kms^{-1}, the rotation velocities of the main sequence star from which the red giant later develops will be unreasonably large.

Atherton: The assumed rotational velocity of the progenitor ranges from 5 → 20 kms^{-1}. However, the study by Phillips and Reay is concerned only with showing how the structure of planetaries can, generally, be explained in terms of the development of shells subsequent to their ejection. The physics of the ejection process is not considered in any detail. The important point to note is that the intensity variations in NGC 6720 can be explained in terms of a spherical shell of gas.

EXAMPLES OF MULTIPLE SHELL STRUCTURES IN PLANETARY NEBULAE AND CERTAIN PECULIAR EMISSION NEBULAE

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There is increasing evidence that multiple shell structures occur often in planetary nebulae and emission nebulae surrounding Oef and Wolf-Rayet Stars, yet the multiple shell structures in the two classes of objects are very different. In planetary nebulae they are defined by an internal structure filled by [OIII] 5007 emission, and an outer shell that is most noticeable in the light of singly-ionized species such as [OII], [SII] or [NII]. Planetary nebulae with multiple shell structure are well exemplified by NGC 6853 (The Dumbbell Nebula) and NGC7293 (The Helix Nebula). The most pronounced effect is [OI] condensations plus [NII], [OII], [SII] "shadows" and complementary [OIII] structure.

The multiple shell structures surrounding Oef and Wolf-Rayet stars, such as NGC 7635 and NGC6164-5, do not show strong excitation differences between inner and outer shell structures. Certainly two, and possibly three, shells exist in NGC 7635, with the most central shell being very symmetrical (and appropriately called the Bubble Nebula). The structure of NGC 7635 is most easily explained by multiple shell ejection of the central star. However, radiation pressure must play an important role as exemplified by the NGC6164-5 nebulosity which shows a hole or empty shell region between the central 10' shell and the few degree outer structure which is possibly interacting or mixed with an H II region.

DISCUSSION

Balick: Do photographic surveys like this show anything of interest in the region of NGC 7027?

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Gull: There are certainly no larger outer shells as far as photographic studies are concerned.

DYNAMICAL EFFECTS OF RADIATION PRESSURE IN EVOLVED PLANETARY NEBULAE

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We have investigated the dynamical effects of radiation pressure occurring in evolved planetary nebulae, for a wide range of central star and nebula parameters. Detailed model atmosphere calculations of the incident stellar flux were used to determine the temperature, ionization structure, and radiative acceleration throughout the nebula. Our computations included the effects of dust, a provision for charge exchange reactions, and all bound-bound, bound-free, and free-free processes that contribute significantly to the total radiation pressure. We have estimated the effects of the radiative force on nebular condensations and, as an example, have applied the results to the problem of the numerous radial filaments in NGC 7293. This work was supported by the U.S. ERDA under contract No. W-7405-Eng-48.

SOME PROPERTIES OF DUST IN PLANETARY NEBULAE

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From an analysis of infrared, optical, ultraviolet and radio data of a number of planetary nebulae, it is found that the dust mixed with the ionized gas mainly consists of relatively large, graphite-like grains.

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