ABSTRACTS OF PAPERS PRESENTED

Aller, L. H. Abundance of carbon in gaseous nebulae.

Whereas nitrogen, oxygen, neon and heavier elements are represented in gaseous nebulae primarily by their forbidden lines, carbon shows only recombination lines of which the most frequently observed is $\lambda 4267$ CII. Carbon/hydrogen ratios are estimated by an approximate theory somewhat similar to that employed by Mathis for his study of the helium/hydrogen ratio.

For the highest levels ($n \geq 7$) it is assumed that the level populations are hydrogen-like. The populations of the lower levels are then calculated by a mechanistic argument. Computations are carried out for the strongest recombination lines of CII, CIII, and CIV for $T_e = 16,000^\circ\text{K}$. Applications to NGC 7027 suggest a ratio of carbon to hydrogen of about 1.5×10^{-3} as compared with a ratio of 2×10^{-3} for oxygen. The mean C/O ratio for several nebulae including NGC 7662, 2440, and 2165 is about 0.7. Carbon and oxygen thus appear to be comparable in abundance but an accurate determination of the C/O ratio will require a more extended theoretical treatment, more accurate observations of the intensities of weak recombination lines, and a reliable determination of the distribution of atoms among different stages of ionization.

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Aller, Lawrence H. and Liller, William. The composition of the Orion Nebula.

Photoelectric spectrophotometric measurements of line intensities in the Orion Nebula are combined with Wyse's photographic measurements for the weaker lines to obtain the concentrations of various ions of the permanent gases. As noted by Osterbrock and others, there is evidence for large density fluctuations in this object. We have adopted a mean electron density $N_e = 4 \times 10^3$ from the forbidden lines and $T_e = 9000^\circ\text{K}$ from the photoelectrically measured $\lambda 4363/(N_1 + N_2)$ ratio. Approximate cross-sections have had to be used for sulfur, chlorine, and argon. A fairly well-defined empirical ionization curve was obtained. The following table compares the nebular abundances with those of early type stars as determined in the Michigan

program:

	log N			log N	
	Star	Nebula		Star	Nebula
Nitrogen	9.2	9.1	Sulphur	9.0	9.1
Oxygen	10.0	10.0	Chlorine	8.7	7.3
Neon	10.1	10.2	Argon	8.4	8.6

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Billings, D. E. Line width structure of coronal regions.

A careful and detailed study of the widths of coronal lines in various parts of coronal regions is in progress. It is hoped that this study will reveal the pattern of temperature or motion in the corona that determines the widths of the lines. One interesting result of the study to date is evidence that the widths of coronal lines begin to decline slowly with height at distances of approximately 75,000 km above the photosphere.

From the regions studied we can rule out rather definitely certain hypotheses concerning the cause of the great widths of coronal lines—specifically that the widths in excess of 6 to 7×10^5 degrees are due to outward streaming of coronal gas, either from active centers or radially from the sun, or from random motion of macroscopic aggregates of the gas. Some evidence is to be found that the contribution of the higher angular momentum states to the ionization cross-section of the coronal ions is comparable to the S-wave cross-section computed by Schwartz (see page 54).

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of the University of Colorado,
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Carpenter, E. F. and Jepperson, Richard. Color photography of faint objects with a special fast film.

For some time Carpenter at the Steward Observatory and Duncan at the Mt. Wilson and Steward Observatories have been experimenting with color film as a simple, single-exposure, qualitative color-discriminant. Carpenter and Jepperson have recently obtained and tested some samples of an experimental Super Anscochrome film of encouraging speed and color characteristics. The emulsion is rated at ASA 160 without forced development. Since it is exceptionally red-