

assumed values of their revolutions." It would be interesting to know how Mr. Stone reconciles the former of these statements with the facts of Table IV. observed by himself, and how he reconciles the latter statement with the facts of Tables VII. and VIII.

The general conclusions appear to be :

1. The errors of screws of Transit-Circles require much more frequent examination than it has been customary to give them.

2. Steel screws should be substituted for the present gun-metal screws of the Cape Circle Microscopes, the latter being far too subject to change from wear.

3. Three of the six microscopes should be reversed (as has already been done at Greenwich), so that the springs may press the bearings of the screws in the opposite direction. This precaution, however, is not a complete cure, as the errors produced by wear affect the screw readings most near the point of greatest compression of the spiral springs, and the curve of correction is thus not symmetrical with the middle of the range. Besides this, it will be seen from Table I. that the wear may be very different for the six screws, although doubtless they were supposed to be made of precisely the same material.

4. The N.P.D. results of the *Cape Catalogue* for 1880 must be corrected for screw errors, and the latitude determination be rediscussed before these results can be admitted into any fundamental determination such as that of the constant of refraction. It is not improbable that the large *cosine* term in the flexure which is so marked in 1871 and 1872 may be due in part or in whole to errors of the screw, coupled with systematic observation of the Nadir near $5^{\circ}3'$, as the N.P.D. of each star will be affected by errors which have a considerable + sign for the most usual readings (see Table VII.).

Royal Observatory,
Cape of Good Hope
1884, Nov. 5.

Spectroscopic Observations made at the Earl of Crawford's Observatory, Dun Echt, Aberdeen. By Ralph Copeland, Ph.D.

Under the direction of Lord Crawford a number of sweeps over the heavens have been made here this autumn in search of small nebulae and other objects with remarkable spectra. The instrument used is the 6.06-in. Simms Equatorial, with a Secchi prism in front of the object-glass. In examining the richer part of the milky way about *Cygnus* four nebulae and one star with a spectrum of bright lines, which seem not to have been pre-

viously noticed, were found in the earlier sweeps. Later sweeps in the same part of the heavens have not added to the list, although many known nebulae and red or variable stars have arrested attention. On September 22 Comet Wolf was found by its spectrum, twelve hours before the news of its discovery had reached Dun Echt, the announcement having been accidentally delayed in the telegraph office at Kiel.

The places of the five objects are :—

R.A. 1884.			Decl. 1884.			When found.	Remarks.
h	m	s	°	'	"	1884.	
20	5	9 ^h 82	+16	34	53 ^h 3	Sept. 17	Equal in brightness to a star 10.2 mag. Diam. <i>n</i> and <i>s</i> 4".6 by micrometer. It has an 11 mag. star at 222° 27', distant 84".2.
20	6	44 ^h 09	+46	7	2 ^h 3	Sept. 20	Planetary nebula ; most of the light in a single line.
20	7	33 ^h 43	+19	38	30 ^h 4	Sept. 17	Nebula about 2½" diam., equal to a 9.8 mag. star. Follows η <i>Sagittæ</i> 7 ^m 32 ^s .77, 61".15 to the south.
20	7	52 ^h 99	+38	0	26 ^h 8	Sept. 22.	This is the 7.1 mag. star, D.M. + 37°, 3821. It has a spectrum of several bright lines near D, and a very bright band in wave-length 464 ^{mm} . The place is from B.W.2.
20	9	40	+12	23	3	Sept. 22	This seems to be identical with the 9.5 mag. star D.M. + 12°, 4266. It is in reality a planetary nebula about 4" in diameter with a nearly monochromatic spectrum.

The fourth object is probably the most interesting of the series. It is practically a member of the same group as the three stars of the same type found by Messrs. Wolf and Rayet to which Professor Pickering has added a fourth. This is the brightest object of its class in the northern heavens. It is intended to examine its spectrum shortly with improved appliances.

Dun Echt :
1884, Dec. 11.

An Occulting Eye-piece. By Edmund J. Spitta, M.R.C.S.
Eng., L.R.C.P.Lond.

This arrangement consisting essentially of a shallow cylindrical brass box containing four shutters, placed in front of a tube carrying the lenses, is convenient in construction, and when screwed in to the telescope in place of an ordinary eye-piece, does not interfere with the comfort of the observer, is easily under his command, and not weighty enough to require a counterpoise.

The box containing the shutters, about a quarter of an inch deep, and one and a half in diameter, is pierced at its circum-