In R Leonis (with strong *TiO* bands) λ 4376 is strong, the other lines greatly weakened. This weakening is probably due to the strong *TiO* absorption which extends longward from the band head at λ 4421. Thus the iron lines must be emitted within or below the layer which causes the band absorption.

TABLE I

INTENSITIES OF BRIGHT LINES OF MULTIPLET (2) OF *Fe* I

λ	J	Lab.	R And*	R Leo†
4375.93	4–5	9	4	9
4427.31	3–4	10	10	3
4461.65	2–3	8	10	3
4482.17	1–2	4	4	–
4489.74	0–1	3	3	tr?

* Plate Ce 3633, 1944 November 2, phase +102 days.
† Plate Ce 3689, 1945 January 1, phase +65 days.

A working hypothesis suggested by the unusual inversion in the place of origin of bright and dark lines and by other observational facts is that, at a certain phase in the light-cycle, masses of superluminous gas may appear in or near the photosphere and, as the cycle advances, rise through the reversing layer until they disappear at an upper level. The rising columns of emitting gas might remotely resemble flares or mild eruptive prominences on the sun, but they must be sufficiently extensive to be observable in integrated starlight.

An alternative hypothesis is that of a compressional wave advancing through a tenuous atmosphere.

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NEW EMISSION NEBULAE

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Many objects show $H\alpha$ in emission with little or no continuous spectrum on objective-prism survey plates obtained by W. C. Miller with the 10-inch telescope. Further examination of these objects has led to the discovery of a considerable number of new emission nebulae.

Most of the 80 objects listed in Table I have been classified as planetary nebulae on the basis of their appearance on direct photographs obtained at the Newtonian focus of the 60-inch or the 100-inch telescope. The remaining objects, although they appeared stellar under average seeing conditions at the Cassegrain focus of the 60-inch or the 100-inch telescope, have been designated planetary nebulae because their spectra are unmistakably like those of planetary nebulae, showing strong forbidden lines with little or no continuous spectrum.

The investigation is not yet completed; particularly for galactic longitudes between 320° and 340° a fairly large number of objects remain to be investigated. Even at the present stage, however, it becomes evident that planetary nebulae are highly concentrated toward the center of the galaxy. The galactic distribution of the planetary nebulae, together with the fact that a planetary nebula is known in the globular cluster M 15, seems to indicate that they belong to Baade's star population of type II. Obviously, the galactic distribution of planetary nebulae is significantly different from that of O- and B-type stars and of the Wolf-Rayet stars.

Slit spectrograms of 41 new planetaries have been obtained with low dispersion. This material is still too incomplete for a general discussion. Some nebulae, which according to their appearance are undoubtedly planetaries, show only relatively weak hydrogen lines with a relatively steep Balmer gradient and very weak or no forbidden lines. The integrated spectrum of such nebulae resembles greatly that of stars of type Bep with very intense *H* lines. This type of spectrum, indeed, is to be expected for the early stages of development of planetary nebulae. So far, one known object, MWC 270, listed as a star of type Bep, has been found to be a planetary nebula about 4″ in diameter.

In Table II are listed 20 diffuse nebulosities with emission, and 3 peculiar nebulae.

Some of the objects are relatively bright and easily found, but many which are faint and strongly reddened cannot be identified without the aid of charts which will be published with a catalogue after the investigation is completed.

TABLE I

PLANETARY NEBULAE

R.A. 1900	Decl. 1900	l	b	Remarks
$1^h 31^m.2$	+49° 57′	97°.7	−11°.8	
1 52.5	+52 24	100.4	− 8.7	Stellar
3 29.3	−26 10	187.8	−53.9	NGC 1360
3 34.2	+51 57	114.6	− 2.2	
5 40.8	+24 22	151.2	− 1.7	Stellar
6 30.6	− 0 1	178.4	− 3.0	
6 31.3	+24 6	157.0	+ 8.2	
6 48.3	+ 3 19	177.5	+ 2.4	
7 0.1	+ 2 56	179.3	+ 4.9	Stellar
7 4.3	− 0 39	182.9	+ 4.1	NGC 2346
7 7.0	−19 41	200.0	− 3.7	Stellar
7 15.2	−21 26	202.5	− 3.2	
7 17.0	−17 56	199.7	− 1.2	
7 23.6	−20 0	202.2	− 0.8	
7 27.5	−19 15	202.0	+ 0.4	
7 32.3	− 9 25	194.0	+ 6.1	
7 35.6	−11 19	196.1	+ 5.9	
7 37.5	−14 7	198.8	+ 5.0	
16 57.2	−33 21	318.4	+ 3.9	
17 23.3	−19 11	333.6	+ 7.9	Stellar
17 28.3	−19 4	334.1	+ 7.0	
17 29.3	−18 24	334.9	+ 7.1	
17 31.6	−18 41	334.9	+ 6.4	
17 32.3	−19 32	334.3	+ 6.0	
17 32.5	−22 4	332.1	+ 4.5	
17 39.5	−30 10	326.2	− 1.7	MWC 270
17 40.1	−33 7	323.7	− 3.3	
17 41.5	−22 4	333.3	+ 2.7	
17 43.8	−30 35	326.3	− 2.6	
17 45.8	−34 38	323.0	− 5.1	
17 46.6	−22 19	333.7	+ 1.6	Stellar
17 50.6	−16 23	339.3	+ 3.8	
17 53.4	−15 48	340.1	+ 3.5	
17 54.8	−33 17	325.2	− 6.0	
17 57.5	−26 42	331.2	− 3.2	
17 57.8	−27 5	330.9	− 4.0	IC 4673
17 59.1	−28 23	329.9	− 4.4	
17 59.7	−28 42	329.7	− 4.6	
18 1.8	−13 28	343.1	+ 2.8	
18 2.1	−22 18	335.5	− 1.5	
18 3.4	−24 13	334.2	− 2.9	

