

tinuation of the lists which appeared in the *Scottish Naturalist* for 1886 and 1887. Mr. Bennett says that the results during the year 1887 were probably richer than in any former year, not only in the large number of comital records, but in the new species added to the Scottish flora.

WE have received several numbers of the *Annales de la Faculté des Sciences de Toulouse* (Paris: Gauthiers-Villars). This new publication (which is well printed on good paper, with wide margins) consists chiefly of memoirs relating to physics, chemistry, and mathematics pure and applied. It contains also articles on questions of general scientific interest. To papers of the latter class the authors append lists of books on the questions discussed.

ACCORDING to a paper in the *Board of Trade Journal* for April, the production of attar of roses constitutes one of the most important branches of native industry in Bulgaria. The valley of Kezanlyk, known as the Vale of Roses, is the centre of this production, which extends as far as Carlovo, and the villages which lie sheltered from the north wind by the vast chain of the Great Balkans. In 1885, and no later statistics have been published, the manufacture of attar of roses in the district indicated amounted to a value of 1,100,000 francs. The prosperous condition of the valley of Kezanlyk has led other districts of Bulgaria to develop the same industry, and particularly the inhabitants of Strema, and of Toundja, at the foot of Mount Rhodope. It is not yet certain that the attar from these new countries will equal in quality the famous product of Kezanlyk. The Government, however, is anxious to encourage this movement, and the Department of the Interior has lately authorized the purchase of a certain quantity of attar prepared at Strema and at Toundja. Specimens of each are to be sent for examination at the laboratory of the University of Moscow, and the result is to be published.

FROM an official report just published it appears that in 1886 there were killed in Norway 114 bears, 37 wolves, 5618 foxes, 950 eagles, 5100 hawks, and 108 other animals of prey. The number of bears was slightly below that of 1885, but above the numbers of previous years, whilst the number of wolves was twice that of 1885. The number of foxes, on the other hand, was only half that of the previous year, whilst those of eagles and hawks were about the same.

IN last week's NATURE (p. 581), near the middle of the second column, for "Ekholm of Hagström," read "Ekholm and Hagström."

THE additions to the Zoological Society's Gardens during the past week include a Common Marmoset (*Hapale jacchus*) from South-East Brazil, presented by Mrs. Leighton; a Striped Hyæna (*Hyæna striata*) from Morocco, presented by Mr. Herbert E. White; an Indian Wolf (*Canis pallipes* ♂), two — Foxes (*Canis* —), a — Hawk Eagle (*Spizaetus* —) from India, presented by Colonel Alex. A. A. Kinloch, C.M.Z.S.; two Rock-hopper Penguins (*Eudyptes chrysolome*) from Auckland, New Zealand, presented by Captain Sutcliffe, R.M.S.S. *Aorangi*; a Gannet (*Sula bassana*), British, presented by Miss Serrell; three Common Swans (*Cygnus olor*), British, purchased; a Chinchilla (*Chinchilla lanigera*), a Barbary Wild Sheep (*Ovis tragelaphus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

PHOTOGRAPHY IN THE DETERMINATION OF THE MOTIONS OF STARS IN THE LINE OF SIGHT.—Of the many developments of spectroscopy, one of the most interesting is that first made a practical branch of observation by the skill and patience of Dr.

Huggins, viz. the determination of the motions of stars in the direction of the visual ray by measures of the displacement of the more prominent lines in their spectra. The research has, however, always been beset with many practical difficulties, one of the most serious being the manner in which the stellar lines seem to elude the sight when the air is disturbed. This hindrance has been especially felt at Greenwich, where this kind of work has been adopted as part of the ordinary routine, and where, in consequence, it has not been possible, as would be the case in a private observatory, to confine observation to nights of faultless definition. Many of the observations have, therefore, been exceedingly rough, or even discordant. Prof. H. C. Vogel, who had made some successful measures of the displacements of lines in three or four of our brightest stars soon after Huggins's first observations, has recently turned his attention to photography as a means of overcoming this difficulty, and his first results, given in a paper read before the Royal Prussian Academy on March 15, are very promising. Prof. Vogel finds that the atmospheric tremors, so wearisome to the eye, exercise no influence upon the photograph, which possesses the additional advantage of being free from all bias or predisposition. Dr. Scheiner, who has been carrying out these experiments, has examined seven spectra, viz. those of Sirius, Procyon, Castor, Arcturus, Aldebaran, Pollux, and Rigel. Of these, Sirius showed a slight displacement to the red, Procyon a decided displacement, and Rigel very large in the same direction, whilst Arcturus showed a considerable displacement towards the violet. The observations were made on the third line of hydrogen, H γ , a train of two prisms of high dispersion being used.

THE TOTAL LUNAR ECLIPSE OF JANUARY 28.—Dr. E. Lindemann sends the following list of the number of occultations observed at different Observatories during this eclipse, in addition to the lists given already: Albany (U.S.), 7; Christiania, 28; Milan, 23; Bonn, 7; Durban (Natal), 17; Oxford (Radcliffe), 9; Bruxelles, 14; Liège, 5; Palermo, 8; Cape of Good Hope, 21; Madras, 10. The weather was cloudy at Warsaw.

