

The principal characteristic of the K_2 images is the appearance of the long dark lines, which M. Deslandres has called *filaments*, joined up by the less conspicuous and less continuous lines designated *alignements*; these apparently intersect at particular points, three or four of them cutting each other in the same place. Then there are large, dark patches, some of which appear to lie above *faculæ*, whilst others are either attached to filaments or are independent.

Some of these filaments have been observed to persist in the same heliographic positions for several rotations, just as do spots in the lowest level, and this leads to the suggestion that spots and filaments are simply manifestations of the same cyclonic motions in different parts of the circulation. The analogy to terrestrial cyclonic movements is shown to be very close, and it is suggested that the closer study of the solar may throw valuable light upon the working of the terrestrial *tourbillons*.

LIVERPOOL ASTRONOMICAL SOCIETY.—The report of the Liverpool Astronomical Society for the session 1907-8 contains a number of papers read by various members during the session; amongst them is the president's address, in which Mr. Plummer gave an interesting description of the motion of Halley's comet and the various methods by which it has been investigated. Papers were also read by Mr. Reynolds, describing the large reflector which he has set up at Birmingham and also the one he presented to the Helwân Observatory, and Father Cortie, whose discourse dealt with the maintenance of the sun's heat.

ONE HUNDRED NEW DOUBLE STARS.—Bulletin No. 144 from the Lick Observatory is devoted to a list of 100 new double stars discovered by Dr. R. G. Aitken. This is the thirteenth list of its kind, bringing the total number of "Aitken" doubles to 1900, and it includes closer companions to the previously known doubles Σ 22, Σ 339, $O\Sigma$ (App.) 41, $O\Sigma$ 87, S. 461, β 627, and Σ 31.

PRIZE AWARDS OF THE PARIS ACADEMY OF SCIENCES FOR 1908.

AT the annual meeting of the academy, held on December 7, the president announced the prize awards as follows:—

Geometry.—The grand prize of the mathematical sciences is divided in equal parts between Luigi Bianchi and C. Guichard; the Francœur prize is awarded to Émile Lemoine, for his work taken as a whole; the Poncelet prize to Prof. Fredholm, of Stockholm, for his researches on integral equations.

Mechanics.—The Montyon prize (mechanics) is awarded to E. Lebert. No memoir was received by the academy on the subject proposed for the Fourneryon prize (the theoretical or experimental study of steam turbines).

Navigation.—The extraordinary prize for the navy is divided between M. Labeuf (2500 francs), for his work on submarines, M. Dunoyer (2500 francs), for his electromagnetic compass, and M. Dautriche (1000 francs), for his work on the influence of alkaline salts on the power of explosive materials; the Plumey prize is divided between M. Codron (1500 francs), for his work on machine tools, M. Marchis (1500 francs), for his work on the use of poor gas and the production and application of low temperatures, and MM. Fortant and Le Besnerais (1000 francs), for their memoir on the oscillations of water along a vertical wall.

Astronomy.—The Pierre Guzman prize is not awarded. The Lalande prize is divided between W. L. Elkin and F. L. Chase, for their researches on the determination of stellar parallax, M. F. Smith receiving a mention; the Valz prize is awarded to Michel Luizet, for his researches on terrestrial magnetism, atmospheric electricity, and variable stars. No memoir has been received on the subject proposed for the Damoiseau prize (the theory of the minor planet Eros based on known observations). Pierre Puiseux receives the Janssen prize for the whole of his astronomical work.

Geography.—The Gay prize is divided unequally between Louis Gentil, for his topographical and geological work in Morocco, Prosper Larras, Abel Larras, and Marcel

Traub, for surveying work in the same country; the Tchihatchef prize is awarded to Lieut.-Colonel Bernard, for his memoir on the delimitation of the Franco-Siamese frontier; the Binoux prize is divided between Paul Heilbronner, for his memoir on the geometrical description of the French Hautes Alpes, and Jules Richard, for his works and book on oceanography. Mentions are attributed to MM. Mazeran and Réne Bossière. The Delalande-Guérineau prize is awarded to Auguste Chevalier, for his researches on the flora and economical resources of tropical Africa.

