

feet. As connected with other Alpine tunnels, Mont Cenis is 40,093 feet, and St. Gothard, 48,952 feet. The Simplon would therefore be longest of all; but, on the other hand, it would be on a lower level than the others, the entrance at Brieg being only 2333 feet, and that at Iselle 2253 feet above the sea level. The entrances to the Mont Blanc tunnel would be 3345 feet at Mont Quart, and 4215 feet at Entrèves above the sea level. The Bardonneche entrance to Mont Cenis is 3970 feet, and that at Modane 3799 feet, while in the case of the St. Gothard tunnel the northern entrance at Göschenen is 3638 feet, and the southern, at Airolo, 3756 feet above the sea. Thus the Mont Cenis tunnel is shorter, but 330 feet higher than the Mont Blanc, while the Simplon would be about half as long again, but about 1000 feet lower. Supposing that the operations would be conducted at the same rate as they have been at St. Gothard, the boring will take 4218 days, or, working at both ends, 2109—nearly six years.

THE additions to the Zoological Society's Gardens during the past week include two Guinea Baboons (*Cynocephalus sphinx*), a Grivet Monkey (*Cercopithecus griseo-viridis*, var.) from West Africa, presented by Mr. Lionel Hart; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by the Rev. George Cuffe; two Arabian Gazelles (*Gazella arabica*), three Domestic Pigeons (*Columba anas*) from Arabia, presented by Mr. Reginald Zohrab; two Common Squirrels (*Sciurus vulgaris*), British, presented by Lieut.-Col. F. D. Waters, 82nd Regiment; a Colared Peccary (*Dicotyles tajaçu*) from Guiana, presented by Capt. W. F. Wardroper; a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. L. H. Haworth; a Cinereous Sea Eagle (*Haliaeetus albicilla*) from Norway, presented by Mr. James Ashbury; a Red and Blue Macaw (*Ara macao*) from South America, presented by Mrs. Supple; two Common Barn Owls (*Strix flammea*), British, presented by Mr. C. T. Foster; an Upland Goose (*Bernicla magellanica*) from South America, presented by Mr. A. Nesbitt; two Common Kestrels (*Tinnunculus alaudarius*), British, presented by Mr. J. Edwards; a Bonnet Monkey (*Macacus radiatus*) from India, a Common Marmoset (*Hapale jacchus*), from South-East Brazil, deposited; two European Scops Owls (*Scops giu*), European, purchased. Amongst the additions to the Insectarium during the same period are larvæ of the Common Butterfly (*Vanessa C. album*), Lobster Moth (*Stauropus fagi*), Pale Tussock Moth (*Orgyia pudibunda*)—the so-called Hop-Dog—*Diphthera orion*, *Halias prasinana*, and *Deilephila euphorbia* and *galii*; also a perfect insect of *Cholus forbesi*, being the third known example of this species, originally described from specimens captured in an orchid-house at Highgate. The present specimen was found, under similar conditions, by Dr. Wallace of Colchester.

## SOCIETIES AND ACADEMIES

### PARIS

**Academy of Sciences, August 22.**—M. Jamin in the chair. —The following papers were read:—Meridian observations of small planets and of Comet *b* 1881, at Paris Observatory, during the second quarter of 1881, by M. Mouchez.—Remarks on M. Jamin's note on comets, by M. Faye.—On spectrum analysis applied to comets, by the same.—On the nature of the repulsive force exercised by the sun, by the same. He associated it long ago with the state of incandescence of the sun; and, in an experiment, rare gaseous matter made luminous by means of an induction-spark was repelled by an incandescent plate at a sensible distance. Some thought this not decisive, however; for the gaseous matter might become more conductive through heating, so that the effect observed might be a sort of obscure discharge. M. Faye invites physicists to take up the matter afresh.—On the interior state of the terrestrial globe, by M. Roche. Supposing the globe formed of a nucleus or solid block nearly homogeneous, covered with a lighter layer, of density

