

CERN Courier Archive: 1972

A LOOK BACK TO CERN COURIER VOL. 12, MAY 1972, COMPILED BY PEGGIE RIMMER

ESO

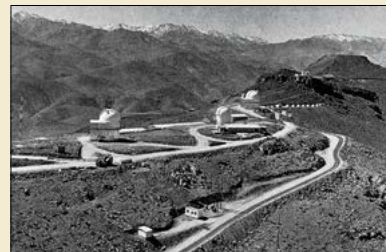
Progress of telescope project

The European Southern Observatory (ESO) is a joint enterprise of European astronomers to establish facilities beyond the reach of individual research centres. The aim is to study the sky in the southern hemisphere, which has not yet been subjected to such close scrutiny as the northern sky.

An observatory has been in action since 1967 on La Silla mountain, 600 km north of Santiago in Chile, with viewing conditions among the best in the world. The astronomers have been using a battery of small telescopes, and await the arrival

of a large optical telescope with a mirror diameter of 3.6 m. This project is on a scale considerably larger than the small ESO organization is used to, and in 1970 ESO entered into an agreement with CERN to design and construct the telescope.

The major task of the past two years has been to complete the detailed design of the telescope and its building. The present schedule calls for assembly of the telescope in Europe early in 1975 and, if all goes well, it should move to La Silla at the end of that year and come into use in 1976.



The ESO observatory in the Atacama desert, Chile. Near the top right-hand corner is the flattened summit where the 3.6 m telescope will be erected.

● Compiled from texts on pp159–160.

CERN NEWS

Telescope conference

From 2 to 5 May, about 180 scientists, predominantly astronomers, came to CERN for the ESO/CERN Conference on Auxiliary Instrumentation for Large Telescopes.

Many of the telescope projects in the 3 to 4 m range have matured to the point where attention needs to turn to instrumentation, to foresee the likely requirements of research programmes in a few years' time and the technical developments needed to meet them.

Most of the conference concentrated on spectrographic methods, but to make good observations on many astronomical features



Professor Margaret Burbidge, director of the Royal Greenwich Observatory, giving the introductory lecture at the conference on auxiliary instrumentation for large telescopes. (Image credit: CERN 149.5.72.)

currently of interest, detectors with much higher efficiencies than photographic plates will be needed. Already, devices are under development in Europe and the US, such as

image tubes (with the phosphor scanned in less than the decay time of the effect of the incoming light, and integration over long times) and tiny diode arrays (with light input converted directly to electronic information). It seems inevitable, although in many ways sad, that astronomers will soon be observing the universe via computer output.

● Compiled from texts on p165.

BROOKHAVEN

Mystery of the missing neutrinos

Started in 1968, the Brookhaven solar-neutrino experiment involves an imaginative alliance of physics and chemistry to catch neutrinos coming from the Sun. A measure of the neutrino rate indicates whether our ideas about fusion interactions going on in the heart of the Sun are correct. The latest results, reported at the Washington meeting of the American Physical Society on 26 April, suggest that so far our ideas are wrong.

The neutrino detector is a huge tank of perchloroethylene (a common dry-cleaning solvent, 80% chlorine) about 1.5 km down the Homestake Gold Mine in South Dakota, where only neutrinos can be expected to penetrate. Neutrinos interacting with chlorine produce argon-37, $\text{Cl}^{37} + \nu \rightarrow \text{Ar}^{37} + e$, which is radioactive with a half-life of 35 days. After collecting neutrinos for about 100 days, the liquid is purged with helium gas to pick up the argon

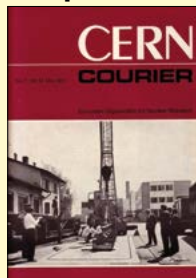
atoms whose decays are counted with a small proportional counter.

The detection sensitivity has been improved since the early days, but the measured neutrino flux is still a factor of 10 below theoretical expectations. If our ideas

on the source of solar neutrinos are correct, two neutrinos per day should be captured – the measured rate is less than 0.2. No convincing explanation for this observation has yet been put forward.

● Compiled from texts on pp173–174.

Compiler's Note



Margaret Burbidge was the first female director of the Royal Greenwich Observatory. Next year, CERN will have its first female director-general, Fabiola Gianotti.

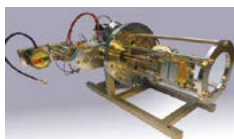
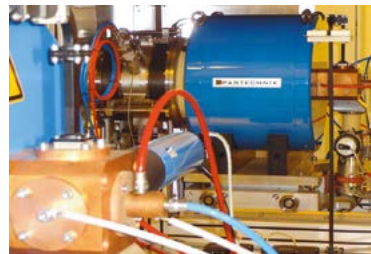
We now know that those missing solar neutrinos had made a flavour-changing journey to Earth, but particle astrophysicists still face many mysteries.

The latest and largest telescope installed in the high and dry Chilean desert is the Atacama Large Millimeter/submillimeter Array, inaugurated in March 2013. ALMA, built by ESO in collaboration with US and Japanese partners, consists of 66 high-precision antennas, spread across distances of up to 16 km, at an altitude of 5000 m (CERN Courier October 2007 p23). It is

already providing stunning images of unprecedented resolution (CERN Courier January/February 2015 p15).



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