Physics.—André Blondel receives the Hébert prize, for his researches on the electric arc; Marcel Brillouin the Hughes prize, for his book on the viscosity of liquids and gases.

Chemistry.—The Jecker prize is awarded to Ph. Barbier, for his researches in organic chemistry; the Cahours prize to MM. Gain and Pierre Carré (in equal parts); Montyon prizes (unhealthy trades) to A. Frois, for his work on dust arising in industrial occupations, and Georges Claude, for his practical applications of liquid gases; the Berthelot prize to M. Fosse; the Fontannes prize to M. Pervinquier; the Bordin prize to F. Priem and M. Leriche.

Botany.—The Desmazières prize is not awarded, but M. Hariot and Mlle. Belèze receive honourable mentions; the Montagne prize is awarded to Ernest Pinoy, for his studies in the myxomycetes; the De Coigny prize to Paul Guérin.

Anatomy and Zoology.—For his work on the Coleoptera, Pierre Lesne receives the Savigny prize; Jules Bourgeois the Thore prize, for the whole of his entomological work.

Medicine and Surgery.—Montyon prizes are awarded to MM. Frouin, Tissot, Carré, and Vallée, and MM. Rennes, Chevassu, and Joly are accorded mentions, MM. Georges Rosenthal, Adrien Lippmann, and Soubies citations. The Barbier prize is awarded jointly to MM. Piettre and Vila, for their work on the blood of mammals and birds; the Bréant prize (interest, in equal parts) between MM. Vincent and Remlinger; the Godard prize to MM. Lamy and Mayer jointly, for their studies on the mechanism of urinary secretion; the Baron Larrey prize to Dr. Bonnette, for his memoir on the dangers attending the use of blank cartridge; the Bellion prize to M. Basset, for his book on pathological anatomy, J. Alquier receiving an honourable mention. The Mège prize is not awarded. The Serres prize is accorded to Albert Brachet, for the whole of his work on embryogeny.

Physiology.—The Montyon prize for experimental physiology is divided equally between J. Sellier, for his studies on the comparative physiology of digestion, of muscular contraction, and the special physiology of the encephalus, Henri Pottevin, for his studies on the soluble ferments, and F. X. Lesbre and F. Maignon (jointly), for their contributions to the physiology of the pneumogastric and spinal nerves. The Philippeaux prize is awarded to M. Lafon, for his experimental researches on diabetes and glycogen; the Lallemand prize to G. Pagano, for the whole of his researches on the nervous system; the Martin-Damourette prize to Eugène Collin, for his application of the microscope to the determination of substances of vegetable origin; the Pourat prize to J. Lefèvre, for his studies on the energetics of the animal body.

Statistics.—The Montyon prize is divided between MM. Deniker and Felhoen, MM. Risser and Laurent receiving mentions.

General Prizes.—Berthelot medals are awarded to MM. Barbier, Gain, Pierre Carré, Frois, and Georges Claude. Charles Frémont receives the Tremont prize and J. H. Fabre the Gegner prize. The Lannelongue prize is divided between Mmes. Béclard, Ruck, Cusco, and de Nabias; the Wilde prize between MM. Tikhoff and Charles Nordmann; the Saintour prize between Paul Gaubert and Émile Rivière; the Jérôme Ponti prize between Louis Bedel and Adrien Dollfus; the Houlevigue prize between MM. Debiegne, Petot, and E. Fabry. The Estrade Delcros prize is awarded to Jacques Hadamard; the prize founded by Mme. la Marquise de Laplace to P. M. E. Lancrenon; and the prize founded by M. Félix Rivot to MM. P. M. E. Lancrenon, G. E. A. Chavanes, and R. D. Blanchet.