TABLE 1

Parameter \ Objects	C / O > 1		C / O < 1	
	IRC –30021	GL 3068	IRC –30023	OH 353.60–0.23
d (kpc)	0.5	1.2	0.5	9.9
V_e (km s^{-1})	10	15	10	18
T_* (K)	2900	2000–3000	2200	2000–3000
$\tau_{10\,\mu m}$	0.02	3.2	0.1	6.0
T_c (K)	1100	1600	750	900
$\dot{M}$ ($M_\odot$. yr^{-1})	1.4×10^{-7}	3×10^{-5}	1.7×10^{-7}	6×10^{-5}
L_* ($L_\odot$)	3.6×10^3	17×10^3	7.3×10^3	80×10^3

Star and shell parameters deduced from adjustments of broad-band photometric data.
"d" is the object distance; "V_e", the shell expansion velocity, "T_*", the central star effective temperature; "$\tau_{10\mu m}$", the optical depth of the dust shell at 10 μm; "T_c", the condensation temperature of the dust; "$\dot{M}$", the mass loss rate and "L_*", the total luminosity.

are obtained at about the same phase, around December 20, 1984. We have plotted also, for comparison, at 12 and 25 μm, and for complementarity, at 60 and 100 μm, the data obtained by the IRAS satellite through 1983. As these data are not obtained at the same phase, there is a possible slight shift between them and ours.

The broad-band spectrum of IRC –30021 is featureless and looks like the one of a blackbody of temperature ~ 1,200°K. Nevertheless, from its spectral type, the star effective temperature should be greater than 2,400 K. All this indicates the presence of carbon grains around R For; except for a resonance band around 11.5 μm which could be due to silicon carbide (SiC) these grains have optical characteristics which present no distinctive feature at $\lambda > .4$ μm.

We have developed a model of circumstellar dust shell based on the Leung (1975) radiative transfer method. Using the opacities derived by Jones and Merrill (1976) for graphite grains of radius ~ 0.05 μm, supposing that the central star radiates like a blackbody and assuming spherical symmetry and uniform expansion for the dust shell, we are able to adjust the observed data between .4 and 100 μm (solid line on Fig. 1). In this simplified model, we do not take into account photospheric bands due to CH, C_2, CN, CO, etc. and circumstellar bands mainly due to CO, in such a way that, in the observations, there is a strong deficit in B (CN and C_2), and also in J and H (CO,...), with respect to the simulation. From this adjustment, we derive for R For, at .5 kpc, a stellar luminosity of 3×10^3 $L_\odot$ and a dust mass loss rate of ~ 1.4×10^{-9} $M_\odot$/year (or, adopting a gas-to-dust mass ratio of 100, a total mass loss rate of ~ 1.4 10^{-7}) $M_\odot$/year).

IRC –30023:

Very near IRC –30021, there is another bright infrared source discovered during the T.M.S.S.: IRC –30023. Our photometric data show it to be variable with a period of ~ 500 days. Although it has an optical counterpart which may be quite bright (V ~ 10 near maximum), till now, it has not been catalogued as a variable star. Fig. 2 presents its broad band spectrum between .4 and 100 μm. A strong emission feature, visible at 10 μm, indicates the presence of silicate dust in a circumstellar shell. We infer from it that the central star is oxygen-rich.

As for IRC –30021, we performed the modeling of this dust shell, using now opacities of silicate grains of radius ~ .1 μm. The solid line in Fig. 2 presents our adjustment. Photospheric absorption bands (mainly due to TiO) are not taken into account in our model and their effects can be seen on the B, V, R fluxes. Our fit implies a total luminosity of ~ 7×10^3 $L_\odot$ and a total mass loss rate of ~ 1.7×10^{-7} $M_\odot$/year.

Conclusion

We are studying at the 1 m telescope a whole sample of evolved stars with luminosities ranging from ~ 10^3 to ~ 10^5 $L_\odot$ and mass loss rate from 0 to 10^{-4} $M_\odot$/year; a few results are given in Table 1. As these objects are variable, it is very important to monitor them for investigating their evolution, and for evaluating their importance in the replenishment of the interstellar medium.

As it is equipped with visible and infrared photometers, the 1 m telescope is very adequate for this kind of study. Its excellent pointing and tracking accuracy makes it particularly valuable for photometry, to the point that, as long as there is not too much turbulence, infrared observations can be performed even during the day. This quality is especially useful for monitoring variable objects of period ~ one year or more.

References

Deutsch, A. J.: 1956, *Astrophys. J.* **123,** 210.
Jones, T. W. and Merrill, K. M.: 1976, *Astrophys. J.* **209,** 509.
Leung, C. M.: 1975, *Astrophys. J.* **199,** 340.
Neugebauer, G. and Leighton, R. B.: 1969, NASA SP–3047.
Salpeter, E. E.: 1974, *Astrophys. J.* **193,** 579.

STAFF MOVEMENTS

Arrivals

Europe

AURIERE, Michel (F), Fellow
GILLI, Bruno (F), Programmer
SCHARRER, Rebekka (D), Laboratory Technician (Photography)
STAHL, Otmar (D), Fellow
WAMPLER, Joseph (USA), Scientist

Chile

MULLER, Guido (CH), Electro-mechanical Engineer
VAN DEN BRENK, John (Australia), Detector Engineer

Departures

Europe

LECLERCQZ, Jean (B), Draughtsman (Graphics)
PAUREAU, Jean (F), Mechanical/Cryogenics Engineer

Chile

DANKS, Anthony (GB), Astronomer