

had been noted in other places in Europe. This implied an alteration in the direction of the earth's axis. That is, the poles and equator, latitude and longitude, are not, as usually assumed, practically fixed data, but are liable to the general terrestrial law of flux. The amount of ascertained decrease of latitude at the end of the six months' period from August 1889 to February 1890 was half a second. But it was notified to the Conference that the Berlin observations for the half-year ending last August showed an increase of latitude amounting to 0.4, or two-fifths of a second. In other words, the fluctuation of the axis is due to a minute oscillation, probably owing to some changes in the internal mass of our planet, and not to be confounded with the precession of the equinoxes.

WE are glad to note that in his address at the opening of the present term at the Johns Hopkins University, Dr. Gilman, the President, was able to speak of the prosperous material condition of the institution after its recent difficulties. Many friends came forward to support the University in its time of trial; and the trustees have been able to make a most advantageous change in a considerable part of the endowment, so that a million of dollars, lately unproductive, now stand invested in an excellent security yielding a fixed and satisfactory income. Dr. Gilman devoted a part of his address to an account of the impressions produced upon him during his recent travels in Europe.

THE new number of the *Internationales Archiv für Ethnographie* (Band iii., Heft 5) opens with a valuable and interesting paper (in German) on Venezuelan clay vessels and figures both of ancient and of modern times, by Dr. A. Ernst, Curator of the National Museum at Caracas. Among the remaining articles is one in English, by Prof. Giglioli, on a remarkable and very beautiful ceremonial stone adze from Kapsu, New Ireland. The illustrations are up to the usual high level maintained by this admirable periodical.

MESSRS. G. PHILIP AND SON have issued a second edition of "The Unknown Horn of Africa," by the late F. L. James. This edition is preceded by an obituary notice of the author, who was killed by a wounded elephant on April 21, 1890, at San Benito, about 100 miles north of the Gaboon River on the west coast of Africa, and within a mile and a half from the shore.

THE Sanitary Institute has published a volume of Transactions, which, as vol. x., continues the series issued by the Sanitary Institute of Great Britain. It contains a full report of the Congress held at Worcester in 1888. Among the contents are papers on the sanitary aspects of the pottery manufacture, by Dr. J. T. Arlidge; on the public health in India, with special reference to the European army, by Sir H. S. Cunningham; sewage disposal, by Prof. H. Robinson; the technical education of plumbers, by Mr. H. D. Matthias; some recent results obtained in the practical treatment of sewage, by Dr. Percy F. Frankland; and the smoke nuisance, under the Alkali Acts, by Mr. H. Fletcher. We may also note a lecture to the Congress, by Sir Douglas Galton; and addresses to the working classes, by Prof. W. H. Corfield, Mr. Henry Law, and Dr. J. F. J. Sykes.

AMONG the contents of the "Papers and Proceedings of the Royal Society of Tasmania for 1889," just received, is an excellent note by Colonel W. V. Legge, R. A., on the Australian curlew and its closely allied congeners. Dealing with the migrations of the Australian curlew, he says it migrates north through the Malay Archipelago, being there met with on passage in Borneo, New Guinea, the Philippines, and other islands; thence northward along the coast of China to Amoor Land, and up to Lake Baikal, in which region it is supposed to breed. In Japan, it

has been met with as far north as Hakodadi. New Zealand seems to be its eastern limit.

DR. P. KUBORN, of the University of Liège, has prepared a French adaptation of Prof. D. J. Cunningham's "Manual of Practical Anatomy." The work is called "Guide de Dissection, et Résumé d'Anatomie Topographique." It is published by Marcel Nierstrasz, Liège; and G. Carré, Paris.

MR. WILLIAM HEINEMANN has published the "authorized translation" of Dr. Koch's paper on the cure of consumption—the paper contributed to the *Deutsche Medizinische Wochenschrift*.

