– IHAP to IHAP communication directly with data compression. (The data compression programme extracted the data directly from the IHAP data-base and also optionally cut them before transmission.)

The transmission of full raw CCD images (320 × 512 pixels) took about 7 minutes. However, images were normally either cut with threshold levels or truncated to a subset of the full image. This allows the reduction of the size of images to some 10–20 %, even without (or before) using data compression.

It is interesting to note anyhow that operationally, the data transmission times went "unnoticed" as, typically, data were sent across the link while the next CCD exposure was taking place.

Data transmission does not clash either with sending commands to the instrument or telescope, as this involves a short exchange of messages on the line.

- An interactive message system was also used to send/receive messages from a dedicated console. This was constantly active and working together with all other operations on the link.
- A voice channel was available as an alternative to the data channel. This is useful in situations like start-up, rebooting, etc. and was routinely used, e.g. during exposures to obtain information in a more direct and informal way than via a message system.

Conclusions

The operation from La Serena proved to be feasible both for the spectrographic mode and imagery. However, particularly for spectroscopy, the addition of a device to digitize the field image of the telescope, and transmit it to the remote site, which was not yet available at this stage, is planned and will be necessary.

Next Step

The next logical step is to observe from Garching. Various technical alternatives to do this will be possible. They basically are:

– Direct link via satellite transmission and an antenna in La Silla.

– Direct link via a satellite link from Santiago shared by ESO, plus a dedicated telephone line to Santiago.

– A dedicated telephone line to Santiago plus access from Santiago to a public international computer network. In this case, in practice, data would be routed via a computer in Santiago to a USA computer via a communications satellite link and from there to Europe.

We expect that this last possibility will become available in a few months as a service. A test with this might be relatively cheap to run and would take us one step further in the direction of having remote control for the NTT.

We would like to thank M. Ziebell for his contribution to the project, P. Biereichel for his data compression programme, D. Hofstadt and the TRS staff for handling the lease contracts with Entel and for the support in Chile.

Tentative Time-table of Council Sessions and Committee Meetings in 1984

October 8–9	Scientific Technical Committee, Chile
November 13–14	Finance Committee
November 27–28	Observing Programmes Committee
November 28	Committee of Council
November 29–30	Council

All meetings will take place at ESO in Garching unless stated otherwise.

Oxygen Abundances in Metal Poor Stars

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Introduction

The study of the chemical composition of old stars may give us interesting information about the early phases of evolution of our Galaxy. The Big Bang may have formed only a trace of elements heavier than Be. It is quite consequent that the early generation of stars in our Galaxy (and in any galaxy) must have formed with a low metal abundance; the metals were then formed in the interior of these early stars and returned to the interstellar medium through stellar winds or supernova explosions. Successive generations of stars formed with an increasing metal abundance. This picture is substantiated by the relation existing between metallicity and galactic orbit eccentricities shown by Eggen et al. (1962); this is interpreted as the interaction between a fast collapse of the gas component of the galactic halo and the increase of the mean metallicity of the same gas.

Many points are still obscure in this picture; the absence of observations of very metal poor stars seems to indicate that the Initial Mass Function (IMF) may have been different in the past, being strongly biased to massive or even super-massive stars ($M > 100 M_{\odot}$). The evolution of these candidates to the first generation of stars is far from being clear (see e.g. Woosley et al., 1982); there is the strong suspicion that they may form large quantities of Oxygen but very small amounts of Iron. On the other side, type I supernovae are probably efficient Fe makers, while there is no available indication of the presence of Oxygen in their ejecta. As type I supernovae do not follow the arms of spiral galaxies and are present also in ellipticals, we think that the lifetimes of their progenitors are long. Thus the timescale of production of Oxygen (and some other light element) may be substantially different from the timescale of Iron (and other heavy elements) production.

It seems thus interesting to study the behaviour of the O/Fe ratio with time. Unfortunately it is quite difficult to derive sufficiently accurate ages for population II objects. We may however assume that age is correlated with metal abundance. This hypothesis is probably good in the solar neighbourhood, though it may be dangerous to extend it naively to other galactic regions.

