mass of around two solar masses with an accuracy of $\varepsilon(Y) = 0.03$. From homogeneous stellar models we find immediately that the mass must be known to 2 %, the heavier elements to 25 % and luminosity to 10 % as a typical combination of uncertainties. The situation is a bit more complicated when we consider evolved stars.

This high precision can be obtained only if we carefully select the most simple photometric and spectroscopic systems. The components must be well separated with small deformations. The eclipses must be deep, if possible a total eclipse. The luminosity of the two components should be nearly the same and not differ more than half a magnitude, since radial velocities of both components cannot be derived with sufficient accuracy if the luminosity difference is too large.

Several systems on the southern sky are observed in the Strömgren four-colour uvby system with a simultaneous four-channel photometer on the 50 cm telescope, giving four essentially monochromatic light-curves. The metal index m_1 gives the content of heavier elements Z to an accuracy better than 25 % for F stars, while we have little check on Z for the earlier-type stars. Radial-velocity measurements are done in parallel to the photometric work.

SZ Centauri

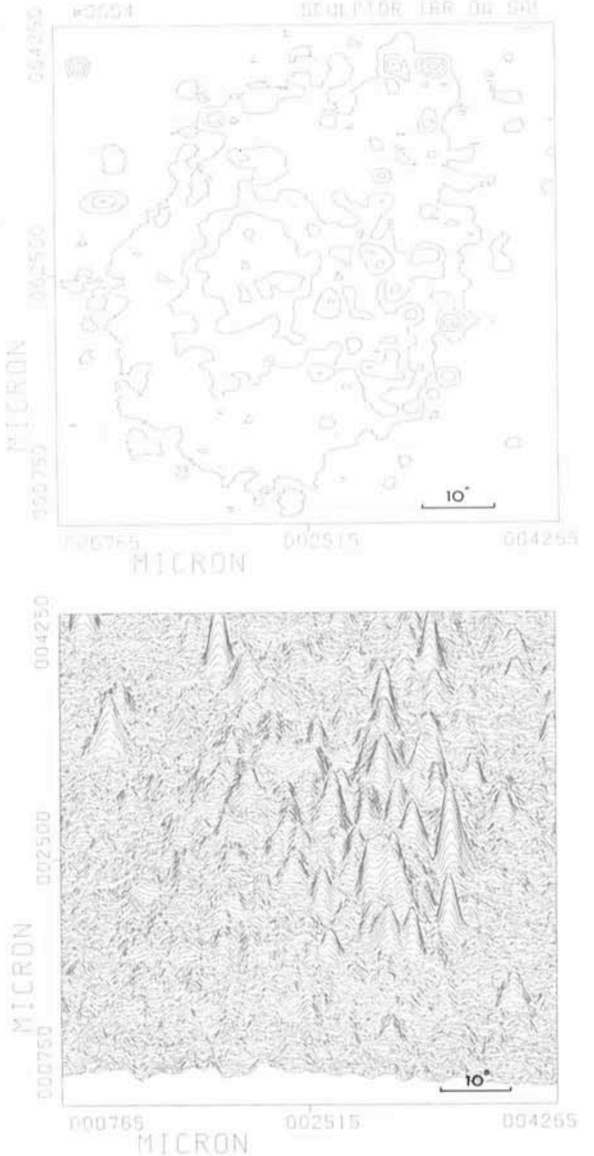
The details of the individual systems shall not be given here, but SZ Centauri is worth mentioning as it poses some interesting problems to theoreticians. The spectrum is A7 III and the masses ($\cong 2.30\ M_{\odot}$) are very nearly equal and known to an accuracy of 1 %. The primary minimum is a total eclipse and the luminosity ratio of the components is known very precisely. The photometric elements are derived by the classical Russell-Merrill method and by the modern model-simulation method by Wood. The two independent methods give consistent results and the radii of the two components are determined better than 1 %. The surface gravities are then also known very precisely (2 %). The temperature difference is small and well defined. Both of the components have left the central hydrogen burning phase, when comparing with standard evolutionary tracks. The tracks and isochrones are nearly horizontal in this phase and the stars move to the left at constant luminosity in the HR diagram. It is simply impossible to account for the observed luminosity (or gravity difference) of the components and the evolutionary tracks may perhaps be very wrong. However, the properties of SZ Cen are understood if there is mixing in a region much larger than the classical convective core. If this explanation is correct, we are forced to a considerable revision upwards of stellar ages. We are presently not very happy about this situation.