A DISCOVERY, which may lead to important results, has been made by M. Chabrié during the course of his experiments upon the properties of the recently isolated gaseous fluorine substitution products of marsh gas. The intimate relation between these bodies and chloroform, and the possibility of their possessing even greater physiological activity, led M. Chabrié to investigate the action of one of them, methylene fluoride, CH_2F_2 , upon specific microbes, with the result that in the case of the particular bacillus experimented upon, the gas is found to absolutely destroy them. The bacteria in question, which have formed the subject of these first experiments, were those discovered by M. Bouchard, in 1879, in urine. Two eprouvettes of equal size were taken and filled with mercury over a mercury trough. Equal small quantities of urine containing colonies of the bacteria were introduced into each, and afterwards a mixture of air and methylene fluoride admitted into one of the eprouvettes, and an equal volume of air alone into the other. The two vessels were both maintained at the temperature of the body, 35° , for 24 hours. At the end of this time a few drops of the urine from each of the vessels were introduced into separate flasks containing sterilized culture medium, and both maintained at the same stove temperature for 24 hours, and again for 48 hours. At the expiration of this period the urine which has stood in contact with air alone was found to have given rise to a flourishing colony of the bacteria, while that which had been in contact with the mixture of air and methylene fluoride had not given rise to a trace of a culture. According to MM. Albarran and Hallé, twelve hours are ample for the development of this bacillus, hence methylene fluoride had evidently been fatal to the germs. The experiment was again repeated without the use of mercury, in sealed tubes, but with the same result. It appears, therefore, that methylene fluoride possesses the property of destroying the urinary bacteria in question. M. Chabrié has made special experiments in order to determine whether the gas possesses any local irritant action, and the results as far as they go appear to be eminently satisfactory. He is now directing his experiments upon the microbe of the hour, that of tuberculosis, and his results will doubtless be watched with considerable interest. Methylene fluoride is easily prepared by heating silver fluoride with methylene chloride in a sealed tube. M. Chabrié has also succeeded in preparing the higher homologue, $\text{C}_2\text{H}_4\text{F}_2$, ethylene fluoride, by the analogous reaction with ethylene chloride, and is extending his observations to the antiseptic properties of this latter gas. An account of the above experiments is given in the current number of the *Comptes rendus*.

OUR ASTRONOMICAL COLUMN.

A NEW COMET (?).—The following is an account that was received through Reuter, and printed in the *Times* on Monday last, relating to a comet that was visible at Grahamstown. If the statement is correct, we have represented here something that is quite unique in cometary phenomena. It has still to be explained how it was that a phenomenon of such a nature:

as this was not telegraphed home at the time, and why no confirmation has been received from other sources.

“*Cape Town, November 5 (via Plymouth).*”

“Mr. Eddie, F.R.A.S., reports from Grahamstown that a comet was seen at 7.45 p.m. on the 27th ult., and observed until 8.32 p.m., when the last trace faded in the south-eastern heavens. It travelled from nearly due west around the western and southern horizon at an altitude from about 20° to 25°, and disappeared in the south-east, performing during that very brief interval a journey stretching over at least 100°. It was at its longest fully 90° in length, while in width it did not exceed half a degree, except where it became very faint and slightly spread out at its posterior extremity, and where there were also faint indications of lateral division. The preceding portion was a point in cometary form, but no nucleus could be discerned.

“When first seen, it was inclined at an angle of about 45° towards the south, and was about 30° in length, but as it moved southward it became almost parallel to the horizon, with an altitude of about 20°, till it stretched along the southern horizon an enormously long, narrow, almost parallel, weird-looking riband of gray light moving visibly across the sky. It passed over several bright stars, notably α Centauri and β Argo Navis, but did not appear to dim their lustre. The moon was at the full.”

THE STARS 121 AND 483 BIRM.—Mr. Backhouse informs us that these irregular variable stars now appear to be near their maxima. He says:—“They are two of the most splendid red stars that are visible in a moderate-sized telescope; 483 is the deepest-coloured star that I am acquainted with of anything like its brightness, with the exception of R Leporis; 121 is usually nearly as deep, but at present seems not so red as usual.” Dunér has described the spectrum of each as Group VI. (Class III. *b*), but, as pointed out by Mr. Backhouse, it is possible that there may be variations with the maximum of luminosity, especially as one of them appears to have changed colour. The positions of the stars are 5h. 39m. 6s., + 20° 39', and 18h. 58m. 32s., - 5° 51' respectively.

APEX OF THE SUN'S WAY.—In *Astronomische Nachrichten*, Nos. 2999, 3000, Oscar Stampe gives an extended investigation into the position of the apex of the sun's way. The following are the numbers and groups of stars considered, and the values obtained:—

	Number of Stars.	Yearly Proper Motion.	Co-ordinates of Apex. R.A.	Decl.
Group I ...	551 ...	0 ^h .16 to 0 ^h .32	... 287 ^h .4 ...	+ 42 ^o .0
„ 2 ...	340 ...	0 ^h .32 to 0 ^h .64	... 279 ^h .7 ...	+ 40 ^o .5
„ 3 ...	105 ...	0 ^h .64 to 1 ^h .28	... 287 ^h .9 ...	+ 32 ^o .1
„ 4 ...	58 ...	1 ^h .28 and over	... 285 ^h .2 ...	+ 30 ^o .4
Mean 285 ^h .0	+ 36 ^o .2

This agrees well with the values found by Boss (*Astronomical Journal*, 213), viz.:—R.A. 280°, Decl. +40°, and does not differ considerably from Struve's values, viz.:—R.A. 273° 3', and Decl. +27° 3', or +37° 7', if Boss's correction be applied. The position of the apex may therefore be taken as somewhere near Vega.

