demand. Is this entirely the consumer's fault ?

Yours faithfully,

K. M. CLAYTON

School of Environmental Sciences,
University of East Anglia,
University Village,
Norwich NOR 88C

Forensic Science

SIR,—Dr Curry in his article on "Recent Developments in Forensic Science" (*Nature*, **235**, 369 ; 1971) errs on the side of extreme conservatism when he asserts that the existing techniques of blood grouping and enzyme measurement can occasionally give a discriminatory power of 1 in 1,000. This laboratory uses routinely in case-work three serological systems (ABO; MN; Rh) and up to six enzyme systems (AK; ADA; PGM; 6PGD; G6PD; PCE) plus haptoglobin and haemoglobin. Discrimination of 1 in 1,000 is commonly obtained but from time to time values as high as 1 in 10^6 have arisen.

Dr Curry has apparently overlooked the advantages of atomic absorption spectrometry which are being exploited in several forensic laboratories. Considerable developments are also being made in scanning electron microscopy particularly in conjunction with electron probe X-ray microanalysis. Such equipment has been in use in the MP Laboratory for nearly a year and has been very useful in the elemental analysis of fragments of paint, glass and metals even when the cross section of the sample analysed is as small as 10 μm.

Yours faithfully,

R. L. WILLIAMS

Director
The Metropolitan Police
Forensic Science Laboratory,
2 Richbell Place, London WC1

Obituary

Sir Frederick C. Bawden

SIR FREDERICK CHARLES BAWDEN, FRS, Director of Rothamsted Experimental Station and Treasurer of the Royal Society, died on February 8 at the age of 63.

Frederick Bawden was a scholar of Emmanuel College, Cambridge, and he graduated with first-class honours in botany. Rather than enrol for a PhD —a degree he never did acquire— Bawden instead obtained a diploma in plant pathology at the Cambridge School of Agriculture. His first appointment in 1930 was as research assistant to the formidable Redcliffe N. Salaman. Salaman, the son of a wealthy Jewish family and a medical man, was originally engaged in medical research at the London Hospital, but he contracted tuberculosis at the age of 30 and was advised to lead an outdoor existence. Living quite near Cambridge at Barley, Salaman became interested in the scientific genetics and breeding of the potato, on which he became a leading authority, and subsequently he developed an interest in the virus diseases of potatoes. As a consequence he persuaded the Ministry of Agriculture in 1927 to establish and finance the Potato Virus Research Station (later to become the ARC Virus Research Unit), which was situated on the edge of Cambridge University Farm, and at the time consisted only of a few glasshouses and a potato shed. There Bawden was to meet Salaman's other colleagues, who included Kenneth Smith, the station's entomologist, and to receive a thorough grounding in virus diagnosis and transmission by grafting, sap inoculation and insect transfer. The work of a research assistant consisted very largely of routine work of this type and of recording the results, often photographically, under the most primitive conditions. The darkroom was built onto the potato shed and was hot in summer and freezing in winter. There Bawden was to make his only contribution to scientific photography. Taking advantage of the infrared reflexion band of chlorophyll, he managed to get good photographs of necrotic virus symptoms on plant leaves using infrared plates[1].

Subsequently he became interested in the diagnosis of virus diseases using the immunological methods that had just been developed. This resulted in a fruitful collaboration with E. T. C. Spooner of Cambridge University Pathology Laboratory. Intrigued as to the nature of the viral antigens present in diseased plants, Bawden also became a close collaborator with a young biochemist, N. W. Pirie, who was Demonstrator in Sir Frederick Gowland Hopkins's famous biochemistry laboratory. Bawden and Pirie, who complemented each other in their knowledge and abilities, soon found that the antigen of Kenneth Smith's potato "X" virus had many of the properties characteristic of proteins[2].

At about this time W. M. Stanley at the Rockefeller Institute, Princeton, published his famous paper on the nature of the tobacco mosaic virus, making the claim that the virus was a crystalline globulin[3]. Repeating this work Bawden and Pirie, in collaboration with J. D. Bernal and I. Fankuchen, showed that the tobacco mosaic virus was a long thin nucleoprotein rod at least 1000 Å long, having a regular structural repeat along its length every 3×22 Å and containing about 5 per cent of ribonucleic acid[4]. The "crystals" of Stanley were found to be liquid crystals. This one paper more or less established modern biochemical virology as well as forming one of the foundations of molecular biology. It was followed by a monumental paper in the *Proceedings of the Royal Society*, which contained so much new information that even now it is well worth consulting[5]. In particular they noted at this time that the nucleic acid of the virus was a much larger molecule than was expected on the basis of the chemical evidence available.

The presence of nucleic acid in the virus was a matter of some controversy for some time, but Bawden and Pirie went on to purify potato "X" virus, cucumber viruses 3 and 4 and Kenneth Smith's tomato bushy stunt virus, all of which were found to contain ribonucleic acid. The cucumber viruses proved unexpectedly to resemble tobacco mosaic virus both physically and chemically though they had no known host in common with the latter. This was the first instance in which virus relationships were finally recognized on the basis of chemical and