NEW MINOR PLANETS.—Herr Palisa discovered a new minor planet, No. 274, on April 3, and another, No. 275, on April 13. The latter is his sixty-third discovery. No. 269 has received the name of Justitia.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 APRIL 29—MAY 5.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on April 29

Sun rises, 4h. 36m.; souths, 11h. 57m. 10'3s.; sets, 19h. 18m.; right asc. on meridian, 2h. 28'7m.; decl. 14° 41' N. Sidereal Time at Sunset, 9h. 51m.

Moon (at Last Quarter May 3, oh.) rises, 22h. 21m.*; souths, 2h. 46m.; sets, 7h. 6m.; right asc. on meridian, 17h. 15'7m.; decl. 19° 30' S.

Planet.	Rises.		Souths.		Sets.		Right asc. and declination on meridian.	
	h.	m.	h.	m.	h.	m.	h.	m.
Mercury..	4	23	11	11	17	59	1	42'0
Venus.....	4	8	10	44	17	20	1	15'8
Mars.....	16	45	22	25	4	5*	12	58'3
Jupiter....	21	25*	1	40	5	55	16	9'9
Saturn....	9	40	17	38	1	36*	8	10'8
Uranus....	16	42	22	20	3	58*	12	53'2
Neptune..	5	35	13	17	20	59	3	48'6

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich).

May.	Star.	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image.	
					h. m.	h. m.
1	50 Sagittarii	6	3 19	3 33	359	339
3	31 Capricorni	6½	2 50	3 43	112	214
May.	h.					
5	18					

Mars in conjunction with and 0° 35' north of Uranus.

Variable Stars.

Star.	R.A.		Decl.		h.	m.
	h.	m.	h.	m.		
U Cephei ...	0	52.4	81	16 N.	May 2,	2 40 m
ζ Geminorum ...	6	57.5	20	44 N.	Apr. 29,	20 0 m
U Monocerotis ...	7	25.5	9	33 S.	May 1,	M
T Geminorum ...	7	42.6	24	1 N.	Apr. 29,	M
R Crateris ...	10	55.1	17	43 S.	„ 30,	m
T Ursæ Majoris ...	12	31.3	60	6 N.	May 2,	M
U Boötis ...	14	49.2	18	9 N.	Apr. 29,	M
δ Libræ ...	14	55.0	8	4 S.	May 1,	21 38 m
U Coronæ ...	15	13.6	32	3 N.	Apr. 30,	22 56 m
U Ophiuchi ...	17	10.9	1	20 N.	May 2,	2 10 m
W Sagittarii ...	17	57.9	29	35 S.	„ 5,	3 0 M
R Scuti ...	18	41.5	5	50 S.	Apr. 29,	M
β Lyræ ...	18	46.0	33	14 N.	May 5,	1 0 M
S Sagittæ ...	19	50.9	16	20 N.	Apr. 30,	0 m
					May 3,	0 M
T Delphini ...	20	40.2	16	0 N.	„ 1,	M
T Vulpeculæ ...	20	46.7	27	50 N.	Apr. 30,	22 0 M
					May 1,	23 0 m
δ Cephei ...	22	25.0	57	51 N.	Apr. 29,	21 0 M

M signifies maximum; m minimum.

Meteor-Showers.

	R.A.	Decl.	
Near ζ Ursæ Majoris ...	206	57 N.	Slow, bright.
„ β Libræ ...	228	5 S.	Rather slow.
„ δ Serpentis ...	233	10 N.	Swift.
„ ν Herculis ...	239	46 N.	Swift, faint.
„ ξ Ophiuchi ...	255	21 S.	Rather slow, long.
„ η Aquarii ...	337	2 S.	Swift, long, streaks.

GEOGRAPHICAL NOTES.

THE Founder's Medal of the Royal Geographical Society has been awarded to Mr. Clements R. Markham, C.B., F.R.S., on his retirement, after twenty-five years' service, from the Honorary Secretaryship of the Society, during which he has done so much for the promotion of geography. The announcement of Mr. Markham's retirement will be received with regret by all who know the value of the work he has done, both in connection with the Society and otherwise. But as he is still in his vigour we may look for many more years' good work from him. The Royal Medal has been awarded to Lieut. Wissmann, who has twice crossed Africa, and done a great amount of excellent exploring work in the region south of the Congo. The Murchison Grant has been awarded to Mr. James McCarthy, Superintendent of Surveys in Siam; the Gill Premium to Mr. Charles M. Doughty, for his explorations in Arabia; and the Cuthbert Peek Grant to Major Festing for his services as cartographer on the Gambia River. As honorary corresponding members, have been selected Dr. G. Radde, of Tiflis, Dr. H. Rink, of Copenhagen, and Dr. Rein, Professor of Geography at Bonn University.

