ing (something we did not want) or quickly raising additional funds.

I am pleased that we were able to obtain a commitment from the Angel Ramos Foundation for an additional $75,000 donation, which is what we needed to start construction. We will continue to raise funds since there will be additional expenses, including the cost for the elevator, not included in the current contract. Final contractual details are currently being arranged, and construction is expected to start in June.

On a personal note, I must say that I am very happy about this course of events, which represent a culmination of five years of effort. (I will be happier next year when it is all done!)

Work with the exhibit designers, Zalisk Martin is also proceeding, and we have now completed about 75% of the initial design sketches for the exhibits. After this stage detailed design documents for each exhibit unit will be prepared from which shop drawings can be made. Design Craftsmen will then fabricate the units. Detailed contents and translations will be worked on in parallel. Jo Ann Eder and I will meet often with the designers on the one hand, and interested members of the scientific staff and colleagues on the other, to obtain input and help with the questions that will arise as the project progresses.

When Every Day was Summer

Chris Salter and Daniel R. Altschuler

25 Years Ago

With the imminent completion of the present telescope upgrade, Arecibo stands on the threshold of a new era. Thus, we have decided to bring to the NAIC Newsletter an occasional series of "lucky dips" into the past to remind ourselves of the burning topics of research, and the achievements of the instrument and its intrepid users, in days (alas) long gone. In this issue, we begin with some of the Arecibo contributions that hit the presses 25 years ago. We hope that these notes will give many of our past users, including those stalwarts still visiting our telescope a quarter century later, the most pleasant of sensations when they see their past lives from the "Era of Flux Units and Parametric Amplifiers" flash before their eyes.

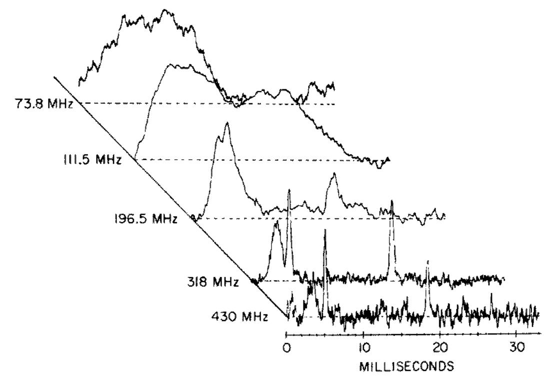

Figure 5. Observed average pulse shapes of NP0532 at 430, 318, 196.5, 111.5, and 73.8 MHz (Rankin et al., 1970).

The "hot" object of 1970 was undoubtedly NP0532 (as it was then known), the pulsar in the Crab Nebula. This had been discovered at Green Bank in 1968 by Staelin & Reifenstein through detection of its occasional "giant" pulses, and its period was subsequently shown to be an unprecedented 33 msec by Comella et al. at Arecibo. The polarization of the integrated pulse profile was investigated by Campbell, Heiles, and Rankin (*Nature*, *225*, 527, 1970). This work showed that the individual components in the integrated profile differed greatly in their 430-MHz linear polarization percentages, from essentially 100% in the main-pulse precursor, through 18% in the main pulse to 11% for the interpulse. They pointed out that the position angle of the polarized radiation changed little throughout the profile, and deduced from this (and the presence of the interpulse) that the magnetic axis passes very close to our line of sight, with the rotational and magnetic axes being close to orthogonal. Separately, Rankin et al. (*ApJ*, *162*, 707, 1970) measured pulse profiles at five frequencies between 74 and 430 MHz (Fig 5). They amply demonstrated the pulse broadening caused by scattering in the ionized interstellar medium, and also used this to explain the apparent low-frequency spectral turnover of the emission. An interesting conclusion (especially using the hindsight that history allows us) was drawn by Richards et al. (*ApJ*, *160*, L1, 1970), who found that for the four months immediately preceding the first recorded period glitch in NP0532, the timing residuals they obtained could be well fit by a sinusoid of 11-week period. They suggested that, while this could be caused by an oscillation or precession of the pulsar, it could also be due to perturbations caused by a terrestrial-mass planet! It is poignant that, while NP0532 was soon shown (e.g. Roberts & Richards, *Nature Phys. Sci.*, *231*, 25, 1971) not to possess such a companion, over twenty years later the first extra-solar-system planets were to be discovered from Arecibo, circling a pulsar (see the "Radio Astronomy Highlights" in this issue for the latest news on that planetary system).