TABLE I (*Concluded*)

R.A. 1900	Decl. 1900	*l*	*b*	Remarks
$18^h\ 4^m.8$	−29° 1′	330°.0	− 5°.8	
18 5.8	−18 46	339.0	− 0.5	
18 10.0	−27 8	332.6	− 6.6	
18 17.2	−19 15	339.9	− 3.1	
18 22.3	−15 37	343.7	− 2.5	
18 23.2	−21 47	338.3	− 5.5	
18 23.7	−19 11	340.7	− 4.4	
18 24.6	−13 58	345.4	− 2.3	
18 27.5	−18 15	341.9	− 4.9	
18 27.9	−11 11	348.2	− 1.7	
18 28.4	−14 57	344.9	− 3.5	
18 29.9	−17 39	342.7	− 5.0	
18 30.4	−17 3	343.4	− 4.9	
18 30.6	−21 49	339.2	− 7.0	
18 32.0	−17 6	343.5	− 5.3	
18 34.9	−10 37	349.6	− 2.9	
18 37.4	−11 15	349.3	− 3.7	
18 37.9	− 9 9	351.2	− 2.9	
18 38.0	−13 51	347.1	− 5.0	
18 40.3	−14 30	346.7	− 5.8	Stellar
18 44.3	−22 41	339.9	−10.7	
18 45.9	−13 19	348.3	− 6.5	
18 46.4	+35 8	32.1	+14.9	
18 51.8	+10 44	10.4	+ 3.4	Stellar
18 53.2	− 1 11	359.9	− 1.7	
19 7.0	+16 38	17.3	+ 2.6	*
19 7.2	+30 23	29.7	+ 9.0	NGC 6765
19 8.9	+ 3 22	6.0	− 3.9	
19 19.7	+ 9 42	12.8	− 3.4	Stellar
19 32.0	+19 29	22.6	− 1.1	
19 37.0	+17 30	21.6	− 3.2	Stellar
19 36.4	+14 41	19.1	− 4.5	
19 37.7	+14 54	19.4	− 4.6	Stellar
20 0.7	+31 11	36.1	0.0	
20 12.7	+36 46	42.1	+ 0.5	Stellar
21 15.5	+45 52	56.6	− 2.7	
21 17.5	+51 27	60.7	+ 1.0	
21 33.3	+48 28	60.6	− 2.8	
22 52.2	+56 37	75.0	− 2.6	

* Surrounding Merrill's Wolf-Rayet star (*Pub. A.S.P.*, 50, 350, 1938).

TABLE II

DIFFUSE AND PECULIAR NEBULOSITIES

R.A. 1900	Decl. 1900	l	b	Remarks
$5^h 25^m.6$	+34° 10′	141°.2	+1°.4	NGC 1931
5 34.3	+35 48	140.8	+3.2	
6 9.0	+13 52	163.6	−1.2	
6 11.8	+22 49	157.2	+4.6	IC 443
7 31.2	−18 32	201.8	+1.5	
17 13.7	−35 58	318.4	−0.4	NGC 6334
17 55.1	−33 15	325.2	−6.1	*
18 12.3	−11 47	345.9	+1.4	
18 20.3	−18 12	341.2	−3.2	
18 56.9	+ 2 1	3.3	−1.9	
19 28.8	+26 42	28.6	+3.5	†
19 32.2	+29 19	31.3	+4.2	‡
19 36.5	+27 5	29.8	+2.3	NGC 6813 §
19 50.9	+26 57	31.4	−1.1	
19 56.3	+35 0	38.0	+3.4	
19 57.0	+33 13	37.4	+1.2	‖
19 57.8	+33 20	37.5	+1.1	‖
19 57.9	+33 15	37.5	+1.0	NGC 6857 ‖
20 23.7	+37 5	43.7	−1.1	
22 52.0	+57 57	75.6	−1.4	
22 54.7	+58 14	76.0	−1.3	
23 9.3	+60 58	78.8	+0.6	NGC 7538
23 11.7	+59 30	78.5	+0.0	

* M-type star with nebula showing [*O* III] λλ 4363, 4959, 5007 only.

† Star between two symmetrical very narrow fans in p.a. 75°. Star and nebula are red.

‡ Binuclear nebula without central star. The north preceding mass has a diameter of about 3″ and is separated from the south following fainter mass by a dark lane. The spectrum is that of a peculiar star, showing M-type bands, strong emission lines of *H* with P Cygni-type absorptions and numerous emission lines of *Fe* II and [*Fe* II]. The nebula is probably not an emission nebula, but a reflexion nebula which obscures the peculiar star by which it is illuminated.

§ H. D. Curtis (*Pub. Lick Obs.*, **13**, 74, 1918) has observed visually continuous spectrum only, but *H*α is fairly strong in emission.

‖ NGC 6857 and the two much fainter preceding nebulae are probably the brightest parts of one very extended, extremely faint nebulosity.