

Wharnton; a Snow Bunting (*Plectrophanes nivalis*), European, presented by Mr. J. Young, F.Z.S.; a Common Boa (*Boa constrictor*) from Venezuela, presented by Mr. R. J. Money; a White-thighed Colobus (*Colobus vellerosus* ♂) from West Africa, a Cape Ratel (*Mellivora capensis* ♂) from South Africa, an Arctic Fox (*Canis lagopus* ♀) from the Arctic Regions; four Spoonbills (*Platalea leucorodia*), European, a Short-toed Lark (*Calendrella brachydactyla* ♂) from Algeria, purchased; four Australian Wild Ducks (*Anas superciliosa*), two Slender Ducks (*Anas gibberifrons*), eight Chilian Pintails (*Dafila spinicauda*), six Summer Ducks (*Ax sponsa*), four Mandarin Ducks (*Ax galericulata*), two Red-crested Pochards (*Fuligula rufina*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

OBJECTS FOR THE SPECTROSCOPE.

Sidereal Time at Greenwich at 10 p.m. on July 24 = 18h. 10m. 17s.

Name.	Mag.	Colour.	R.A. 1890.			Decl. 1890.		
			h.	m.	s.	°	'	"
(1) G.C. 4390	—	—	18	6	45	+ 6	49	
(2) G.C. 4403	—	—	18	14	17	—	16	13
(3) D.M. + 43° 2890 ...	8	Reddish-yellow.	18	3	29	+ 45	26	
(4) η Serpentis	3	Yellow.	18	15	36	—	2	56
(5) γ Opbiuchi	3	White.	17	42	16	+ 2	45	
(6) D.M. + 36° 3243 ...	8	Red.	18	39	0	+ 36	50	

Remarks.

(1) This small bright nebula was thought by W. Struve to be one of the most curious objects in the heavens. The G.C. description is: "A planetary nebula; very bright; very small; round; a little hazy." According to D'Arrest, its diameter is about 7". The observations of Dr. Huggins and Captain Herschel show that the spectrum consists of the three chief nebula lines, and a faint continuous spectrum. Dr. Huggins also notes that "the lines are exceedingly sharp and well-defined." This latter observation requires confirmation, and the spectrum should also be examined for other lines, as we know that a greater number of lines are seen in other nebulae of the same class.

(2) This is the so-called "Horse-shoe Nebula," which is thus described by Herschel: "A very remarkable object; bright; extremely large; extremely irregular figure; 2-hooked." The spectrum has been observed both by Dr. Huggins and Captain Herschel. The former noted in 1866 that the line near λ 500 was visible, in addition to a faint continuous spectrum, and added: "When the slit was made as narrow as the intensity of the light would permit, this bright line was not so well defined as the corresponding line in some of the other nebulae under similar conditions of slit, but remained nebulous at the edges." It will be seen that this observation gives the chief line a very different character to the preceding one (4390), and it is very desirable that the discrepancy should be cleared up, especially as Dr. Huggins has recently stated that the line is always seen sharp and well defined, although there is no evidence to show that he has reobserved the nebulae in which he formerly recorded it as ill defined. It is important that both nebulae should be examined as nearly as possible at the same time with the same instrumental conditions. Captain Herschel simply writes: "Bright object; bright lines."

(3) The spectrum of this star is one of great interest in connection with the view that stars of Group II. are similar in constitution to comets. Dunér states that, notwithstanding the small magnitude of the star the bands are very well seen even in the ultra blue, and that they are so wide and dark that the spectrum is totally discontinuous, especially in the blue-green and the blue. Now it seems pretty evident that all the light referred to in the blue in a faint star like this cannot be due simply to continuous spectrum, and it is therefore probably due to the radiation of some substance. This substance is probably carbon,

giving a series of bright flutings in the blue-green and blue, and giving rise to apparent dark bands, which are in all probability simply the dark spaces between the bright flutings. The measurements made by Dunér and Vogel of the bands in other stars show close coincidences with the carbon flutings, but the question can only be finally decided by direct comparisons. If the existence of the carbon flutings be confirmed, then we must conclude that stars of Group II. and comets showing the same series of flutings are identical in constitution.

(4 and 5) These are stars of the solar type and of Group IV. respectively, and the usual more detailed observations are required in each case.

(6) The observations of Secchi and Dunér show that the spectrum of this star is a well-marked one of Group VI.; but the only details observed were three "zones" separated by two strong dark bands. Further details and deviations from the regular type should be looked for. A. FOWLER.

NICE OBSERVATORY.—The third volume of the "Annales de l'Observatoire de Nice" contains a new map of the solar spectrum by the late M. L. Thollon, the whole of the theory of the minor planet Vesta by M. Perrotin, the Director of the Observatory, and numerous observations of comets and planets made by M. Charlois.

The part of the spectrum mapped by M. Thollon extends from A to b, and is contained on seventeen beautifully engraved plates, each having two horizons 32 cm. long. The whole length is thus a little over ten metres, and the number of lines contained in it is about 3200, of which 2090 are said to have a solar origin, 866 are purely telluric, and 246 have a mixed origin—that is to say, they result from the superposition of solar and telluric lines.

Each of the 33 horizons is divided into millimetres, from 0 to 320, hence the lines can easily be read off to 1/10 of a division. Thollon intended at the beginning of his work to express the position of the lines on a scale of wave-lengths, and this would doubtless have facilitated their identification to a considerable extent; but the method of relative measurement which he adopted was more accurate than the absolute measures made by Ångström, and he found that to use a wave-length scale it would be necessary to alter a number of accepted places of lines or to alter his measured intervals. It is rather unfortunate that such should be the case, for ready reference to the lines and comparisons of them with those mapped by other observers are rendered somewhat difficult. Beneath each scale are four horizons on which are respectively represented: (1) the appearance of the lines when the sun is 80° from the zenith and the air is dry; (2) the appearance of the lines when the sun is 60° from the zenith and the air is very moist; (3) the appearance of the lines when the sun is 60° from the zenith and the air is very dry; (4) the lines of solar origin—that is, those that would be observed from outside our atmosphere. The width of the lines was determined for each of the four horizons, and intensities are expressed from 1 to 10, 1 indicating the weakest and 10 the strongest lines. The values for each line are given in the text relating to the maps. Another horizon gives the position of iron lines, but this is incomplete in some of the maps owing to M. Thollon's death.

The theory of Vesta, by M. Perrotin, is in continuation of that published in the first volume of "Annales de l'Observatoire de Toulouse, 1880," and deals with the algebraical expressions of the perturbations produced on its elements by different planets.

ENLARGEMENT OF PHOTOGRAPHS OF STELLAR SPECTRA.—The enlargement of all the photographs of stellar spectra taken under Prof. Pickering's direction at the Henry Draper Memorial observatories is made by means of a cylindrical lens, and the result of the adoption of this method is well known. Dr. Scheiner, of Potsdam Observatory (*Astronomische Nachrichten*, No. 2969), has obtained even better results by fixing the negative lengthways in a frame which has a to-and-fro movement. The motion causes the width of the lines to be increased on the plate being exposed, in a manner similar to the increase that takes place when a cylindrical lens is inserted between it and the negative. The advantage of the arrangement over that of Prof. Pickering lies in the fact that the diminution of the intensity of the lines in the process of enlargement is much less.

The method now described by Dr. Scheiner has been used successfully at South Kensington for some time.