

Tom Arnold君の研究室滞在

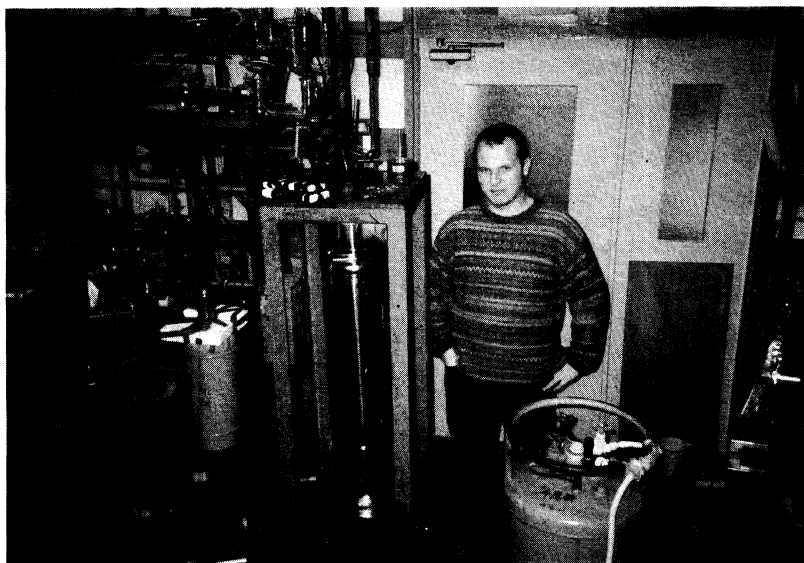
オックスフォード大学からPhD studentのThomas Arnold君がやってきたのは1999年2月28日（日）であった。日本で言えば大学院修士課程の一年生になったばかりの学生である。前年12月に、オックスフォード郊外にあるラザフォード・アップルトン研究所で一緒に中性子散乱実験を行ったのが彼との初対面であったのだが、それからちょうど3ヶ月足らずで日本にやってきたのは驚きである。ブリティッシュカウンシルの基金によるものであった。

彼のオックスフォードでのsupervisorはDr. Robert K. Thomas, F.R.S.であり、われわれの共同研究はもう15年間続いている。当時のPhD studentであったDr. Stuart M. Clarkeは今、ケンブリッジ大学のキャベンディッシュ研究所にいて、Tom君を直接指導している第2のsupervisorである。そういう間柄で今回、是非ともカロリメトリに触れたいというのがTom君の来日希望の第一であった。第二は、この機会に高エネルギー加速器研究機構（KEK）で中性子実験を経験したいというものであった。そこで、受理されていた実験課題のビームタイムを彼の来日予定に合わせて設定してもらった次第である。研究対象は「固液界面で形成される二次元固体」である。その内容については、彼の記述と本号の研究紹介を参照していただくことにしよう。

彼の研究（勉学）態度には、逆にこちらが引き込まれるような魅力さえある。フットボール（イギリスではラグビーのこと）とアーチェリーを愛するスポーツマンでもある。日本での車両左側通行が見慣れた光景であったことは間違いないが、意外なところにカルチュアショックが多々あったらしい。「冬に色が変わる芝生を芝生とは言わない。」「飲料やタバコ、アルコールの自販機が街中に溢れているのに、スナック（おやつ）の自販機が無いのはおかしい。」など頑固な一面も見せてくれた。ヨーロッパ大陸（EU）人とは違うとの主張も、如何にもイギリス人である。

彼は日本縦断の経験もした。池袋では、カプセルホテルでの宿泊を経験したという。その機能性と安い料金は気に入ったらしい。本人が大阪に戻ってくる前に、秋田駅からの宅配便で彼のジャンパー（忘れ物）が先に帰ってきたのを見てもその冒険ぶりが分かる。こうして密度の濃い一ヶ月余りの日本滞在を過ごし、4月6日帰国の途についた彼は、フランスのグルノーブルにあるラウエ・ランジュバン研究所での4月12日からの中性子実験のために、準備をすべくオックスフォードに戻った。その7日間のビームタイムと一緒に過ごしたわれわれは、もう何年も前から知り合いであったかのような錯覚を起こしたくらいであった。彼の今の悩みは、将来、アカデミックな職に就くべきかどうかで、こればかりは万国共通であるらしい。

（稲葉 章）



A Visit to Osaka University

I arrived in Osaka at the end of February this year for a stay of six weeks in Japan, which would include a trip to the advanced experimental neutron facility at KEK, Tsukuba, as well as day-to-day work with my host, Associate Professor Inaba. The first thing I noticed about Japan was the colour of the grass. I had been used to the green grass of home, so I was not expecting the Japanese grass to be a different colour. After this initial surprise I found myself noticing lots of small differences between our two countries that I had not been expecting. (For example, there seem to be a very large number of vending machines in Japan, but I could not find any that would sell snack food, which was surprising because this is the only type of vending machine to be found in Great Britain.) However, along with these differences I found that a lot was very familiar. So much so that, without understanding much Japanese, I was able to use public transport or buy things and generally do many of the normal everyday things which might have been difficult otherwise.

Work in the laboratory soon became fairly routine and I found that all the people were genuinely friendly and helpful, despite a communication problem at times. We were working on the adsorption of alkane molecules onto the surface of graphite using adiabatic calorimetry to measure the temperature and enthalpy of any phase transitions. It is known from previous work that the surface layer of an alkane adsorbed from its liquid adopts a different structure and melts at a different temperature than the bulk alkane. This work looked at a binary mixture of alkanes (octane and nonane) at various compositions to try to determine if there was any preferential adsorption of one of the alkanes over the other. Work with differential scanning calorimetry (DSC) had been done previously, but the data was not clean and the added accuracy available using adiabatic calorimetry actually meant that some new transitions were noticed. The delicacy of the instrumentation and the length of time to take each measurement, however, does mean that it is almost impractical to complete a systematic study of the binary mixtures without the aid of the comparatively fast but inaccurate DSC, and the two techniques complement each other well. I was impressed with the instrument, and I felt that I learnt a lot about the technique, even though I barely scratched

the surface. I certainly improved my knowledge of thermodynamics especially on the practical side of things and I hope that my future studies will be better for it.

The neutron beam time at KEK was for one week, and was used to study the incoherent quasi-elastic spectrum of dodecane adsorbed on graphite, with a view to determining the melting behaviour of the surface layer. Again previous work, including some adiabatic calorimetry, showed that the dodecane layer (adsorbed from its liquid) undergoes a solid-solid transition before melting. The quasi-elastic spectrum is able to provide information regarding the diffusion constant of this layer at temperatures before during and after the transitions, and so say something about the nature of this two-dimensional phase. The instrument used for this was LAM-80ET which despite the low neutron flux (compared to the European sources I had used previously) was very efficient and some very good data was obtained.

After this I returned to Osaka to continue with the calorimetry work on the octane/nonane system, but before long my time in Japan was to end. I was fortunate enough to see the cherry blossom in Osaka and Kyoto the week before I left, which I still remember as an amazing transformation from winter into spring. After all this time in Japan, my only regret is that I could not stay longer to learn more about the culture and language. I would like to thank all the people in the Matsuo research group for their kindness and hospitality, with special thanks to Professor Matsuo and Associate Professor Inaba.

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