Things much deeper in space were being observed by Dave Jauncey and his collaborators. They reported in *ApJ*, *160*, 337, 1970, on 610-MHz VLBI between Arecibo and the 140-ft dish at Green Bank, actually observed in 1967 and 1968. For reasons not completely understood (ah, a situation we all know so well!), the 1968 observations showed no fringes, but the 1967 measurements gave

Figure 6. A section of the platform of the Arecibo telescope in 1969. The carriage house is at high zenith angle, and the extendible boom is visible at the far left (Terzian & Parrish, 1970).

fringes of > 1 *flux unit* amplitude for 12 sources, seven of which (including those hardy annuals CTA102 and 3C454.3) appeared unresolved at < 20 milliarcsec. These were also the heroic days of radio-spectrum determinations, with flat and complex spectra for extragalactic sources having been revealed during the previous decade. Jauncey, Neill, and Condon (*ApJ*, *162*, L31, 1970) measured 111-, 318- and 430-MHz flux densities for 47 Ohio sources with "unusual" spectra to fill in their low-frequency behavior. Extending the spectra to over two decades of frequency showed the unexpected complexity of many of them. These observers pointed out that while the objects for which they derived flat spectra could represent single components with a relatively low value for the electron-energy distribution index, γ, they could also be superpositions of components with normal nonthermal spectra that become optically thick at different frequencies. They used the then-existing VLBI results to back the latter notion; early intuition of the "cosmic conspiracy" theory, indeed.

Finally, our fancy was caught by the fact that it is 25 years since Arecibo managed to observe the Orion Nebula, an option that we won't be able to offer present -day users, even after the current upgrade! Terzian and Parrish (*Ap. Lett.*, *5*, 261, 1970) used a specially constructed mechanical system to observe the Orion Nebula at 74, 111, and 196 MHz. An extendible boom on Carriage House 1 could carry their feeds out to 34 feet beyond the center of the Carriage House, extending the sky coverage to -5^{o} 54' < dec < $+42^{o}$ 36' (Fig. 6). The feeds at the three frequencies were concentric pairs of Yagi antennas, and the observations finally enabled the low-frequency spectrum of the Nebula to be well determined (Fig. 7). While recombination-line measurements had yielded electron temperatures of 11,000 K for the "central" part of the region, the new continuum spectrum represented the lower-density extended component at the lowest frequencies and gave a temperature closer to 5,000 K, indicating that the outskirts of the Nebula are considerably cooler than is the center.

Agent 007 Comes to the Observatory

Daniel R. Altschuler

In late January, after several months of negotiations related primarily with legal matters and questions of what is allowed and what is not, we were visited by the staff of EON Productions, the company that is producing the new Bond movie. This, the seventeenth in the series, will be called *Goldeneye* and is directed by Martin Campbell. It features Pierce Brosnan (ex-Remington Steele) as the new Bond, James Bond that is. Several important scenes occur at a location that

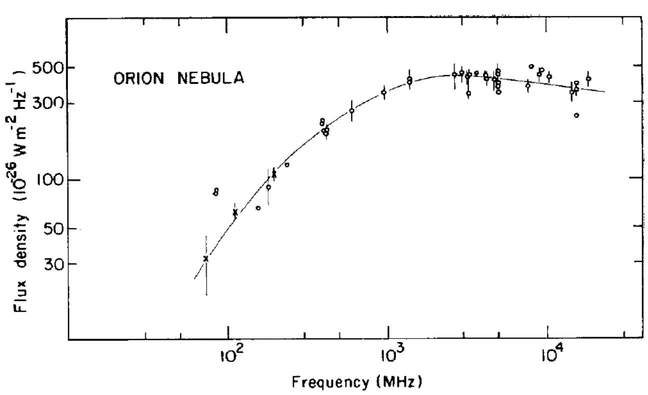

Figure 7. The radio continuum spectrum of the Orion Nebula including the Arecibo points at 73.8, 111.5, and 196.5 MHz (shown as crosses).