AI Hydrae

Finally another interesting system should be mentioned. At least one of the components of the eclipsing binary AI Hydrae is a δ Scuti star with a period of 0.138 day. For the first time we derive observationally a pulsation constant Q to an accuracy of 1 %. The Q value corresponds very precisely to a radial first overtone pulsation, showing that a least one δ Scuti star pulsates in a radial mode and not in a non-radial mode as preferred for δ Scuti stars by many authors during the last few years. The discussion of this system together with B. Grønbech is not yet finished.

TWO NEW IRREGULAR DWARF GALAXIES

During the past year, two new southern dwarf galaxies were discovered on ESO Schmidt plates. The first object, in the constellation Phoenix, was first believed to be a distant globular cluster (cf. *Messenger* No. 4, March 1976), but recent observations by American astronomers at the Cerro Tololo Interamerican Observatory now show the Phoenix

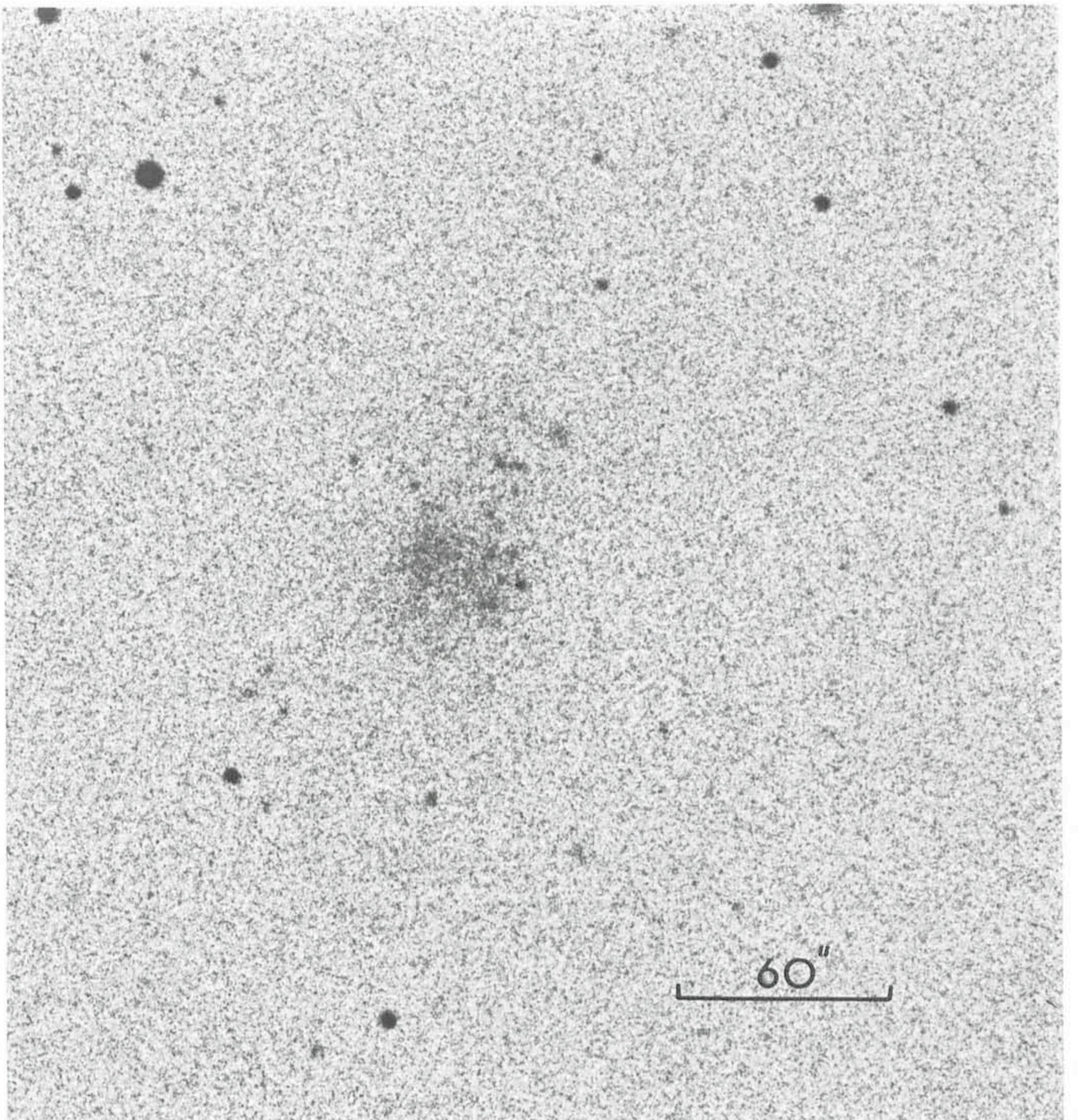


The analysis of astronomical photos involves much more than just looking at the objects on the plates. As an example, we show here a computer-drawn contour map of the Sculptor Irregular Dwarf galaxy, made from the photo on the frontpage of this issue of the *Messenger*. The upper part shows a smoothed isophote that corresponds approximately to the outer boundary of the galaxy. In the lower figure, the intensity across the galaxy is visualized by a three-dimensional (X, Y, density) plot. The higher the "mountains", the stronger the intensity. It is fairly easy to compare directly the photo and the drawing. The positions on the original 3.6 m plate are given in microns at the abscissa and ordinate axes. The plate was scanned by the S-3000 measuring machine at the ESO Sky Atlas Laboratory in Geneva (aperture 100 x 100 microns) and the measured densities were computer-processed in the ESO HP computer system by means of an interactive programme developed by Frank Middelburg. Such scans serve for many purposes: to determine the extent of the galaxy, to integrate the intensity over the whole surface, and to determine the magnitude of individual member stars are just some of these.

object to be an irregular dwarf galaxy at a distance of about 1.8 Megaparsec. The second object, in the constellation Sculptor, has just been observed with the ESO 3.6 m telescope and a preliminary analysis places it at 3 Mpc distance in the Sculptor group of galaxies.

THE SCULPTOR IRREGULAR DWARF GALAXY