Two papers were read at Monday's meeting of the Royal Geographical Society, one by the Rev. T. S. Lea, on the Island of Fernando Noronha, and the other by Colonel Sir Marshall Clarke, on Basuto Land. Mr. Lea accompanied Mr. H. N. Ridley on his mission to Fernando Noronha last year. The islands are 290 miles north-east of Pernambuco. The total length of the whole group from north-east to south-west is about 6½ geographical miles, and the maximum width of Fernando itself 1½ mile. The north-east cape of that island is very rugged and precipitous, though of no great height. Boobie Island and Egg Island are also raised masses of reef rock, which again appears on the top of the basalt of Platform Island. Mount St. Michael is a phonolite peak on which the weed invasion has hardly found a footing, and the native plants still flourish. This phonolite is a gray, close-grained columnar rock, and it seems to be the key to the very interesting geology of the island. Platform Island and Egg Island have a connection at low water with the main island, a small mass of reef rock. Morro do Chapeo, or the Hat Rock, seems to represent the residue of a larger block. The north cape of the main island is stony, and there is no great wealth of vegetation, though even here many of the endemic plants may be found. There is a patch of blown sand at San Antonio over which the *Ipomea pes-capræ* trails, and beyond that the ground rises towards the basaltic height on which the town is

built. The basalt is more inclined to be nodular than columnar. Descending from the town hills, the peak stands out clear against the northern sky. It is a huge mass of columnar phonolite, with a talus of debris around it, in shape not unlike a church with a tower. About the centre of the plain rises a round mass of phonolite. On the south coast, like bastions, stand two other phonolite masses, with a ridge of basalt between them, steep on its seaward side, but sloping gradually landwards. The islands of the south coast, with the exception of the minute I. Jones, are also phonolite. Tobacco Point is basaltic, and Morro Branco, in Leão Bay, altered phonolite. There are raised beaches of reef rock on Tobacco Point and to the east of Look-out Hill. Mr. Lea hazards the following observations with regard to the structure and possible history of the main island. Though undoubtedly volcanic in origin, the date at which it was in any way active must be exceedingly remote. No hot springs, or any trace of them, occur; no earthquakes or tidal waves are felt. No site of a crater can be pointed to with certainty, and indeed any attempt to reconstruct its pristine shape from the attenuated remains that are left us must be undertaken with extreme diffidence. As the island is surrounded by deep sea, and as nothing volcanic occurs, as far as he is aware, on the coast of Brazil in its neighbourhood, he is inclined to think that it marks the site of an isolated vent. The number of species of plants, &c., peculiar to the island seems also to point to this, or at any rate to the extreme remoteness of any connection with other land. But there is at least one thing which may throw some light on this matter. All round the island, though interrupted in places, especially on the northern coast, there is a sort of reef formation laid bare at low water, and closely resembling the Recife of Pernambuco. At certain points a very similar rock is found at considerable heights above the sea. On Rat Island this reef attains no great elevation. It rests upon a beach of rounded boulders near the landing, which may be seen underlying it. Boobie Island and Egg Island also have it, and there are traces of it at the summit of Platform Island. On basalt in Cotton-tree Bay, close by Look-out Hill, it occurs at a yet greater height, and again on Tobacco Point and I. Jones it also occurs above high-water mark. Raised beaches, therefore, seem only to exist on basalt, and in close connection with a phonolite peak. Mr. Lea suggests that the phonolite regions mark the sites of the ancient vents of the volcano, the phonolite itself being the plug which remained fixed during subsequent eruptions of lava. The scoria is all but gone, only remaining where the basalt covers it, but the harder phonolite still remains in its place, and the raised beaches show that beneath it lay the forces which manifested themselves in the last expiring efforts of the volcano. The flora and fauna of the group have already been very fully described by Mr. Ridley.

SIR MARSHALL CLARKE's paper described an official tour he made in Basuto Land, last October, to visit the Baltokoa tribe settled among the mountains. He traversed 400 miles of country, a large proportion of which had never been visited by Europeans. The highest point attained was 10,750 feet; but from thence, both north and south, distant heights appeared at great elevations.

ANTAGONISM.¹

SOME months ago, shortly after I had resigned my office of Judge of the High Court, I was expressing to a friend my fear of the effect of having no compulsory occupation, when he said, by way of consolation, "Never mind, for Satan finds some mischief still for idle hands to do." You may possibly in the course of this evening think he was right. I have chosen a title for my lecture which may not fully convey to your minds the scope of the views which I am going to submit to you. I propose to adduce some arguments to show that "antagonism," a word generally used to signify something disagreeable, pervades all things; that it is not the baneful thing which many consider it; that it produces at least quite as much good as evil; but that, whatever be its effect, my theory—call it, if you will, speculation—is that it is a necessity of existence, and of the organism of the universe so far as we understand it; that motion and life cannot go on without it; that it is not a mere casual adjunct of Nature, but that without it there would be no Nature, at all events as we conceive

¹ Lecture delivered at the Royal Institution, on April 20, by the Right Hon. Sir William R. Grove, F.R.S.