Analytical Viewpoint

The following is a member of what is intended to be a continuing series of articles providing either a personal view of part of one discipline in analytical chemistry (its present state, where it may be leading, etc.), or a philosophical look at a topic of relevance to chemists in general or analytical chemists in particular. These contributions need not have been the subject of papers at Analytical Division Meetings. Persons wishing to provide an article for publication in this series are invited to contact the editor of *Analytical Proceedings*, who will be pleased to receive manuscripts or to discuss outline ideas with prospective authors.

Academic - Industrial Co-operation: A Comment on the Mutual Advantages of Gown - Industry Partnerships

L. Morris
Development Manager, Philips Scientific, York Street, Cambridge CB1 2PX

That mutual benefits are to be gained by good co-operation between industrial companies and university research establishments is unlikely to be denied by anyone in either camp. Nevertheless, a case example illustrating how in-depth such co-operation can be, and how a long-term and profitable relationship may be forged, can I believe be an incentive to such useful collaboration in the future.

This article describes the relationship formed over several years between Philips Scientific (earlier Pye Unicam) and the University of Strathclyde, through the auspices of the late Professor John Ottaway (to whose memory it pays tribute). It highlights the advantages accruing to my company, to Professor Ottaway's group and to analysts alike.

Large commercial organisations, such as the Philips group, have their own research laboratories, of course, funded by a set levy on all parts of the company. This guarantees a good independent research backing for the group as a whole, but can fall short when specific areas within the group wish to expand into areas currently outside of the group's current activity. At this stage, combining in-house research facilities with the activities of academic institutions has great potential.

Exactly this situation occurred when Philips developed electrothermal atomisation as part of the expansion of its atomic spectroscopy capability, and co-operated with the University of Strathclyde.

A good relationship was formed between Professor Ottaway's laboratory and myself as a project group manager at that time. We were able to grasp a three-way opportunity presented by the late Dr. B. Lersmacher and Philips research laboratories at Aachen in West Germany (with their wealth of knowledge on carbon), Professor Ottaway's team's innovative research ability and our skill in developing instrumentation.

As project leader for AA spectroscopy within the Philips development laboratory, I became acquainted with Professor Ottaway on a matter of supporting a CASE student, and was soon convinced of the benefit of such co-operation between the company and the university.

It is cogent to remark here that CASE studentships are a valuable source of co-operative activity when they conform to certain fundamental rules. These are: that there should be a clear agreement on the objectives aimed at by both the industrial and academic partners; that the industrial partner should be committed enough to subscribe, if necessary, greater than the minimum financial requirement; and that the student should be prepared to spend a period of time (months at least) at the industrial partner's establishment, getting to know the people there on a friendly basis, and understanding the partner's needs and objectives. It is easier subsequently to get help if you know who to contact and have had previous amicable dealings with those people.

Philips Scientific (or Pye Unicam as it was then) found that it could offer two attractive benefits to Strathclyde University: the loan of instrumentation and equipment and, later on, the services of a highly skilled development machine shop that specialised in the making of pre-production development models.

It has to be recognised at the outset, by all concerned, that there may well be industrially unsuccessful ventures as well as successful ones. For instance, in our case an excellent idea for solving a problem in the measurement of toxic dust monitoring was discussed and worked on at length in 1978/79. It was for a beryllium dust in air monitor, potentially needed by the AWRE for environmental monitoring in their machine shops. The concept was to use the electrothermal atomiser, which we had collaborated on to produce, to collect dust by electrostatically charging the dust and attracting it to the cuvette (see Fig. 1). Unfortunately, the necessary funding did not materialise and therefore Philips had to abandon support of the project. This, however, did not offend Professor Ottaway; it was taken up by the university, under his control, and the results published elsewhere.

Once having set up a good working relationship it is well worthwhile investing in it. John Ottaway proved an excellent

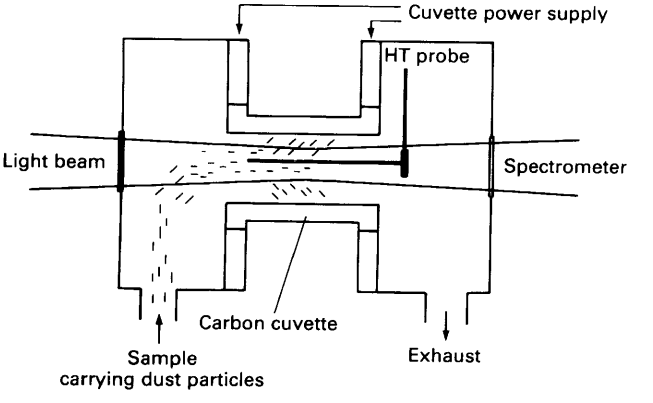

Fig. 1. Concept for dust analysis in air

academic and his work was attractive. His department was also successful because he was very skilled at marketing its output to industry. Furthermore, he was always a champion of his students, and helped to get them financial support.