This object was first found on a Schmidt plate, taken for the ESO (B) Survey on October 22, 1976 (see photo on this page). Although rather faint, it was partially resolved in stars and it was decided to use it as a test object for the 3.6 m telescope as soon as it was ready to take the first pictures. Three plates were obtained on November 9–11; the result may be seen on the front page of this issue. It is instructive to compare the Schmidt photo with that from the large telescope. The Schmidt plate reaches about $21^{m}.5$, but the 3.6 m plate goes at least $2^{m}.5$ fainter. Look how many of the diffuse spots on the Schmidt plate turn out to be galaxies. See the increased resolution in the galaxy into stars. No



An enlargement from the discovery plate for the new irregular dwarf galaxy in Sculptor. On the original Schmidt plate, 60 arcseconds correspond to 1 mm. Try to compare this picture with that from the 3.6 m telescope on the front page! The limiting magnitude of the Schmidt plate shown here is about $21^{m}.5$.

wonder that the astronomers are satisfied with the new giant telescope!

A preliminary analysis reveals that the brightest stars in the Sculptor Irregular Dwarf galaxy are blue, but that there are also several red stars that could be members. Assuming similarity to the irregular galaxy IC 1613 in the Local Group, ESO astronomers S. Laustsen and R. West deduce a distance modulus of about 27^m, in a report submitted to *Astronomy & Astrophysics* on November 24. The integrated magnitude has been measured as $V = 16^m.0$ with the ESO 1 m photometric telescope. It appears that the galaxy is a very small one, only about 1,000 pc (3,200 light-years) across, and with an absolute magnitude of only -11^m. This would make it one of the smallest and faintest irregular dwarf galaxies known to date, but further research, now being undertaken, is necessary in order to confirm this result. In particular, a search has been started for variable stars, that could possibly show up on the 3.6 m plates, just above the plate limit.

THE PHOENIX IRREGULAR DWARF GALAXY

Astronomers R. Canterna and P.J. Flowers from the Washington State University in Seattle obtained plates of this object with the 4 m Tololo telescope in August 1976. The first analysis indicated a distance of only 300 kpc, making the Phoenix galaxy a new member of the Local Group of galaxies. However, Canterna und Flowers find a great similarity between Phoenix and IC 1613 and obtain a distance of 1.85 Mpc (6 million light-years). It is significantly larger than the Sculptor Irregular Dwarf galaxy, 4,800 x 3,800 pc, and considerably brighter.