Observations and Analysis

Early attempts to derive Oxygen abundances for metal poor stars have been made by Sneden et al. (1979) and Clegg et al.

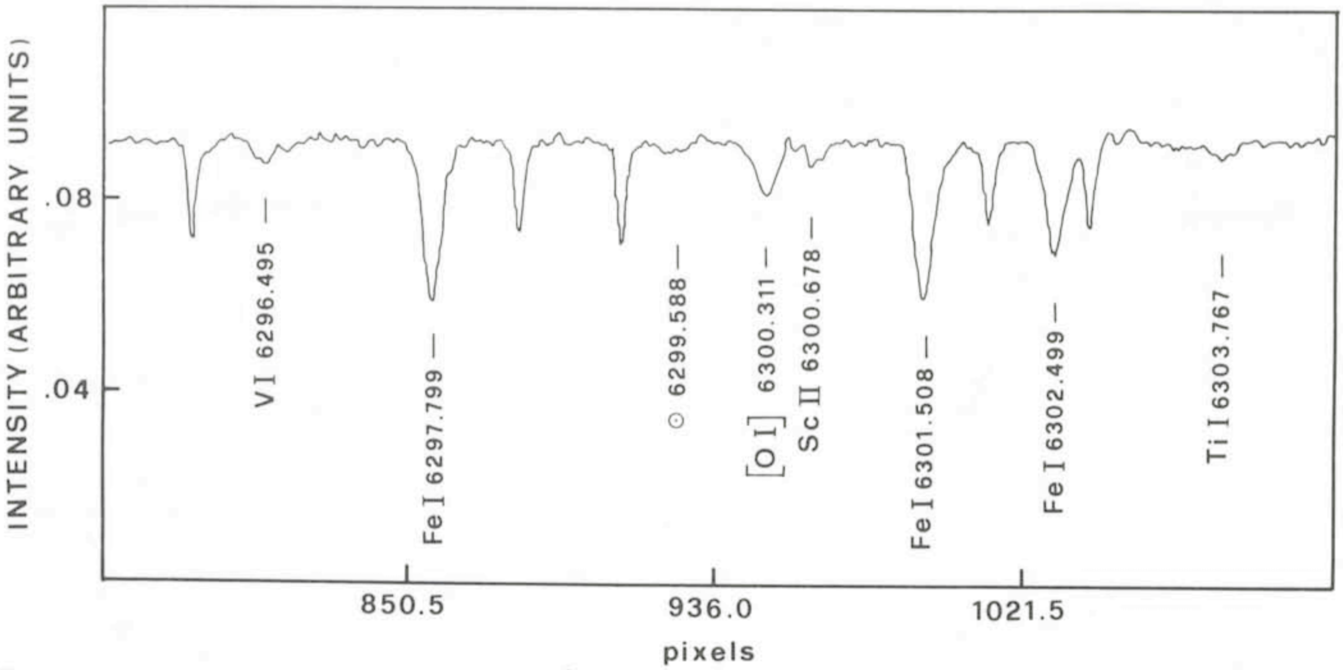

Fig. 1: *Tracing of a CAT+CES Reticon spectrum of the 6300 Å region in the metal poor giant HD 26297 (V = 7.48). The exposure time was 2 hours; the resolution 100,000. The narrow lines are telluric O lines.*

(1981). They make use of the strong infrared Oxygen triplet; this is a high excitation feature which is affected by non-LTE effects. Some doubts about the strong Oxygen overabundances found by these authors seem legitimate.

The best abundance indicators for Oxygen are the forbidden 6300 and 6363 Å lines (Lambert, 1978). However, the observation of these lines is quite difficult, the lines being weak and sometimes contaminated by telluric absorptions and emissions. Further, the lines are strongly gravity dependent. These problems may however be overcome by using the most recent high dispersion instrumentation, like the ESO CES spectrograph at the CAT telescope. The exceptionally high S/N ratio and resolution given by this instrument allow to get accurate equivalent widths for the Oxygen lines (see Fig. 1). It is possible to compare the Oxygen lines directly with other nearby lines having similar atmospheric parameter dependence, like the 6300.68 Sc II line. The abundance ratios that may be obtained in this way are largely model independent, and very small error bars may be obtained.

