should explode as SN's, while 75 years would give a lower limit of 9 M☉, all compatible, within the errors, with the ideas about massive star evolution. No additional constraints can be set up from pulsar birth-rates, because of the large uncertainty in the evaluation of the maximum age of a detectable pulsar. This age is at least a factor of ten higher than the assumed maximum age for a detectable SNR (approximately 10^5 years) and is probably enough to explain why, if about 300 pulsars are now detected, only two firm associations between pulsars and SNR's have been made: the Crab and Vela, both young objects. The detection of such associations is in addition made difficult by the large transverse velocities now measured for some pulsars.

The same kind of comparison between SNR statistics and massive star evolution has been tried recently for LMC. Owing to the large uncertainties involved there: uncompleteness of the SNR sample and no firm independent knowledge of what the SN rate should be, one can only conclude that the number of observed supergiants compared to the best estimates of the SN rate is compatible with the idea that the minimum mass for a SN progenitor lies somewhere between 4 and 8 M☉. But, both in LMC and in our galaxy, it remains to be explained why so few SNR's of diameters larger than about 30 pc are observed, while this corresponds, according to the present views, to only about one-tenth of the expected life time. As most of the SNR's are detected at radio wavelength, a better understanding of the relations between the radio emission and the surrounding medium may help to solve that aspect of the problem.

Further Research Needed

Not very much attention has been given in this review to the Crab Nebula. It reflects, in fact, the work on SNR's in the last years, where the Crab was believed to be understood, at least as far as the mechanism of excitation of the visible filaments was concerned, and also regarded as being too peculiar by comparison with other SNR's. However, things are changing now. A search is under way for fainter filaments outside the main nebula which may be the tracers of the shock-front and some new possible members of the same morphological class as the Crab are being found (3C 58, G21.5-0.9). Other trends of present research include the search for older, large-size SNR's in our galaxy and LMC, with the difficulty of distinguishing them from H II regions or other shock-excited nebulae (stellar winds); detailed investigation of velocity structures to be compared with models; extension of the studied spectral range to the UV and near IR; search for SNR's in other galaxies of the Local Group mainly by optical techniques (see Fig. 1), and last, but not least, investigation of nuclei of external galaxies showing the characteristic emission lines of low ionization species, in order to see whether or not there is any significant contribution of shocks in the excitation of these nuclei. There is great hope that, with the simultaneous development of model calculations, all this effort will eventually answer the remaining major questions about SNR's and their progenitors. And we may at the same time learn as much about the surrounding interstellar medium as about heavy element processing in massive stars.

A New Infrared Top-end for the 3.6 m Telescope

So far, most, but not all, infrared observations have been carried out with conventional optical telescopes. This often implies that a comparatively strong infrared radiation (heat) from the telescope proper has to be subtracted from the total signal for a given celestial infrared source. This is particularly so when the telescope has much material in the beam, e.g. support of the secondary mirror, cables, etc.

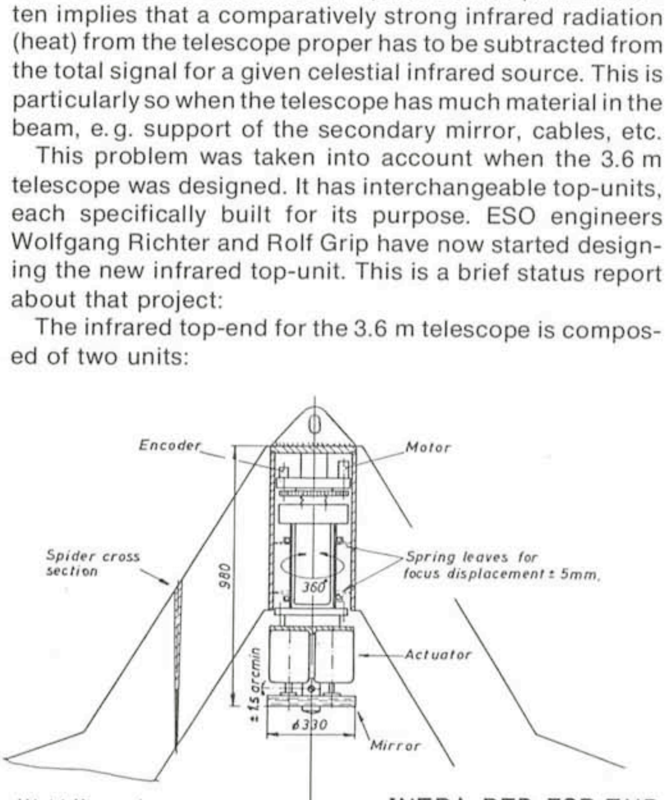
This problem was taken into account when the 3.6 m telescope was designed. It has interchangeable top-units, each specifically built for its purpose. ESO engineers Wolfgang Richter and Rolf Grip have now started designing the new infrared top-unit. This is a brief status report about that project:

The infrared top-end for the 3.6 m telescope is composed of two units:

– wobbling secondary mirror
– top-ring for infrared observation.

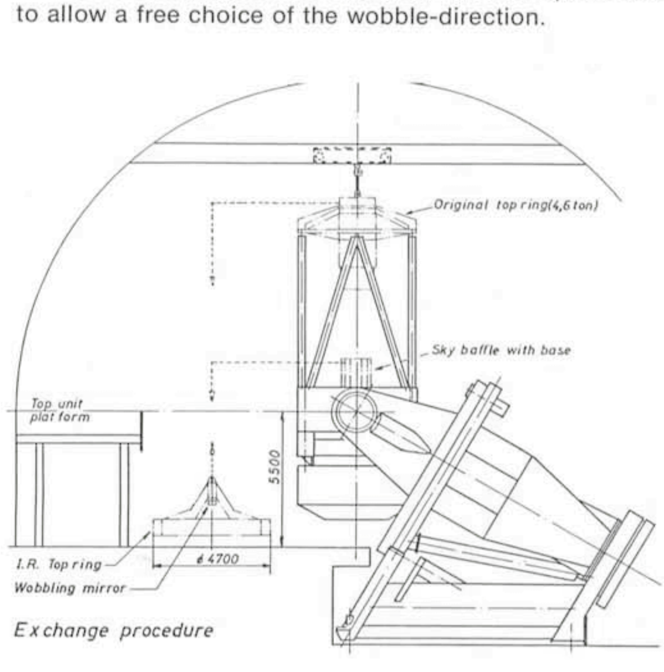
The design of these two units is actually in progress. The optical conception is a secondary mirror for an f/35 at the Cassegrain focus. This secondary mirror will be excited by two electromagnetic actuators, one pushing, the other pulling, and vice-versa.

This wobbling unit can be rotated around the optical axis to allow a free choice of the wobble-direction.



Wobbling mirror

INFRA-RED TOP END



Exchange procedure

A new top-ring for the telescope is required to remove the material, which supports the normal top-units, out of the light beam. The outer ring is therefore heavier in order to maintain the balance of the telescope tube.

The control system of the wobbling mirror is still under study.

ALGUNOS RESUMENES

El cercano encuentro con 1978 CA y 1978 DA

Recientemente el Dr. Hans-Emil Schuster ha descubierto dos planetas menores que se estaban acercando a la tierra sobre placas que fueron tomadas con el telescopio Schmidt de ESO en La Silla.

El primer planeta (1978 CA) fue descubierto como una pálida raya sobre una placa tomada en la noche del 7 al 8 de febrero. Durante las noches siguientes se tomaron algunas placas de exposición corta y se estableció una órbita preliminar que confirmó la cercanía del nuevo planeta menor a la tierra (42 millones de kilómetros el día 8 de febrero).

Hans Schuster notó una segunda raya larga en otra placa tomada para el 1978 CA el día 17 de febrero. Se tomaron más placas de este objeto y una semana más tarde se confirmó que 1978 DA (como fue llamado el segundo planeta menor) también se acercaría bastante a la tierra.