Like IC 1613, the Phoenix and Sculptor galaxies may become important stepping-stones towards the outer Universe. It is expected that both objects will be useful for the calibration of the distance scale, once they have been investigated in detail and their stellar content is better known.

How to Keep Hungry Heroes Healthy and Happy

Gastronomy on La Silla

When Captain James Cook served vegetable soup to his crew in 1770 it was not just because of philanthropy or his name. And although likening Cerro La Silla to an old-fashioned warship with its high stern (3.6 m) and low foredeck, may not stand up in all details, some basic problems are still shared with the great navigator. The isolation of La Silla (nearest port Coquimbo over 150 km away), the physical and mental strain from day- and nightwork during long (observing) runs, and the deserted, undulating surroundings could well be expected to have adverse effects on the morale of visiting astronomers and mountain staff. But happily, ESO is in a much better position than most other observatories to fight these natural evils, in particular because of its unique kitchen. "Good and healthy food need not be expensive" and "Food tastes as it looks like" are two of the axioms of German-born ESO Chef-cuisinier Erich Schumann, *who is also the* maître d'hôtel *"ESO La Silla" and a frequent contributor to international gastronomical journals. It is a proven and curious (but not necessarily disturbing) fact that many American astronomers react to the name of ESO by turning their eyes towards the heavens with an "Oh yes, that is where those Europeans have that real* cuisine française!".

With 25 years' experience, also from several major European restaurants, Mr. Schumann and his competent Chilean staff daily live up to their internationally established reputation and—with great care and insight—they prepare our stomachs and spirits for the hardships of a mountain observatory. These are Mr. Schumann's own words about some of the secrets of how to keep the ESO people happy and in good shape:

How to Start the Day .....

The day for the La Silla kitchen starts shortly before 7.00 when the first cooks arrive to prepare breakfast under the direction of Juan Fernández. Two kinds of juice (one is fresh orange juice, when oranges are in season), yoghurt, butter, cheese, different hams and sausages and two different marmelades complete the layout on the self-service counter. We also serve three kinds of bread; two are a German-type brown bread, flown in from Santiago twice a week with our daily air-service. Real good Brazilian coffee is prepared in the automatic coffee-machine, and we have tea, herb tea, milo *(para campeones!)* and fresh milk. Fried eggs with ham and bacon, scrambled eggs, omelette with ham, cheese, tomatoes, onions or whatever you like can be ordered to the waiter.

Many astronomers prefer a kind of heavy sandwich called *completo*. This is really something to restore lost energy after a busy cold night at the telescopes or when they wake up in the afternoon: two pieces of toast, topped with slices of baked ham, tomatoes and two fried "fresh farm" eggs.

For lunch and dinner, we serve dishes which must satisfy Chilean as well as European employees and astronomers from all over the world. That is not always easy:

Dinner begins at 18.00 in summertime and at 17.30 in wintertime. You may start with a little appetizer such as stuffed avocado with tuna fish, or diced chicken, ham or *langostinos* (jumbo shrimps).

Chilean Seafood!

Seafood is served very often on La Silla and is much appreciated by our guests. We buy fresh fish and seafood twice a week. It is always amazing to go to the markets in La Serena and Coquimbo and see the wide variety, just out of the Pacific Ocean: *congrio, corvina, cojinova, merluza, cabinza, sardinas, lenguados, atún* (conger-eel, seabass, cajinova, sardines, soles, tunafish). *Mariscos* are different kinds of mussels and shells which can be eaten raw with lemon or prepared in different ways. *Locos* (abalones) are delicious, either cold with different kinds of dressing, or warm with grated cheese and gratinated. *Erizos* (sea-urchins) are liked by people who prefer something fancy; they have a strong taste of iodine.

Ostiones (coquilles St-Jacques) are originally from the beaches of Tongoy and Guanaqueros. Only once a year can they be taken out of the ocean. That is in the wintertime when heavy waves loosen them from the sandy or rocky grounds, lift them up to the surface and throw them to the beach. This year we have had ostio-