

containing thus, with the first Armagh Catalogue, a complete record of all the meridian work accomplished at the Observatory since 1827; for the results published in the *Transactions* of the Royal Dublin Society in 1872, and forming a catalogue of 1000 stars, have been incorporated in the present work, as there were numerous unpublished observations of many of the stars there given.

The R.A.'s of the present Catalogue depend on the standard stars of the *Nautical Almanac*, four or five of which were observed on each night, whilst the N.P.D.'s depend upon observations of the nadir point, the adopted being $54^{\circ} 21' 12'' \cdot 70$. Dr. Robinson's investigation of the division-errors of the circle (*Mem. R.A.S.*, vol. ix.), and also his refraction-tables (Armagh Catalogue, pp. 834-35) have been used. The details of the construction of the refraction-tables, which may be considered as identical with Bessel's, are given in the *Transactions* of the Royal Irish Academy, vol. xix. The places of the stars are reduced to the epoch 1875'0, with Struve's constant, but proper motions were never taken into account. The Catalogue, which is very clearly printed, and forms a very compact and neat-looking volume, contains for each star its number in Lalande, its magnitude, generally from the DM., its mean R.A. and N.P.D. for 1875'0, together with the annual precession, the number of observations, the epoch and references to other modern star catalogues, this last column being very complete. The secular variation has been omitted. The introduction also contains a comparison between the present Catalogue and Prof. Grant's Glasgow Catalogue of 6415 stars, not only because it was deduced from observations made nearly at the same time as the Armagh observations and depended in R.A. on the *Nautical Almanac* stars, but also because it had already been rigorously compared by Prof. Auwers with his "Fundamental Catalogue." From the comparison of 539 which the two catalogues have in common, it would appear that the Armagh and Glasgow Catalogues, though perfectly independent of each other, are in fair agreement, so far as N.P.D.'s are concerned. But the R.A.'s appear less satisfactory, as considerable discordances are evident. These Dr. Dreyer thinks may be readily accounted for, partly by the one-sided character of the instrument, partly by the conjecture that perhaps the azimuth found by observing the meridian mark may not be strictly applicable on the opposite (south) side of the zenith. The comparison with Auwers's "Fundamental System" gives a similar result, the N.P.D.'s agreeing much better than the R.A.'s. The probable error of a single observation found from 400 observations of 80 stars between 30° and 100° N.P.D. was R.A. $\pm 0\cdot 08$ ts., N.P.D. $\pm 0\cdot 85$.

Great credit is due to Mr. Faris for his perseverance in continuing and reducing the observations during thirteen years, and to the present Director for his energy in completing and publishing the entire results, which will not fail to be a useful addition to our star catalogues.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 DECEMBER 19-25

(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 December 19

Sun rises, 8h. 4m.; souths, 11h. 57m. $21^{\circ} 55'$; sets, 15h. 50m.; decl. on meridian, $23^{\circ} 26'$ S.; Sidereal Time at Sunset, 21h. 43m.

Moon (one day after Last Quarter) rises, 0h. 42m.; souths, 6h. 52m.; sets, 12h. 51m.; decl. on meridian, $1^{\circ} 8'$ S.

Planet	Rises		Souths		Sets		Decl. on meridian
	h. m.	...	h. m.	...	h. m.	...	
Mercury	6	3	10	26	14	49	$18^{\circ} 54'$ S.
Venus	8	25	12	14	16	3	$23^{\circ} 58'$ S.
Mars	10	0	14	2	18	4	$22^{\circ} 4'$ S.
Jupiter	2	53	8	3	13	13	$10^{\circ} 31'$ S.
Saturn	17	35*	1	39	9	43	$21^{\circ} 38'$ N.

* Indicates that the rising is that of the preceding evening.

