

as much as food for the body. Now, I am sure I can safely assert that, in the investigation and discovery of the secrets and mysteries of the heavens, the human intellect finds most invigorating exercise, and most nourishing and growth-making aliment. What other scientific facts and conceptions are more effective in producing a modest, sober, truthful, and ennobling estimate of man's just place in Nature, both of his puny insignificance, regarded as a physical object, and his towering spirit, in some sense comprehending the universe itself, and so akin to the divine?

A nation bound to the dust, and near to starving, needs first, most certainly, the trades and occupations that will feed and clothe it. When bodily comfort has been achieved, then higher needs and wants appear; and then science, for truth's own sake, comes to be loved and honoured along with poetry and art, leading men into a larger, higher, and nobler life.

SCIENTIFIC SERIALS

THE *Journal of the Franklin Institute* for July contains:—How to determine the grade of expansion and the size of a steam-engine which is to perform a given duty with the least total expenditure of money per working hour, by L. D'Auria.—Present state of the subject: "Heat of combustion of coal," by Chief Engineer Isherwood, U.S.N. (with figures and tables).—New York to Chicago in seventeen hours, by W. Barnet Le Van (4 diagrams).—Electro-dynamics, by John W. Nystrom.—A short paper criticising Moncel's formulæ in "Electricity as a Motive Power."—The ellipticity of planets, by Pliny Earle Chase, LL.D.—The discharge of turbine water-wheels, by J. P. Frizell (with tables).—The iridium industry, by Wm. L. Dudley (illustrated).—Physical and chemical tests of steel for boiler and ship plates for the U.S. Government cruisers, by Pedro G. Salom (5 pages of tables).—To tell iron from steel in small pieces (translated from Dingler's *Polytechnisches Journal*, by W. F. Worthington, U.S.N.—Report on the trial of the "City of Fall River," by J. E. Sague, M.E., and J. B. Adger, M.E.—Correspondence.—Book Notices.—Franklin Institute.—Items.—Low temperatures.—Ventilation of sewers.—Marsant's safety lamp.

Rivista Scientifico-Industriale, June and July.—Exposition of a new theory on the formation of hailstones; experiments on their artificial production, by Prof. Giovanni Luvini.—Remarks on radiant heat in connection with the second law of thermodynamics, by Prof. Adolfo Bartoli.—On the various hypotheses hitherto proposed to harmonise the results of the theory of radiation with the second law of thermodynamics, by the same author.—On Lambrecht's thermo-hygroscope, by the Editor.—Researches on the persistence of life and the vital functions in insects after decapitation, by Dante Roster.

Bulletin de l'Académie Royale de Belgique, June 7.—Obituary notice of M. F. Duprez, by M. Van der Mensbrugge.—A contribution to the study of drinking-waters, and especially of those supplied to the city of Louvain, by M. Blas.—Researches on the germination of linseed and sweet almonds, by M. A. Jorissen.—On the Marine Station at Edinburgh, by MM. Van Beneden and Renard.—Note on a flint instrument discovered in the Quaternary alluvia of Hainaut in association with the remains of the mammoth, rhinoceros, and horse, by F. L. Cornet.—Discourse pronounced at the obsequies of M. Louis Hymans, by M. Wagener.—On gymnastic exercises in the Belgian educational establishments, by M. Vincent de Block.—On the poetical works of Jean d'Outremeuse, by M. Stanislas Bormans.

Archives des Sciences physiques et naturelles (de Genève), 3^e période, tomes ix. and x., 1883.—On electrolytic condensers, by C. E. Guillaume.—The determination of the absolute capacity of some condensers in electro-magnetic units, by M. Schneebeli.—On the theory of atmospheric absorption of solar radiation, by J. Maurer.—Note on cometary refraction, by G. Cellérier.—Researches on the absorption of ultra-violet rays by various bodies, by J. L. Soret.—Remarkable movements which sometimes follow the fall of hailstones and sleet, by D. Colland.—Theory of dynamo-electric machinery, by R. Clausius.—Adjustment of resistance coils, by S. P. Thompson.

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, September 8.—M. Rolland, President, in the chair.—The sitting was opened by the President

with a few remarks on the ninety-ninth anniversary of M. Chevreul, *doyen* of the Academy.—Researches on the general development of vegetation in an annual plant (continued): nitrous elements and mineral constituents, by MM. Berthelot and André.—Note on the general resolution of the linear equation in matrices of any order, by Prof. Sylvester.—Remarks on balloon steering, by M. Duroy de Bruignac. The author considers that the experiment of August 9 at Chalais introduces a new phase of aerial navigation; and that the problem hitherto regarded as hopeless may soon be completely solved. It must, however, always remain of difficult application, the results depending on two essential conditions: that is, the necessity of increasing the propelling power and of diminishing the resistance of the air. A simple calculation shows that this resistance is in proportion to the cube of the sine in the angle of incidence of the prevailing atmospheric current. Hence for the small angles, which are rightly preferred, we get a variation of from 2^o to 4^o double or treble, or thereabouts, a tremendous obstacle, which has to be overcome.—Observations of the new Borely planet 240, made at the Observatory of Algiers, by M. Ch. Trépied.—Observations of the solar spots and faculæ made at the Observatory of the Collegio Romano during the second quarter of the present year, by M. Tacchini.—A new contribution to the question of the origin of the phosphates of lime in the South-West of France, by M. Dieulaufait. The author refers these formations to the action of saline waters during the Tertiary epoch, analogous to if not identical with those of the lagoons at the present time. The saline and concentrated waters of these lagoons, which certainly existed in Tertiary times, played a double part in the production of the natural phosphates of lime. In the first place they attacked the limestone rocks far more actively than ordinary water could have done; and then they contribute directly phosphoric acid, which is still being deposited in the shallow lagoons of the Rhone delta.—Experiments made for the purpose of testing the influence of pulps and other artificially prepared foods on cow's milk, by MM. A. Andouard and V. Dézaunay. These experiments, carried on during the years 1883 and 1884, tended to show that the prepared foods acted injuriously on the milk, but increased the quantity of butter without affecting its quality.—On the solar coronas recently observed in Switzerland, at Nice, and elsewhere, by M. L. Thollon. From a comparative study of the different accounts received of these phenomena, the author concludes that they are not merely halos, but true coronas, that is, an effect of diffraction produced either by fine dust or by light particles of moisture present in the elevated regions of the atmosphere.—Description of a meteor observed at the Trocadéro Observatory on the night of September 5, by M. L. Jaubert.

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