Observations of the 6300.31 [OI] line region and of other spectral regions were performed at the CAT telescope at La Silla during October 1982 and May 1983. The observational material (Reticon spectra with S/N in excess of 100 and resolution 100,000) was of exceptional quality: it is easy to distinguish atmospheric features from stellar ones by their widths.

Results

A preliminary analysis of the spectra has been performed using model atmosphere analysis programmes available at the Asiago Astrophysical Observatory. We have derived [O/Sc] and [O/Fe] ratios for about twenty stars of different evolutionary phases and chemical compositions. No large differences between dwarfs and giants have been seen. This means that non-LTE or evolutionary effects are unimportant, as expected. The only atmospheric parameter which significantly affects the data is the effective temperature. This was derived from photometric indices. An error of ± 100 K in the temperatures gives an error of ± 0.04 dex in the [O/Sc] and 0.08 dex in the [O/Fe] ratios respectively. Correction for CO formation was included, assuming that C is depleted by

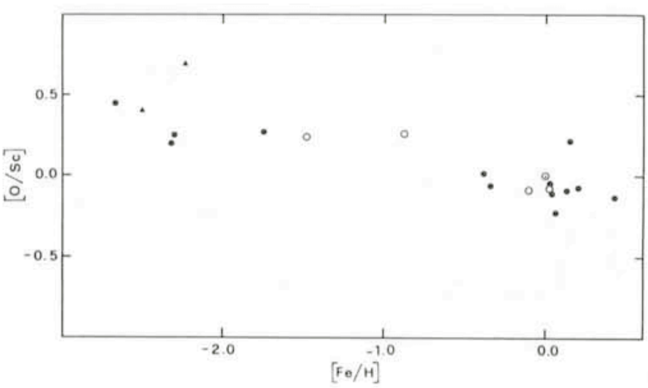

Fig. 2: *The [O/Sc] abundance ratio against the metal abundance ([Fe/H]). Dots are giants; circles are dwarfs; triangles are data from Lambert et al. (1974).*

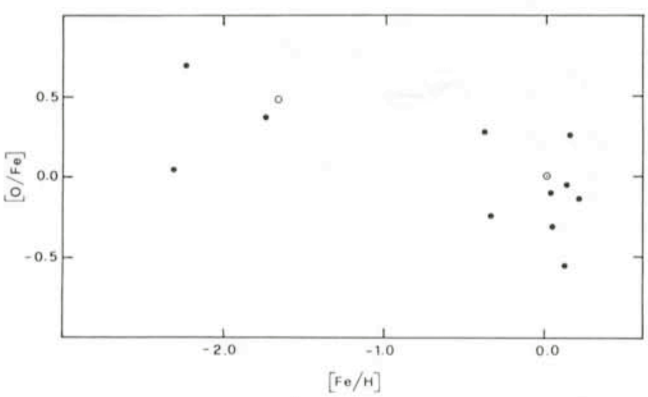

Fig. 3: *The [O/Fe] abundance ratio against the metal abundance ([Fe/H]). The symbols are the same as in Fig. 2.*

0.2 dex in giants (Lambert and Ries, 1977, 1981; Kjaergaard et al., 1982). The effect of this correction is important only for a couple of the cooler population I stars.

Fig. 2 and 3 give the [O/Sc] and [O/Fe] ratios against the iron abundance; an additional star (HD 122563: Lambert et al., 1974) having literature data is plotted in Fig. 2 as a triangle.

Inspection of Fig. 2 und 3 reveals that metal poor stars are Oxygen overabundant. However, this overabundance is less than indicated by the previous works. Our result refers to a small sample of stars. However, it may be considered as an evidence of a slight (0.3 dex) Oxygen overabundance in metal poor stars.

