

by MM. M. Meslans and F. Girardet, the other by M. A. Colson. In the first paper, the method previously used with success by M. Meslans in the preparation of other organic fluorine derivatives, the treatment of the corresponding chloride with metallic fluorides, was employed. M. Colson used a rather different method, the action of the halogen acid upon the organic acid in presence of a dehydrating agent. With hydrogen fluoride, the anhydride of the organic acid gives the best results; thus with acetic anhydride the reaction is



The operation, which must be carried out in freezing mixture in a metallic flask, gives a theoretical yield. Acetyl fluoride boils at $20^{\circ}8$ under a pressure of 770 mm., and its density at 0° is 1.0369. Propionyl fluoride boils at 44° , and is lighter than water, its density at 15° being about 0.972. Benzoyl fluoride, which has already been prepared by M. Guenez, is best obtained by acting with benzoyl chloride upon dry zinc fluoride, and is a liquid of extremely irritating odour, boiling at 154° .

THE additions to the Zoological Society's Gardens during the past week include a Common Viper (*Vipera berus*), British, presented by Mr. S. Ockenden; four Japanese Teal (*Querquedula formosa*, δ δ δ δ) from North-east Asia; two Smews (*Mergus albellus*, δ δ), European, a Black Lark (*Melanocorypha yelltonensis*) from Siberia, purchased; a Purplish Death Adder (*Pseudechis porphyriaca*), a Punctulated Tree Snake (*Dendrophis punctularia*) from Australia, deposited; a Hybrid Pheasant Antelope (between *Tragelaphus gratus*, δ , and *Tragelaphus spekkii*, δ), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

PERRINE'S COMET.—A telegram from Kiel announces the re-discovery of Perrine's comet by Dr. Lamp, on February 13. At 17h. 40m., Kiel mean time, it was in R.A. 19h. 44' 8m. and decl. $-2^{\circ} 22'$. The R.A. agrees well with the ephemeris published in NATURE on January 23, but the south declination is about a degree greater than that predicted.

A NEW COMET.—Another telegram from Kiel is as follows: "New comet Perrine Lamp, February 15, 17h. 28' 6m., Kiel mean time; R.A. 19h. 26m. 44s., decl. $-1^{\circ} 1' 56''$; daily movement in R.A. 7m. 36s., in declination $2^{\circ} 57'$ towards the north; bright." The new comet is thus in the immediate neighbourhood of the original Perrine's comet, but it has a much more rapid movement. Both comets are in the constellation Aquila, rising about 4 a.m.

THE ZODIACAL LIGHT.—During the last three years the zodiacal light has been very carefully observed by E. Marchand, under the advantageous conditions afforded by the observatory of the Pic du Midi, at an altitude of 2860 metres (*Bull. Soc. Astr. de France*, February). Ordinarily this phenomenon is best seen during the evenings of spring or in the mornings of autumn; but in the absence of the moon, when the sky is clear, it is seen at all times of the year from the mountain observatory, completely encircling the celestial sphere. The limits of the luminosity have been plotted on charts, and taking the mean positions of the boundaries, it is found that the width of the belt of light is about 14° , and that it is very nearly a great circle inclined 6° or 7° to the ecliptic, with a longitude of about 70° for the ascending node. Now the inclination of the sun's equator is about 7° , and the longitude of the ascending node is about 74° ; hence, it is concluded that the central plane of the zodiacal light coincides with the plane of the sun's equator.

The observations support the idea that the attenuated cosmical matter of which the zodiacal light is probably composed extends all round the sun, in the form of a very flattened ellipsoid of revolution, to a distance well beyond the earth's orbit.

In the part of the sky opposite to the sun, the brightness of the light is not greater than that of the most feeble parts of the Milky Way, but it becomes much more intense as the sun is approached. The increase of brightness in the direction of the

sun, however, is more rapid than can be accounted for merely by the increased thickness observed, so that a greater condensation of cosmical matter in the neighbourhood of the sun seems probable. Near the horizon, the width of the zodiacal light seems generally greater than that which traverses the sky; but it is pointed out that this may be due to the same cause as that which makes the sun, moon, or constellations appear larger when near the horizon. The "Gegenschein," or counter-glow, does not appear to have been noted.

SURFACE DRIFT OF JUPITER.—A useful summary of the various determinations of the rotation period of Jupiter in different latitudes is given by Mr. Stanley Williams (*Monthly Notices*, lvi. No. 3). Nine distinct currents can certainly be recognised, and their boundaries are pretty sharply defined, though possibly varying slightly in position from time to time. These currents, with the exception of that including the red spot, completely encircle the planet, travelling due east and west, and giving little or no indication of any movement towards or from the poles. In the following tabular statement the number of the zone or current is followed by the geographical latitudes of its boundaries; then follows the average rotation period of the zone expressed in time and in terms of the equatorial period.

Zones.	Lat.	Period.		
		In time.		
		h.	m.	s.
I. ...	$+85^{\circ}$ to $+28^{\circ}$...	9	55	37.5
II. ...	$+28^{\circ}$,, $+24^{\circ}$...	9	54	30
		9	56	30
III. ...	$+24^{\circ}$,, $+20^{\circ}$...	9	48	0
		9	49	30
IV. ...	$+20^{\circ}$,, $+10^{\circ}$...	9	55	33.9
V. ...	$+10^{\circ}$,, -12° ...	9	50	20
VI. ...	-12° ,, -18° ...	9	55	40
VII. ...	-14° ,, -28° ...	9	55	40
VIII. ...	-18° ,, -37° ...	9	55	18.1
IX. ...	-37° ,, -55° ...	9	55	5

There is a remarkable want of symmetry in most of the currents. In the northern hemisphere the drift is nearly uniform from the pole to lat. 28° , and there is nothing equivalent to the red spot (zone VII.); in the southern hemisphere there is no counterpart of the region about lat. 25° , which is such a prominent feature in the northern hemisphere. It is suggested that atmospheric circulation in a north and south direction may take place through the narrow rifts which have been seen to traverse obliquely some of the belts and clear zones.

THE TEMPERATURE OF AIR AND THE PROBLEM OF AN ICE AGE.¹

THE mean temperature t of the air is determined by the balance of radiations received from the sun and from the soil with that given up towards the sky, and is ruled by the action of meteorological factors. According to Maurer's and Trabert's discussion of nocturnal temperatures, air radiation in the atmosphere is a linear function of its temperature; so radiations from soil and towards sky are expressed as proportional to the differences $[(t_s - t), (t - t_c)]$ of t from the mean temperature t_s of soil, and from the mean temperature t_c of an ideal stratum, the radiations of which would be equivalent to that of the whole atmosphere and of all the celestial bodies except the sun. This temperature t_c I call *temperature of the sky*.

Similarly, the mean temperature t_s of soil is determined (if we abstract from meteorological agents, that is in *solar climate*) by the balance of its radiation towards the sky [which is proportional to $(t_s - t_c)$] with that fraction of mean solar heat which is bestowed upon heating the surface considered. The mean annual solar heat received by unity of surface at the limits of the atmosphere (which is 0.305 of the solar constant at the equator) diminishes with the latitude λ , not as $\cos \lambda$, but, according to Wiener's computations, as the cosine of an auxiliary angle ζ , which is 0° at the equator, and $65^{\circ} 31'$ at the poles, and which repre-

¹ I beg permission to briefly review the assumptions upon which Section II., III. of "Le Cause dell' Era Glaciale" (Pavia, 1865) is based, and which the reviewer of the book in NATURE (No. 1348, vol. lii. p. 412) judged as far from satisfactory.—LUIGI DE MARCHI.