Trabajando en directa colaboración con el Dr. B. Marsden del Observatorio Smithsonian en Cambridge, Massachusetts, fue posible establecer la órbita *antes* de producirse las aproximaciones más cercanas durante marzo de 1978. Esto permitió que otros observadores pudieran estudiar los pequeños planetas y conocer más sobre sus propiedades físicas.

El Dr. Degewij del Observatorio Lunar y Planetario de la Universidad de Arizona es uno de los astrónomos que han observado los planetas. Nos informa que los diámetros de los objetos son de aproximadamente 1,86 km para 1978 CA, y 0,9 km para 1978 DA.

La Gran Nube Magallánica en luz infraroja!

En el Observatorio Europeo Austral se está haciendo muchas placas de las Nubes Magallánicas con el telescopio Schmidt de 1 metro. En la página 19 mostramos La Gran Nube vista en luz infraroja en una placa obtenida el día 16 de enero de 1978. El tiempo de exposición fue de una hora. La placa fue sensibilizada y guiada por Guido Pizarro y su uniformidad es notable. Normalmente es muy difícil hipersensibilizar placas infrarojas sin correr es riesgo de obtener grandes desuniformidades.

La placa muestra especialmente las estrellas más rojas en la Gran Nube Magallánica y suprime la nebulosa gaseosa. Incluso en la parte céntrica de la barra se ven las estrellas bien resolvidas. La nebulosa en la parte superior izquierda es 30 Doradus, la región H II más brillante de la Gran Nube Magallánica.

Radio observaciones del cometa Bradfield (1978c)

La ventaja de radio observaciones de onda larga reside en la calidad de los espectros que no es afectada ni por las condiciones atmosféricas ni por la proximidad del sol o de la luna. Sin embargo, la mayor desventaja en la radio observación de cometas se encuentra en la debilidad de las señales que requieren largos tiempos de integración, y es importante que las coordenadas se conozcan con gran precisión.

Los Drs. Despois, Gerard, Crovisier y Kazès del Departamento de Radioastronomía del Observatorio de Meudon en Francia han ya observado muchos cometas con el radio telescopio francés de Nançay. Al saber que un nuevo cometa brillante, Bradfield (1978c), avanzaba hacia el norte, decidieron estudiarlo inmediatamente. Sin embargo, debieron interrumpir las observaciones por falta de recientes posiciones exactas.

A pedido de ellos, el Dr. Hans-Emil Schuster fotografió exitosamente el cometa con el telescopio Schmidt de ESO y el Dr. Marsden en Estados Unidos pudo computar una mejor efemérides. Con esta nueva efemérides fue posible reasumir las radio observaciones.

Este suceso no es sólo un ejemplo para la importancia de la colaboración internacional en la astronomía, sino también para la colaboración entre la radioastronomía y la astronomía óptica.

ESO, the European Southern Observatory, was created in 1962 to . . . establish and operate an astronomical observatory in the southern hemisphere, equipped with powerful instruments, with the aim of furthering and organizing collaboration in astronomy . . . It is supported by six countries: Belgium, Denmark, France, the Federal Republic of Germany, the Netherlands and Sweden. It now operates the La Silla observatory in the Atacama desert, 600 km north of Santiago de Chile, at 2,400 m altitude, where nine telescopes with apertures up to 3.6 m are presently in operation. The astronomical observations on La Silla are carried out by visiting astronomers—mainly from the member countries—and, to some extent, by ESO staff astronomers, often in collaboration with the former.

The ESO Headquarters in Europe will be located in Garching, near Munich, where in 1980 all European activities will be centralized. The Office of the Director-General (mainly the ESO Administration) is already in Garching, whereas the Scientific-Technical Group is still in Geneva, at CERN (European Organization for Nuclear Research), which since 1970 has been the host Organization of ESO's 3.6-m Telescope Project Division.

ESO has about 120 international staff members in Europe and Chile and about 150 local staff members in Santiago and on La Silla. In addition, there are a number of fellows and scientific associates.

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