



ANNIVERSARY

This report is rather personal since this year I *celebrate* the 30th anniversary of my first CD installations. First ones were a Cary 60 at ENI (major Italian petrochemical company) nearby Rome and a Cary 61 at CNR c/o the University of Rome.

I do not want to look with nostalgia at the years gone, past is past anyway, but it may be interesting to see how things changed in the CD field.

In a sense not much, most of the leading people are still there, a bit aged, but still active specialists of the technique, while a few regrettably passed away: many people will hardly forget Prof Snatzke or Prof Moscovits

Also spectra are still the same, obviously easier and faster to obtain, but not much better in s/n term and with no extra information built in.

During my first Cary 60 installation at ENI my Varian colleagues were installing an XL-100 FT/NMR spectrometer. At that time the vacuum tube electronics Cary 60 was looking very old compared to the innovative XL-100. Well today the XL-100 is a piece of museum (i.e. clearly obsolete) compared to current NMRs, while a Cary 60 would still be competitive in many respect versus current CD spectrometers.

The real big jump has been the *piezoelectric modular* replacing the old pockel cells. Cary pockel cells were fine, but they had the bad habit to crash one week after warranty was over. I do remember a Cary 61 which was at last refitted with a much more lasting Jasco pockel cell and it has been running till now.

The other major step has been the *cost down*, a Cary 60 was more expensive than an apartment downtown or if you prefer a collection of Ferrari supercars. Today with the J-810 money you can get only the lower cost Porsche available.

Cost down however has been not as impressive as in other analytical techniques, so, even today, CD is not as popular as it'd be.

Data processing has been the most obvious advance in these 30 years, multipot baseline correction was an art new generations can skip to learn, but this often means also a lack of know-how on the way instruments operate and on their actual limits.

PC acquisition control is the other point. Today it is so easy to perform experiments such as temperature melting and multiple shots stopped-flow, which were possible also in the past, but with much more effort.

Reliability has been probably one of the most noticeable advance, modern electronics is not making use of sliding potentiometers or of Mercury relays. But well cared old units are still competitive:

-my friend Maurizio Zandomenighi in Pisa is using an old J-40, previously installed at the ETH in Zurich, unit is now over 25 years old, but it's still going strong

- recently I received from Minsk a message from Vladimir G. Zaitsev stating that their 26 years old J-20 is still able to perform research work, as published this year (*Chirality*, 2000, 12, 287).

So old instruments, in proper hands, have still a role; no surprise about: light sources, detectors and monochromators are still virtually the same!

Other improvements?

Yes, but apparently so small that even manufacturers are not stressing them into their literature.

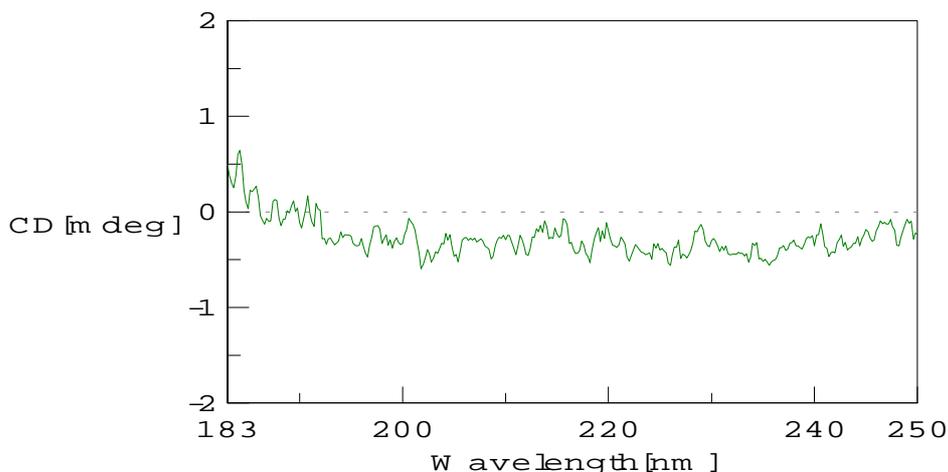
Prof Shindo¹ (probably today the most famous CD hardware expert) suggested that the natural (uncorrected) baseline shape is the best criteria to judge the optical quality of a CD spectrometer.

Manufacturers always *forgot* to give any specification about. 30 years ago a natural air baseline shift of tenths of mdeg was normal, 20 years ago a J-500 equipped already with PEM modulator was considered good when within +/-6mdeg in the 200-700 nm range.

Data reported below shows the actual baseline obtained a few days ago on a new J-810 with a 1mm path rectangular quartz cell (Hellma 110Q) filled with buffer in the path.

Baseline shift is very small, even below 200 nm, this means that Hellma is making good cells, but also that the *quality* of current CD spectrometers is widely improved.

¹ Y. Shindo, M. Nakagawa, *Rev.Sci.Instrum* 56 (1985) 32.



The main reason behind this improvement is probably to be located in the way the PEM is hold in its support. The original design (inspired by the Hinds original approach) was exchanged since J-700 introduction about 10 years ago. From then natural baseline flatness has been improved, but you do not trace any mention of this in any Jasco commercial document

Can we expect innovative changes in the future?

Yes and not: to me CCD detectors would allow even today the development of different instruments; faster, i.e. more sensitive, but a CCD based CD spectrometer means a lot of development work that the few current manufacturers seem afraid to invest on, considering that the present global market per year is in the few hundred pieces range

Further cost down using current technology would be possible too: the UV-VIS spectrophotometers market is a good example; here too the question is to see how CD market would expand in front of the offer of moderate cost, analytical CD instrumentation.

In the UV-VIS spectrophotometers field you can select different instruments with different performances, would the CD market accept performance limitations in front of a substantial lower cost?

This to me may become true only if CD technique will become more popular also in the hands of non-specialists. Chirality is becoming more and more a popular subject, mainly at analytical level, how long should be await for real analytical CD applications?