As Spectrophotometry Group Manager I was keen to co-operate, although restrained by a keen budget. The financial limitations led to a more involved phase, when Professor Ottaway and Philips were able jointly to secure a grant from the Pye Foundation.

This, thanks to the company's investment and the university's research grant, proved to be a very fruitful period, the funding available allowing the appointment of a lectureship. The investment a company may place when assured of this type of co-operation is more than amply rewarded. The foundation for what followed had already been laid (by the concepts of L'vov and Pelieva,[1,2] in 1978–80). The need was for isothermal atomisation in carbon cuvettes and the achievement of this via a probe (Fig. 2). Complementing this need was the available research on carbon from the Philips Aachen Laboratories, with the expert knowledge of Dr. Lersmacher and support from Dr. W. F. Knippenberg at the Natuurkundig Laboratorium in Eindhoven, Holland.

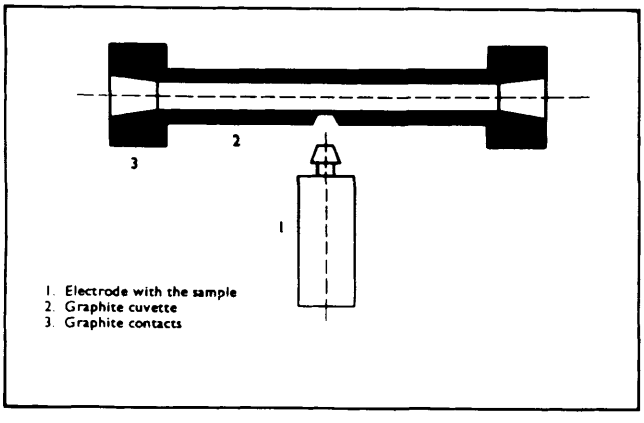

Fig. 2. The L'vov furnace system

The early work was carried out using competitive equipment. In its later phases the procedure adopted was to organise a meeting between Philips research laboratory staff from both Aachen and Eindhoven, development and applications staff from Cambridge and the University of Strathclyde team. At that meeting a work plan was evolved. Carbon probes and cuvettes would be made at Aachen, tested for purity in Eindhoven and then sent to Strathclyde.

The instrumentation, at this stage a Pye Unicam spectrophotometer, would be modified, special apparatus created and tested in Cambridge, and transported to Strathclyde, where research based on the ideas previously created and discussed would go forward. A variety of probe shapes was evaluated, as is shown in Fig. 3.

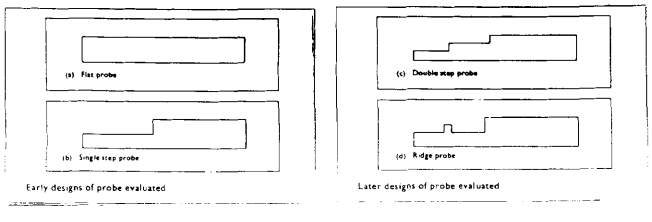

Fig. 3. Probe designs

Totally pyrolytic graphite cuvettes were created and benefits demonstrated (Fig. 4). A great deal of work and research went into optimising the process to produce the totally pyrolytic material and the design for the instrumentation. The probe work eventually came to a point where it was taken over by the development laboratory and developed for use with instrumentation. This reached completion with the recent launch of the probe furnace (Fig. 5). Sadly, Professor Ottaway did not live to see this work come finally to a marketed product.