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Image processing at ESO is heavily used and much effort is made to provide the most sophisticated hardware available. A very fashionable and comfortable computer desk terminal has just been chosen from an advertisement published in the Los Angeles Times *(15.5.1984).*

Visiting Astronomers

(October 1, 1984 to April 1, 1985)

Observing time has now been allocated for period 34 (October 1, 1984 to April 1, 1985). As usual, the demand for telescope time was much greater than the time actually available.

The following list gives the names of the visiting astronomers, by telescope and in chronological order. The complete list, with dates, equipment and programme titles, is available from ESO-Garching.

3.6 m Telescope

October 1984: Hunger/Heber/Drilling/Kudritzki, Alloin/D'Odorico/Pelat, Dravins/Linde/Nordlund/Fredga/Gahm/Ayres/Linsky/Simon, Eriksson/Saxner, Gratton/Ortolani, Maurice/Lequeux/M.L. Prévot/L. Prévot, Cristiani, Moorwood/Cetty-Véron, Richter/Chiosi/Ortolani/Gratton, Beuermann/Pakull/Motch/Krautter, Lindblad/Jörsäter, Kunth/Sargent, Zuiderwijk/v. Paradijs/de Loore.

November 1984: Zuiderwijk/v. Paradijs/de Loore, Alloin/D'Odorico/Pelat, Rosino/Ortolani, Pizzichini/Pedersen, Bergeron/Puget, Marano/Zamorani/Zitelli, Westerlund/Azzopardi/Breysacher, Marano/Zamorani/Zitelli, Westerlund/Azzopardi/Breysacher, Neckel/Staude.

December 1984: Neckel/Staude, Kudritzki/Conti/Gehren/Groth/Husfeld/Simon, Danks, Ferlet/Dennefeld, Rodono/Foing/Cutispoto/Scaltriti/Bonnet/Linsky/Butler/Haisch, Dennefeld, Cristiani, Richtler/Seggewiss, Pakull/Beuermann/Ilovaisky/Chevalier/Motch/van der Klis, Danziger/Cristiani/Shaver.

January 1985: Epchtein/Braz, Israel/Koornneef/de Graauw/Schwering, Westerlund/Jörgensen U.G./Gustafsson, Olofsson/Bergvall/Johansson, van der Kruit, Westerlund/Jörgensen, U.G./Gustafsson, Lequeux/Azzopardi/Breysacher/Westerlund, Schild/Maeder/Kunth, Hensler/Schoembs/Kudritzki/La Dous/Barwig, Chmielewski/Jousson.

February 1985: Chmielewski/Jousson, Kudritzki/Nissen/Gehren/Simon, Reipurth, Cetty-Véron, Bergeron/Boissé, Pottasch/Bouchet/Dennefeld/Karoji, de Grijp/Lub/Miley/de Jong, Pottasch/Bouchet/Dennefeld/Karoji, Preite-Martinez/Persi/Ferrari-Toniolo/Pottasch.

March 1985: Preite-Martinez/Persi/Ferrari-Toniolo/Pottasch, Moorwood/Glass, de Muizon/d'Hendecourt/Perrier, Perrier/Chelli/Léna, Stalio/Ferluga, Gehren/Hartmann/Kudritzki, Krautter.

1.4 m CAT

October 1984: Crivellari/Beckman/Foing/Franco, Ferlet/Vidal-Madjar/Gry/Laurent, Spite, M. and F./François, Danks/Lambert.

November 1984: Danks/Lambert, Pallavicini, Holweger/Gigas/Steenbock, Mauron, Reimers/Hempe/Toussaint.

December 1984: Reimers/Hempe/Toussaint, Foing/Bonnet/Crivellari/Beckman/Galleguillos/Lemaire/Gouttebroze, Gustafsson/Vilhu/Schoembs, Rodono/Foing/Cutispoto/Scaltriti/Bonnet/Linsky/Butler/Haisch, Foing/Bonnet/Crivellari/Beckman/Galleguillos/Lemaire/Gouttebroze, Gustafsson/Vilhu/Schoembs, Barbuy, Baade.

January 1985: Baade, Hanuschik/Dachs, Baade/Ferlet, Furenlid/Kurucz.

February 1985: Baade, Gratton/Ortolani/Sneden, Hanuschik/Dachs.