

much to effect economy in fuel as to prevent smoke; and although the first cost was somewhere about 130*l.* per boiler, the proprietor considers himself to be already more than recouped for his outlay, as a saving of fully 12 per cent. in the fuel consumed was effected. At the same works I have also seen in operation the method of Messrs. Haworth and Horsfall, of Todmorden, which has, I am told, in certain circumstances, some advantages over the other. In this, as in the other, the coal is fed in uniformly by mechanical arrangements. The mechanism is different in the two cases, but the result in the motion communicated to the coal is very much alike in both. The bed of coal, which is gradually supplied in front, is caused to travel along the bars towards the inner end of the furnace, and the combustion proceeds in a very uniform manner in conditions highly favourable to economy of fuel, and without the emission of almost any visible smoke.

These two methods I have mentioned because they appear both to work very successfully in practice, while they both bring into effect the principle of action of the fuel which has long appeared to me to be the best that can be adopted for ordinary cases of steam-engine boilers.

I have now occupied, I think, enough of your time, and so I will conclude. I have endeavoured to select out of the wide range of subjects which fall within the scope of the Mechanical Section of the British Association, a few which have come more particularly under my own notice, and on which I thought it was in my power to give intelligence that might be interesting as to past progress, and suggestions that might be useful towards extension of improvements in the future.

### SCIENTIFIC SERIALS

*Archives des Sciences Physiques et Naturelles*, No. 198.—M. C. Marignac contributes a paper On the simultaneous diffusion of certain salts, and gives long tables of the results of his experiments.—M. Marc Micheli gives a note of eighteen pages in length, On the Onagraceæ of Brazil, of which the greater part is taken up with the genus *Jussiaea*. He sums up the distribution thus:—

|                     | N. America. | Mexico. | Antilles. | Guyane. | Pacific States. | Brazil. |
|---------------------|-------------|---------|-----------|---------|-----------------|---------|
| <i>Eujussiaea</i>   | 23          | 1       | 2         | 5       | 7               | 22      |
| <i>Oligospermum</i> | 12          | 2       | 3         | 4       | 5               | 10      |
| <i>Macrocarpon</i>  | 4           | 1       | 2         | 2       | 2               | 4       |
|                     | 4           | 7       | 11        | 14      | 13              | 36      |

—M. Maurice de Tribolet gives a concise history of the study of the genus *Nerinea*, and gives analytical tables showing the distribution of species in the Jurassic beds of the Jura. The meteorological observations made at Geneva, under Prof. Plantamour, during May, conclude the number.

### SOCIETIES AND ACADEMIES

#### PARIS

Academy of Sciences, Aug. 31.—M. Faye in the chair.—The following papers were read:—Astronomy at the Italian Spectroscopic Society, by M. Faye. This was a reply to some criticisms of P. Secchi. The author pointed out that P. Secchi's theory of sunspots was a return to the idea announced by Galileo in 1612, the clouds being buried in the body of the sun instead of floating above it. The theory advanced by the author on the other hand had been pronounced by Mr. Langley to be a *vera causa*. This *vera causa*, according to M. Faye, is nothing more than a law of hydrodynamics, perfectly established for terrestrial air and water currents.—Remarks on the fish of the Algerian Sahara, by M. P. Gervais. The remarks refer to species of *Coptodon* and *Cyprinodon*, the former of which had been cited by M. Cosson as proving the continuity of the sheet of water which extended over this region.—Note on the development of the contractile coat of the vessels, an anatomical paper by M. C. Rouget. New researches undertaken by the author on amphibian larvæ establish beyond doubt the contractibility of the ramified protoplasmic cells observed last year in the vessels of the hyaloid membrane of the adult frog.—On winged *Phylloxera* and its progeniture, by M. Balbiani. The author points out the complete analogy between *Phylloxera vastatrix* and the *Phylloxera* of the oak.—New observations on the migrations of *Phylloxera* to the surface of the soil and on the effects of the

method of submersion, a letter from M. G. Bazille to M. Dumas. The letter contained a note, published in the *Messenger du Midi*.—M. P. Mouillefert addressed also a letter containing observations on the employment of the chief insecticides from experiments tried in the laboratory at Cognac and on the vines of the neighbourhood.—M. P. Rohart addressed a letter on the action exercised by the soil on insecticide gases.—Other communications relating to *Phylloxera* were received from MM. Delfan, A. Richard, Gauthier, L. Rousseau, &c.—On a physiological phenomenon produced by excess of imagination, a letter from M. P. Volpicelli to M. Chevreul. Two experiments were made with magnets upon nervous subjects, to see if the effects produced were really magnetic or due to the imagination. In the first experiment a piece of unmagnetised iron was shown to the patient, who immediately fell into convulsions. In the next experiment a magnet was placed in the hand of a nervous subject, who at the end of a few seconds became so over-excited that the magnet was removed. That the effect thus produced was due to the sight of the magnet was proved by hiding several powerful magnets in the chair occupied by the same individual, who when thus unconscious of their presence experienced no ill effect. M. Chevreul made some remarks *à propos* of the foregoing paper on certain other illusions, such as the diving pendulum and diving ring.—Remarks on recent researches concerning the explosion of powder, by MM. Roux and Sarrau. The authors pointed out the agreement between certain of the results obtained by them and by MM. Noble and Abel in their recent communications to the Academy.—New note on the tail of Coggia's Comet, by M. A. Barthélemy. The theory of a repulsive force emanating from the sun requires, according to the author, that the axis of the tail should always be a prolongation of the radius vector. With Coggia's Comet, however, as observed by M. Heiss on July 5, the tail made an angle of 160° with the radius vector. The facts appear to the author to be simply explicable by the hypothesis of an interplanetary medium submitted to the attractive action of the sun, through which medium the comet travels with an increasing velocity; fans and jets are supposed to be the result of the sun's attraction on the denser portions of the cometary matter.—On a new theory of the formation of comets and their tails, by M. Viret d'Aoust. In 1835 the author suggested the hypothesis that comets were nascent stars—the internal and still incandescent portions shining through cracks in the dark surface. This view was afterwards abandoned for Saigey's hypothesis, which considered the tails of comets as the result of the reflection of their light on an atmosphere which they drew after them. This opinion was again modified to meet the researches of Weiss, Schiaparelli, Klinkerfues, and Oppolzer, who showed the connection between the comets of 1862 and 1866, of Biela and Pogson, and the annular meteor streams which give us the August and November shooting stars. The author then asked whether comets did not equally belong to rings which had given rise to their existence, and if the light emitted by their tails did not simply result from the reflection of light from the nucleus on to the cosmical particles which constituted the rings on which they seemed to depend. The recent researches upon Coggia's Comet confirm this view in the author's opinion.—On a new model of prism for direct vision spectroscopes, by M. J. G. Hofmann.—On some points in the anatomy of the common mussel (*Mytilus edulis*), by M. Ad. Sabatier.

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