ORBITS OF 61 CYGNI, CASTOR, AND 70 OPHIUCHI.—In the November number of the *Sidereal Messenger*, Mr. N. M. Mann discusses the orbits of these three interesting binaries. The period of 61 Cygni is shown to be 462 years. If this be so, then, taking the parallax of the binary as 0^h.55, the mass of the system is 1.45 times that of the sun. In a previous note (*Sidereal Messenger*, vol. ii. p. 22) the author found a period of 1159 years, whilst the combined mass of the connected bodies was concluded to be only one-seventh the sun's mass. New orbits have been calculated for Castor and 70 Ophiuchi. The latter star has made an entire revolution since the first good observation, hence it is probable that the elements computed are correct, and that the places given may be relied upon for many years.

TWO NEW COMETS (*e* AND *f* 1890).—Dr. Copeland announces, in *Edinburgh Circulars* Nos. 10 and 11, the discovery of a rather bright comet, by Prof. Zona, at Palermo, on November 15, at 10h. 24^m. local time. Its position then was R.A. 5h. 35m. 54^s., Decl. N. 33° 23'; daily motion minus 5m. 32s., and plus 17'. This comet was observed at Kiel on the

following day at 9h. 1^m. in R.A. 5h. 30m. 46^s., and Decl. N. 33° 37' 6".

Dr. Spitaler discovered a faint comet, not identical with the above, at Vienna, on the 16th inst., its place at 16h. 32m. local time then being R.A. 5h. 27m. 16^s., Decl. N. 33° 37' 16". It was in the constellation Auriga, and moving slowly towards the north-east, like Zona's comet.

THE STAR D.M. + 53° 2684.—The Rev. T. E. Espin announces (*Wolsingham Circular* No. 28) that this star, 710a in the Espin-Birmingham Catalogue, R.A. 21h. 37m. 6s., Decl. + 53° 49' (1890), was observed in the spring as 7.5-8.0 magnitude, but on November 15 was only of the ninth magnitude. The star is very red, with a magnificent spectrum of the third type (Group II.).

MATABELELAND.

AT the meeting of the Royal Geographical Society on Monday evening, Lieutenant E. A. Maund read a paper on Matabele and Mashona Lands. Mr. Maund was with Sir Charles Warren in South Africa in 1885, when he traversed and reported on Matabeleland. Since then he has spent much time in the country, accompanying Lobengula's two envoys to England about two years ago. He has thus had exceptional opportunities of observing both country and people, and moreover has had access to the official reports of Colonel Pennefather, the leader of the Pioneer Expedition into Mashonaland. After some introductory remarks, Mr. Maund proceeded to give a description of the country:—

“The physical features noticeable in Bechuanaland extend to the high veldt plateau of the Matopo Range, formed by vast sand-belts running east and west, varying in breadth from a few thousand yards to 50 miles, and in elevation, the crest above the trough, from a few feet to several hundred. These belts carry good grass and bush with camel-thorn trees, the bush being invariably thickest on the crest, but necessarily lacking a surface water-supply. This marked feature extends, with a few accidental variations caused by the outcropping of granite, limestone, and basaltic hills, probably from Namaqualand and Damaraland on the west to the Basuto Transvaal and Mashona Mountains on the east, and beyond the Zambezi northwards.

“The cause of these mysterious sand-belts suggests a problem in physical geography which must be left to geology to decide. They must have been raised in their present wave-like formation either by the aid of water or by a constant and powerful wind. The theory that this part of Africa was an elevated basin, which has gradually drained Zambeziward, is the most acceptable, as in the greatest depression about Lake Ngami and along the fertile valley of the Chobe there is still abundance of water. The continual washing backward and forward of the water has disintegrated the old red sandstone upper crust, and left the red sand in this formation like, on a small scale, the sand-ridges left on our sea-shore by the receding tide; while the kopjes of granite, which all have one form, stand out like rocks at low water.

“These kopjes are rocky hills, with the summits apparently denuded, leaving a flat table-top with short cliff-like edge, the *débris* having fallen in slopes at an angle of 45°, as though crumbled off as the tide fell. Beneath the sand formation is generally to be found a limestone sedimentary crust, which in the Kalahari undoubtedly preserves the water underneath from evaporation. Thus at a fountain near Vryburg, between Motito and Takoon, 20 feet beneath the surface there is a running stream 57 feet deep, doing no good to the soil, simply because it wants man, aided by science, to prevent its thus running to waste. The sandstone conglomerates at Kanje and Molopolali, and the banket formation in Matabeleland, were possibly formed by infiltration during this water age. The results of its energetic action is seen in the Matopo range, where you find hills formed of a single block of granite, looking in the distance like our Downs, but on closer inspection this gentle slope is rounded off and polished by the action of the sand-laden water. Detrition has made it as smooth as the shingle-pebbles on our shores. These hills are a favourite haunt of baboons, as immediately they are disturbed they scamper over the steepest and roughest hills, where you cannot follow them. There is apparently no glacial action, but *moulins* I have frequently found of all sizes in the smooth surface, often with the rounded boulder *in situ*. Indeed, for a long time, until I found them large and the boulder