Occultations of Stars by the Moon (visible at Greenwich)

Dec.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image	
					h. m.	h. m.
19	γ Virginis...	$2\frac{1}{2}$	1 50	2 34	74	170°
19	B.A.C. 4277	6	2 55	3 21	100	148

Dec.	h.	...	...	...
20	15	...	...	Jupiter in conjunction with and $3^{\circ} 24'$ south of the Moon.
21	—	...	...	Sun at greatest declination south; shortest day in northern latitudes.
22	14	...	...	Mercury at greatest elongation from the Sun, 22° west.

Variable Stars

Star	R.A.		Decl.		h. m.
	h. m.	...	...	...
U Cephei	0	$52^{\circ} 2'$	$81^{\circ} 16'$	N.	Dec. 23, 0 44 m
Algol	3	$0^{\circ} 8'$	$40^{\circ} 31'$	N.	" 24, 4 9 m
λ Tauri	3	$54^{\circ} 4'$	$12^{\circ} 10'$	N.	" 20, 6 42 m
U Monocerotis	7	$25^{\circ} 4'$	$9^{\circ} 32'$	S.	" 24, 5 35 m
W Virginis	13	$20^{\circ} 2'$	$2^{\circ} 47'$	S.	" 22, M
δ Libræ	14	$54^{\circ} 9'$	$8^{\circ} 4'$	S.	" 24, 21 30 m
U Coronæ	15	$13^{\circ} 6'$	$32^{\circ} 4'$	N.	" 20, 20 33 m
V Ophiuchi	16	$20^{\circ} 4'$	$12^{\circ} 10'$	S.	" 23, 4 24 m
R Scuti	18	$41^{\circ} 4'$	$5^{\circ} 50'$	N.	" 24, 6 48 m
δ Cephei	22	$24^{\circ} 9'$	$57^{\circ} 50'$	N.	" 24, M

M signifies maximum; m minimum.

Meteor-Showers

Ursa Major supplies a couple of radiants at this season—one near γ , R.A. 131° , Decl. 48° N., the other near α , R.A. 157° , Decl. 64° N. December 19 and 21 are fireball dates.

SANITARY PROGRESS DURING THE REIGN OF THE QUEEN¹

IN opening the meetings of the One Hundred and Thirty-third Session, it appeared to me that, as we are entering upon the jubilee year of the Queen's reign, it might be interesting to take stock, as it were, of the progress which has been made by the nation in some one of the branches of usefulness to which the proceedings of this Society have contributed; and it occurred to me that the most fitting subject to select would be that of the progress which has been made in sanitation during Her Majesty's reign.

The year 1838 was the first complete year of registration.

The first report of the Registrar-General brought forward the sanitary condition of different parts of the country, and of different classes of the population. Disease was as prevalent amongst the labouring population in rural villages as it was in the most crowded and filthy districts in towns, and, on the motion of the Bishop of London, the House of Lords, in August 1839, presented an address to the Queen, begging her to direct an inquiry into this prevalence of disease. From this period may be said to date that great social and sanitary movement which has tended so largely to ameliorate the moral as well as the physical condition of the people of this island, and which forms one of the most prominent features of the Queen's reign.

The Poor-Law Commissioners were directed to report upon the condition of the labouring classes; and the direct evidence of much preventable disease, which the records of disease and death furnished from all parts of the country, formed the basis on which the Commission founded their recommendations. In towns, the people were crowded in courts and alleys; they swarmed in cellars which were neither ventilated nor drained. In 1837, it was calculated that one-tenth of the population of Manchester, and one-seventh of the population of Liverpool, lived in cellars.

The dead were buried in overcrowded churches, chapels, and churchyards in the middle of towns. The rural districts were no better.

In the towns this condition of things arose from the great increase of population which had been taking place for some years previously, coincident with the rapid expansion of our trade and manufactures, coupled with the absence of legislative provisions to meet the new exigencies which had arisen, and with which the older laws, in consequence of that increase, were unable to cope.

But there were other active causes. For instance, the Commissioners state that parochial administration operated mischievously in degrading the habitations of the labouring classes,

¹ Abstract of Address by Capt. Douglas Galton, C.B., F.R.S., at the opening of the Session of the Society of Arts.