

At a recent meeting of the London Physical Society a paper by Mr. W. Ackroyd was read on rainbows produced by light reflected before entering the rain drops. The author investigated mathematically the rare phenomena of three bows, and inferred that it would generally take place about sunrise or sunset. Mr. Lecky thought that the effect might be said to be due to two suns, one (reflected) appearing to be below the horizon.

A NEW EXPLOSIVE.—The *Neva Militarische Blätter* gives an account of a new explosive called dynamogen recently invented by a Viennese, M. Petri. It compares favourably with ordinary powder and neither contains sulphuric acid, nitric acid, nor nitro-glycerine. It may be formed into cylinders under pressure; no danger is incurred either in its manufacture or use. Its properties are not affected either by heat or cold; it costs 40 p. c. less than gunpowder.

ELECTRO-CHEMICAL DEPOSITS OF VARIOUS COLOURS PRODUCED ON PRECIOUS METALS, FOR JEWELLERY, BY M. WEIL.—M. Weil exhibited at the Paris Academy of Sciences, pieces of gold and silver jewellery, polychromised industrially, by his processes, with oxide of copper.

The colours, undeniably artistic, resist friction, the action of dry and moist air, air vitiated by sulphuretted hydrogen and coal gas, and light.

CHEMICAL STUDY ON MAIZE AT DIFFERENT EPOCHS OF ITS VEGETATION, BY M. LEPLAY.—Sugar is found in the leaves, and accumulates in the stem till the moment of formation of starch in the grains. It then migrates into the spike, first into the support of the grains, then into the grains themselves, where it is replaced by starch. The migration continues to be fed by the leaves till they disappear, then in great part by the stem diminishing, however, as the starch is developed. The function of the sugar, then, is to furnish to the grain the elements of starch.

THE AGE OF TREES.—It is everywhere stated that the age of trees may be determined by the number of concentric ligneous layers corresponding to one year's growth. This principle is not applicable to tropical and equatorial trees, as the following fact proves. After an interval of twenty-two years, M. Charency visited the ruins of Palenque, in Mexico; he cut off a branch of a shrub, on which he found 18 concentric layers, while from its size, he considered it to be only 18-months old. Better still, in his first visit, in 1859, M. Charency caused a certain number of trees to be cut down. Since that time these trees have grown again, and are naturally all of the same age, viz., twenty-two years. Upon one of them, M. Charency counted 230 concentric layers. If, as he thinks, warm and wet years count double, even in Europe, the trees must have certainly gained considerably in 1882.

PROCEEDINGS OF SOCIETIES.

MEDICO-CHIRURGICAL SOCIETY.—At the Meeting on the 12th a paper by Dr. Osler and Mr. A. W. Clement was read on "Parasites in the pork supply of Montreal." One thousand animals were investigated, and of these four were trichinous. Seventy-six contained "measles" or the larvae of tapeworm, and thirty-one contained Echinococci. The following conclusions were arrived at:—

1. The investigation shows that the hogs slaughtered for our markets present parasites in number sufficient to necessitate a more thorough inspection than is at present carried out.

2. As regards *trichina spiralis*, which was found in proportion of 1 to 250, we are of opinion that, considering the extreme rarity of cases of trichinosis, and the difficulties attendant upon a systematic inspection, a compulsory microscopic examination of the flesh of every hog killed is not at present called for.

3. In the case of "measles," the liver should be carefully examined, and if present in it, the flesh of the animal should receive the special attention of the inspector; if only in the liver, the entire carcass need not be confiscated.

4. Echinococcus cysts in the liver renders that organ unfit for food, but in other parts, unless very numerous and disorganizing, they may be cut out, and the carcass remain marketable.

5. The public should be made aware of the possible dangers of eating, in any form, raw or partially cooked meats. The best safeguard against parasitic affections is not so much inspection of the flesh unless, indeed, this is minutely carried out, as careful attention to culinary details.

6. To reduce the number of infested hogs greater attention should be paid to their hygienic surroundings, particularly in the matter of feeding. The danger is not during the period when the animals are penned and fed on grain, &c., but when they are allowed to roam at large and feed indiscriminately.

MONTREAL MICROSCOPICAL SOCIETY.—The regular Monthly Meeting was held on Monday the 8th. D. J. Baker Edwards read a short paper on "Aquarium Studies," and exhibited a number of beautiful ciliated

Infusoria. Dr. Wilkins showed a series of injections and specimens illustrating trouble staining.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Mr. W. H. Paine in the chair. Mr. W. P. Shinn read a paper on the increased efficiency of railway for the transportation of freight.

The first portion of this paper gave, from carefully gathered statistics, a valuable amount of information in regard to the actual increase of traffic upon American railways. In 1860 the tonnage mileage of the New York Central and Hudson River Railroad, the Erie Railway, and the Pennsylvania Railroad was about equal, and amounted in the aggregate to a little over 1/3 of that of the New York State Canals, and in 1870 each of these railroads averaged about the tonnage of the Canals, and in 1880 they averaged each nearly double that of the Canals.

