and bring it into the regular planetary system. There will not be a transit in September and October for several years.—Note on the transits of hypothetical intra-Mercurial bodies over the sun, by M. Janssen [See separate article].—Industrial application of solar heat, by M. Mouchot. He presented a small solar alembic, with mirror 58 cm. diameter. The boiler contains one litre of wine which boils after half an hour in the sun. The vapour passes in a tube through the bottom of the mirror to the worm where it is condensed. With water in the boiler, and a receptacle for odoriferous leaves or flowers interposed between it and the worm, various essences may be distilled; or the steam may be used to cook vegetables.—Note on Phylloxera, by M. Lichtenstein.—On the theory of solar spots and the constitution of the sun, by M. Gazan. The spots he explains by continuous cooling of the sun, which changes the inferior layers of vapour of its atmosphere into liquid layers. The sun is a large earth, with nucleus in fusion, vapour and gases in a solid envelope, surmounted by a luminous liquid layer, and supporting an atmosphere of vapour and gas.—Discovery of the planet 168; telegram on September 28, by Mr. Joseph Henry, of Washington, to M. Leverrier. Discovered by Mr. Watson at Ann-Arbor.—Discovery of the planet 169 by M. Prosper Henry, by M. Leverrier.—Elements and ephemerides of the planet 164 Eva, by M. Bossert.—Influence of temperature on magnetisation, by M. Gaugain. If a steel bar, with one end in contact with a magnet, be several times heated and cooled between temperatures T and t, the corresponding magnetisms M and m assume variable values. The ratio $\frac{M-m}{m}$ expresses the value of this *temporary variation*. This coefficient increases considerably the further you go from the point of contact. The ratio $\frac{M-M_0}{M_0}$ expresses the value of the *permanent variation*; M_0 being the magnetisation at ordinary temperature at a given point, before heating, and M that obtained after a series of heatings. This coefficient also increases with distance from the point of contact, and more rapidly. The coefficient of temporary variation is independent (within certain limits) of the intensity of the magnetising force, that of permanent variation increases as the force diminishes.—Chemical reactions of gallium, by M. Lecoq de Boisbaudran.—On a skeleton of Hemiphractus, by M. Brocchi.—On the nature of the phenomena of cell division, by M. Fol. These are studied in Heteropoda, Sea Urchins, and Sagitta. They are occasioned by a fusion between the protoplasm and the nucleus, beginning at the two opposite poles of the nucleus. When reproduction commences the nucleus ceases to be the centre of the system, and the points of fusion become places of convergence for the currents of sarcode which run on all sides towards these new masses. The new nuclei result from partial liquefaction of these masses. They are then composed of a mixture of the substance of the old nucleus and the protoplasm of the cell.—Siphonation and migration of gases, by M. Bellamy. He describes several phenomena that may be distinguished from osmose proper (through a septum), in which there are conductors of large surface and length almost *nil*, while here the conductor has a narrow surface and a relatively great length.

GENEVA

Society of Physics and Natural History, August 3.—Prof. J. L. Soret gave an account of the results of a new series of researches in which he is engaged along with M. Edward Sarasin, on the rotatory polarisation of quartz, principally for the ultra-violet rays, to which these measurements have not been before extended. By means of Broch's method and by employing for this purpose the spectroscope with fluorescent eye-piece devised by M. Soret, a prism of spar and quartz lenses, they have carried their measurements as far as the line R. They have repeated, besides, a great number of determinations for the different lines of Fraunhofer in the visible part of the spectrum. Their results agree in a satisfactory manner for that part with those of the physicists who have preceded them. Moreover, they have found a striking agreement between their results as a whole from A to R and those which result from the formula given by M. Boltzmann for connecting the rotatory power with the wave-length.

VIENNA

Imperial Academy of Sciences, July 20.—The following, among other papers, were read:—Annual period of the insect fauna of Austria and Hungary; II., the beetles (*Coleoptera*), by M. Fritsch. This is in two parts, the first treating of times of appearance (observation of 5,025 species at sixty-five stations from 1852 to 1874); the second, of annual distribution.—On the vessel-nerves of the Ischiodon, by M. Stricker.—A contribution on the action of the heart, by M. Rokitansky. This refers to the action of richly-oxygenated so-called apnœic blood in the arteries and veins on the heart.—Microscopic studies on growth and change of hair, by M. Ebner. He shows that the inner root sheath is essential for hair formation, and though broken through by the hair, it grows during the whole hair-vegetation, in the lower part of the follicle with even greater rapidity than the hair. He defends Langer's view that the new hairs are formed in the old follicle and on the old papilla, and describes fully the mechanism of the process.—Researches on the influence of light and radiant heat on the transpiration of plants, by M. Wiesner. Both luminous rays and dark heat rays strengthen transpiration. Ultraviolet rays have probably little action of this kind. With a gas flame, the influence of the dark heat on transpiration is relatively more prominent than with sunlight (in the one case, *e.g.*, 57 per cent. of the action was due to the dark heat rays; in the other, 21 per cent.). The increase of transpiration of green plants through light is due to absorption of the light by the chlorophyll, and transformation of it into heat, whereby the tension of water vapour in the gas-spaces of the plant is increased, and so the relative moisture, and there is an escape of aqueous vapour into the atmosphere. Other colouring substances, such as etiolin, favour transpiration like chlorophyll by their power of changing light into heat, but in less degree.—Contributions to anatomy and morphology of the bud coverings of dicotyledonous woody plants, by M. Wiesner.—On the consequences of action of temperature on germination and germinating power of the seeds of *Pinus picea*, Du Roi, by M. Velten. The percentage and rapidity of germination warrants no sure inference as to germinating power of seeds. Heating of seeds may have a favourable or an unfavourable influence on the germinating power, according to the physiological state in which the seed is. The duration of the heating has an important influence on development of seeds, inasmuch as long heating at low temperatures can produce the same effect as short heating at high temperatures.—On the theory of waterspouts, by M. Boué. He opposes Faye's view that these are always formed from below downwards. He has witnessed some formed the other way.—M. Viktor v. Lang described an improvement on M. Broch's method of determining the rotation of the plane of polarisation by quartz.—On barometric measurement of heights, by M. Hann. This refers chiefly to influence of moisture on the results of such measurement, and shows how to take exact account of it where measurements of moisture are wanting, at the two stations whose difference of level is to be ascertained. He calculates from the observed air-temperature and an estimated *relative* moisture.—On the velocity of propagation of sound-waves from explosions, by MM. Mach and Sommer. The experiments show that this velocity rapidly increases with the violence and suddenness of the explosion.

CONTENTS

ERRATUM.—Vol. xiv. p. 506, col. 1, line 17 from top, for *applied, a coast*, read *applied to a coast*.