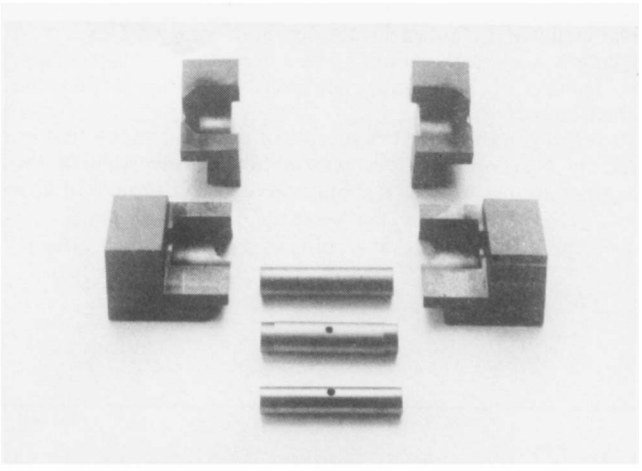

Fig. 4. Totally pyrolytic graphite cuvettes

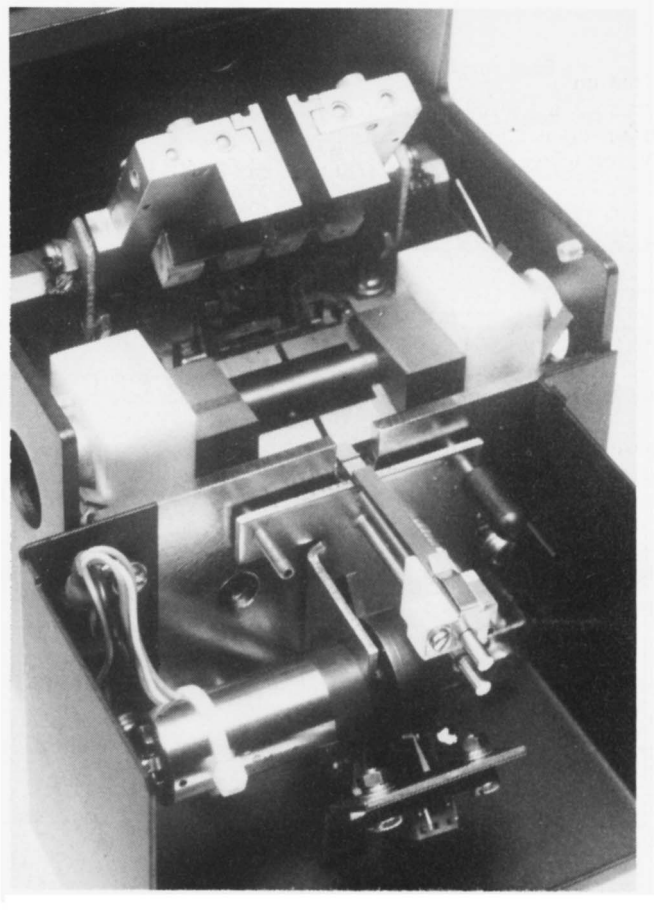

Fig. 5. The Philips probe furnace

During the five year lectureship a great deal of work was also pursued on atomic emission with a similar pattern of co-operation. In that period over £200 000 was invested in the work by the Pye Foundation, Pye Unicam and Philips.

At Philips Scientific we have benefited a great deal from the knowledge gained through all this collaboration, using it as input to promote new products. The University of Strathclyde has benefited by the investment and has produced no less than 34 publications connected with the work. It is to be hoped that analysts will now be benefiting from both.

This example shows how a sincere will to co-operate can bring success to all parties concerned. Professor Ottaway was a

great believer in industrial co-operation and was expert in making it work to the benefit of his department, his students, the science of analytical chemistry, the analyst and the industrial partner.

It remains to be said that success of this kind should not be used by Government as a reason for not investing in the country's future. Rather it should serve as an example of how funding can be successfully placed.

References

1. L'vov, B. V., and Pelieva, L. A., *Zh. Anal. Khim.*, 1978, **33**, 1572.
2. L'vov, B. V., and Pelieva, L. A., *Zh. Anal. Khim.*, 1980, **35**, 1744.

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The East Anglia Region of the RSC's Analytical Division will be holding a meeting on the above topic at Unilever Research Laboratory, Sharnbrook, Bedfordshire. The two keynote lectures will be delivered by Professor G. Baiulescu and Professor R. W. Frei.

For further information contact P. R. Brawn, Unilever Research, Colworth Laboratory, Sharnbrook, Bedfordshire MK44 1LQ (Tel. 0234-22011).

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A Meeting entitled

FLOW ANALYSIS METHODS

will be held at

The Scientific Societies Lecture Theatre, 23 Savile Row, London W.1.

on

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Offers of papers for the above meeting are solicited. Offers should be sent to Dr. D. I. Coomber, 8 Rowben Close, Totteridge, London N20 8QR as soon as possible.

ROYAL SOCIETY OF CHEMISTRY: ANALYTICAL DIVISION
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November 17th, 1988, Linnean Society, London W. 1.

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