geologically shown to be about 3 in relation to water; he finds it possible to harmonise the general values of precession and flattening, if it be considered that the interior nucleus has solidified and taken its definitive form under influence of a rotation less rapid than that now animating the earth. The central block is probably like meteoric iron in specific gravity, while the enveloping layer is comparable to aëroliths of stony nature, with little iron.—On the irreducible co-variants of the binary quartic of the eighth order, by Prof. Sylvester.—On a new species of *Cissus* (*Cissus Rocheana*, Planch), from the interior of Sierra Leone, capable of bearing the winter of Marseilles, by M. Planchon. Its endurance is a matter of temperament, and a proof of the extent of the scale of resistance to cold and heat which some plants possess, and which often upsets all prevision. The American *Vitis riparia* lives sixty miles north of Quebec, and is also found in the sub-tropical Southern States.—On the laws of formation of cometary tails, by M. Schwedoff. Starting with the existence of an infinite number of ponderable particles in celestial space, he shows that those with parabolic orbits have most chance of collision and consequent heating and dispersion. The sudden vaporisation of solids, due to passage among them of a cometary nucleus, generates the cometary nebulosity. The velocity of propagation of visible waves accompanying the nucleus is equal to the velocity of the nucleus itself at the moment of departure of these waves. The maximum of intensity of a cosmic wave is found in the tangent to the orbit of the nucleus at the point of departure of the wave. With these two laws he seeks to explain the phenomena observed.—On a particular case of the theory of motion of an invariable solid in a resistant medium, by M. Willotte.—M. Trève communicated the results of some experiments as to the effects produced by shunts in telephonic circuits.—Solar observations at the Royal Observatory of the Roman College during the first quarter of 1881, by P. Tacchini. After the secondary minimum in the end of last year, the solar activity resumed its course towards the maximum. The distribution of protuberances, &c., was the same as in the last quarter of 1880.—Observations of solar spots and faculae in April to July, 1881, by P. Tacchini. A minimum of spots occurred in May, and an exceptional maximum in July; now, the activity is anew at a minimum. During this year several periods of abundant frequency have recurred.—Spectroscopic studies on comets *b* and *c* 1881, by M. Thollon. Comet *c* seems to be almost wholly gaseous. The brightness of the head and tail of the comets seems to vary rapidly and uniformly with distance from the sun; arguing that their white light is almost wholly reflected sunlight. The slowness of variation of the band spectrum is against the view that the cometary elements are rendered incandescent by calorific action of the sun. The comets have probably a light and heat of their own.—Researches on the telluric lines of the solar spectrum, by M. Egoroff. Sending a strong electric beam through 18m. of aqueous vapour, and increasing the tension to 6 atm., the spectrum was notably changed in aspect. The group *a* in the extreme red he thinks fundamental for aqueous vapour, and he is going to examine it in detail.—On the existence of a new metallic element, actinium, in the zinc of commerce, by Mr. Phipson.—Note relative to a new series of phosphates and arseniates, by MM. Filhol and Senderens.—Fixation of hypochlorous acids on propargylic compounds, by M. Henry.—On the abnormal presence of uric acid in the salivary, gastric, nasal, pharyngeal, sudoral, and uterine secretions, and in menstrual blood; diagnostic and therapeutic indications, by M. Boucheron.—Observations during a thunderstorm on June 25, 1881, by M. Larroque.

## CONTENTS

	PAGE
THE BRITISH ASSOCIATION	401
Inaugural Address by Sir John Lubbock, Bart., M.P., F.R.S., D.C.L., LL.D., President	402
Section B—Chemical Science—Opening Address by Prof. A. W. Williamson, Ph.D., LL.D., F.R.S., V.P.C.S., President of the Section	413
Section C—Geology—Opening Address by A. C. Ramsay, LL.D., F.R.S., &c., &c., Director-General of the Geological Survey, President of the Section	419
Section D—Biology—Opening Address by Richard Owen, C.B., F.R.S., President of the Section	421
OUR ASTRONOMICAL COLUMN:—	
Encke's Comet	425
Schäberle's Comet	425
NOTES	425
SOCIETIES AND ACADEMIES	428