose single swing is equal to the interval, and which is liberated by the excited current. The details are so easily

arranged that it is scarcely worth while to particularise them. Of course the battery current thus liberated by the excited current could be used for controlling other clocks.

The effect on the pendulum is thus restricted to the quicker parts of its swing; and consists of slightly retarding the descent, and accelerating the ascent, apart from all mechanical friction or contacts. Thus each action is produced at the most suitable time.

Possibly a pendulum cutting off heat rays from a thermopile might thus work a switch, and be even less affected than by producing an excited current in the coil-bob, as proposed above.

Bromley, Kent

W. M. FLINDERS PETRIE

Did Flowers Exist during the Carboniferous Epoch?

NOTICING in your pages under the above heading a discussion on *fossil* butterflies and moths, &c., and being struck with the deep interest taken in the question as evidenced by the letter of the Rev. A. E. Eaton (vol. xx. p. 315), I thought that I would ask for a very small space for an intercommunication which may forward investigation.

I have in my collection what appears to me to be a butterfly (using the word without any regard to scientific nomenclature), as a carbonaceous impress on a piece of shale from the Slievardagh coal-field, Tipperary; and by way of contributing my mite towards an inquiry which it gives me pleasure to find so earnestly pursued, I shall be happy to forward the specimen for examination to any of the scientific gentlemen interested who will furnish me his address, or in turn to as many as it will be convenient so to accommodate, on condition that the specimen be returned to me in good order and without unreasonable delay.

I may be allowed to add that I have no sympathy whatever with the discussion in its present bearings.

Earlshill Colliery, Thurles, August 7 WILLIAM MORRIS

"Euclid and His Modern Rivals"

MR. DODGSON thinks "it worth while to point out a mistake made in the paragraph about Mr. Morell's book" (NATURE, vol. xx. p. 240). In the words "the thing not being capable of proof," the "thing" referred to is Mr. Morell's assertion that "the perimeter *MDQRSTM* is less than the perimeter *MPQRSTM*," which is not necessarily true, and of course is incapable of proof. Surely this assertion, which I quote two lines before "thing" occurs, is its grammatical antecedent? You refer it back to the theorem itself, which Mr. Morell is trying to prove—a theorem which *is* true and easily proved." I gladly accept Mr. Dodgson's statement, which is, if I remember rightly—for I am here far away from Mr. Dodgson's book—perfectly correct—and apologise for having inaccurately represented his meaning.

THE WRITER OF THE NOTICE OF

"EUCLID AND HIS MODERN RIVALS"

Penzance, August 8

SOCIETIES AND ACADEMIES

LONDON

Entomological Society, August 6.—J. W. Dunning, M.A., F.L.S., vice-president, in the chair.—Mr. Philips exhibited living specimens (both sexes) of *Spercheus emarginatus*, taken at West Ham.—Mr. Stainton exhibited, on behalf of Mr. Grigg, of Bristol, larvæ of *Rösterstammia exolebella*, a genus of which the larva had hitherto been unknown.—Miss Ormerod read a paper entitled "Sugar-cane Borers of British Guiana," and exhibited specimens of the insects referred to, in different stages of development. The exhibition was made on behalf of the Colonial Company, who were anxious to receive any information as to available and practical methods of dealing with these insects. Mr. Distant stated that the circumstances were almost the same on the sugar estates in the Straits Settlements at Malacca, where burning the infected canes was the usual remedy applied.—Mr. Swinton communicated a note with reference to the urticating properties of the larva of *Liparis auriflua*, and a communication was also received from Mr. McLachlan on correlation of mutilation in the larva with deformity in the imago, being the substance of a notice by M. Melise on the subject in the *Compte Rendu* of the Belgian Entomological Society.

VIENNA

Imperial Academy of Sciences, June 13.—On two new *Notodelphydes*, with remarks on some features in the organisation of this family, by Herr Kerschner.—On the yearly period of the insect fauna of Austria-Hungary, No. IV., by Herr Fritsch.—On the motion of plates between the electrodes of a Holtz machine, by Herr Doubrava.—On the perfect pentagon, by Herr Kohn.—On the specific viscosity of a liquid and its relation to chemical constitution, by Prof. Pribram and Dr. Handl.—On the crystalline form and optical properties of isodulcite, by Prof. Urba.—Determination of the inclination from oscillation of a magnetic bar, by Prof. Pscheidl.—The Ferdinandsbrunn spring at Marienbad in Bohemia, by Prof. Gintl.

PARIS

Academy of Sciences, August 11.—M. Daubrée in the chair.—Experimental researches on the erosive action of highly compressed and highly heated gases, and their application to the history of meteors and bolides, by M. Daubrée.—On the acids generated when the crude acids resulting from the saponification of neutral fats are distilled in a current of super-heated steam, by MM. A. Cahours and Demarçay.—Reply to M. Berthelot's note on hydrate of chloral, by M. Wurtz.—On the generation of electricity by the Rays, by M. Ch. Robin.—On the eclipse of July 19 last, observed at Marseilles, by M. J. Janssen.—Second and last observation by M. A. Ledieu, on M. Bouquet de la Grye's paper on atmospheric waves, by M. Palacciano was elected correspondent in the Medical and Surgical Section of the Academy, in place of the late M. Lebert.—On some properties of quadratic forms, by M. Poincaré.—On hydrodynamical principles and the application of these principles, by M. G. Clère.—On the formation of nitric ether in wine, by M. Romanet du Caillaud.—On the distillation of liquids under the influence of static electricity, by M. D. Gernez.—On Ampère's currents, by M. Trève.—On the vapour densities of some organic substances with high boiling points, by M. L. Troost.—On the density of chlorine at high temperatures, by M. Ad. Lieben.—On the synthesis of phenol glucoside, and of ortho-formylglucoside or helicine, by M. A. Michael.—On a combination of chromic acid with fluoride of potassium, by M. L. Varenne.—On the production of crystallised metallic oxides by means of cyanide of potassium, by the same.—On the identity of hydrate of diisoprene and of caoutchine with terpene.—On the conservation of green fodder, by M. G. Lechartier.—On the latent irritation of the muscle in frogs and in man, both in the healthy and the diseased states, by M. M. Mendelssohn.—On the electric irritation of the apex of the heart, by MM. Dastre and Morat.—On the action of the poison from *Bethrops jararacussu*, by MM. Couty and de Lacerda.—Causes of the alteration of animal temperature produced by ether, chloral and chloroform, by M. Arloing.—On the structure of the cephalic ganglions of insects, by M. W. Wagner.—On the rot of the vine, by M. A. Millardet.—On the temperature of the month of July, 1879, by M. E. Renou.—On the history of perfect numbers, by M. L. Hugo.

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