The aggregate tonnage mileage of the other railroads was in 1881, 1,217 per cent. more than 1860. Statistics were also given showing the increase of population, of railroad mileage, of the production and export of grain and other leading exports. The means by which this rapid increase of freight transportation had been developed was considered under two general heads, namely, improvements in the administration. The improvements in the physical condition were treated under the following heads:—

1. Improved track or "permanent way," including bridge structure.
2. Additional sidings, and second, third, and fourth tracks.
3. Increased capacity and strict classification of locomotives.
4. Increased capacity of freight cars.
5. Additions to terminal facilities.

The improvements in the administration were referred to under the following heads:—

6. Improved methods of signalling.
7. Running locomotives "first in, first out," and running freight trains at higher rates of speed.
8. Consolidation of connecting lines under one management by purchase, lease, amalgamation or otherwise.
9. Running freight cars through one point of production to tide-water without trans-shipment.
10. Issuing through bills of lading (or freight contracts) from western points of shipment to Atlantic and European ports.

The general introduction of steel rails was stated to be the very corner-stone of increased efficiency. The improvements in all the directions referred to were treated of, and described at considerable length.

The second portion of the paper presented the views of the writer as to the means whereby still greater efficiency could be most economically obtained. The constant demand is for more transportation facilities, for more cars. In the opinion of the writer, what is needed is not so much more cars as more movement of cars. Freight blockades will be prevented, not by having more tracks to stand cars upon, but by having fewer standing cars. It was shown that upon one railway there had been a decrease in the miles run by the cars of 21 per cent. between 1858 and 1881, and that the Union Line Cars between 1870 and 1882 were increased 49 per cent. in number, while the mileage run by them decreased 16 per cent. in the same period. The remedies suggested by Mr. Shinn were more main tracks, more locomotives, more trains, the improvement of the making up of trains at the points where loaded. The detention of cars at stations and private sidings and the absence of cars on foreign railroads were considered as among the greatest causes of loss, and the writer suggests that the remedy will be to charge a per diem charge for cars when on foreign roads, and that this charge would be based upon the average economic value of the cars in use to their owners.

The paper was discussed by Messrs. T. C. Clarke, G. S. Greene, jr., W. C. Andrews, C. Macdonald, C. E. Emery and by the author.

ENGINEERS' CLUB OF PHILADELPHIA.—The regular meeting of this club was held December 16th, 1882. Mr. Henry G. Morris in the chair. Mr. E. F. Loiseau, read a paper on the subject of his Artificial Fuel, which he exhibited, in process of consumption, in the club room grate. After giving a short historical sketch of the manufacture of Artificial Fuel in Europe, where "briquettes" have been made for years past, Mr. Loiseau said that the aim of inventors has been to manufacture small lumps in paying quantities and, so far, the attempts have been failures. Sixty-eight fuel factories have been successfully operated in Europe, but they all make brick-shaped lumps, too large for family use. Mr. Loiseau claims to have solved the problem, and states that the Loiseau Fuel Co. at Port Richmond cannot supply the rapidly increasing demand for the small egg-shaped lumps (weighing about 2 oz.), which they manufacture at present. Mr. Loiseau described at length his process, and the machinery used for mixing and pressing into lumps the coal dust and the pitch, of which the fuel is made.

Prof. J. E. Denton's tests show:—1st. That the Loiseau Fuel evaporates more water to the pound of coal than ordinary anthracite; 2d. that the quantity of ashes is smaller; and 3rd. that these ashes contain no clinkers. Mr. Loiseau demonstrated its insolubility by the exhibition of specimens which had been placed in jars of water. The specimen of Mr. Loiseau's fuel was found intact and the water clear. In the consumption of the fuel in the grate no offensive odour could be detected, and it was noticed that the lumps retain their shape while burning and threw off a great amount of heat.

Mr. Ashburner presented a memo relating to the maps and sections of the Anthracite Survey.

Prof. L. M. Haupt presented a short description by John C. Trautwine, and W. E. Babbit, of the floating drawbridge at Rouses Point, and also a drawing, with notes, of a wooden arch bridge across the Genesee River below Rochester, of 352 feet span, 54 feet rise, which failed by descending at the haunches and rising at the crown.

Dr. R. ANGUS SMITH, F.R.S., read before the Manchester Literary and Philosophical Society "A Note on the Development of Living Germs in Water." The process employed cannot be too generally known. About 2 1/2 per cent. of gelatin well heated in a little water is mixed with the water to be tested, and the mixture forms a transparent mass. If any organisms are developed they do not fall to the bottom, but become visible as spheres of activity, which remain long and can be closely observed. It is suggested that photographs of these globules may be taken and become a visible report made by nature when the water has active organisms in it.