agencies, liberating Foundation staff for other work. Appropriations in 1961 supported studies in the genetics of corn at the University of Nebraska, in population genetics at the North Carolina State College at Raleigh, including at both places advanced training to Latin American plant breeders. The Foundation also operates the Rice Research Institute in Los Banos, the Philippines, and provides the funds and services of six members of the staff, which is making a concerted attack on the problems limiting the production of rice in the 'rice bowl' of the Far East.

For the virus research programme, to which some 18 virologists, entomologists and epidemiologists were assigned in 1961, the Foundation appropriated some 1·7 million dollars in 1962, including work on the development of professional education by staff members. In the five field laboratories the primary aim is to determine prevalence of the arborviruses in the region, and of 143 viruses classified by the New York laboratories only 14 occur in more than one biogeographical region; 58 occur in South America, 35 in Africa, 28 in India, Indo-China, China and the East Indies and 13 in North America.

ELECTROPHORESIS IN STABILIZED MEDIA

TECHNIQUES in electrophoresis, refined over recent years, were considered at a symposium organized on October 17, 1962, by the Scottish Office of the Department of Scientific and Industrial Research under its Scottish Research Laboratories Mutual Assistance Scheme. The Arthur D. Little Research Institute at Inveresk, Midlothian, acted as host.

Dr. F. N. Woodward (director, Arthur D. Little Research Institute), in the chair for the morning session, directed attention to the advances in electrophoresis since the Tiselius technique first appeared. The demand for places at the meeting and the widespread use of the method were sufficient to illustrate its value.

Dr. R. L. M. Synge (Rowett Research Institute, Aberdeen) gave an introductory review of electrophoresis and pointed to other modes of stabilization than by solid additives, at the same time questioning the choice of title which 'excluded' modes of electrophoresis such as rotating horizontal tube, thin liquid layer, diaphragm and electrodecantation cell. He saw the future bringing investigations on isoelectric fractionation, displacement techniques and electrophoresis in magnetic fields. The examination of the physicochemical principles showed that they had to grapple with other effects such as electroendosmosis, adsorption and charge on the solid stabilizer as well as diffusion and fibre size in paper. The discussion which followed seemed to favour the reservation of the term electrophoresis in stabilized media for those systems where additives (for example, sucrose (density gradient), paper) were used.

Dr. J. W. B. King (Animal Breeding Research Organization, Edinburgh) gave an account of starch-gel electrophoresis used by the zoologist. They had developed useful one- and two-dimensional procedures for genetical investigations of pig sera. Mr. I. E. Lush (Poultry Research Centre, Edinburgh) opened the discussion with a description of the method he used in terms of the ovalbumin investigations he had carried out with starch-gel electrophoresis.

Column electrophoresis was dealt with by Dr. D. L. Mould (Animal Diseases Research Association, Edinburgh), first in terms of design such as the recent developments in increase in column size and then its application. He stressed that this was virtually the only method for electrophoresis in stabilized media which handled large quantities. Dr. G. R. Tristram (Biochemistry Department, University of St. Andrews), in discussing column electrophoresis, suggested that there was little object in using a method which was so time-consuming when other alternatives, such as ion-exchange celluloses or even starch-gel systems, were available and that this was the reason why it was little used. Dr. Mould pointed out, in reply, that column electrophoresis was complementary, not competitive, to the other methods.

Prof. S. C. Frazer (Department of Chemical Pathology, University of Aberdeen) reviewed, in his opening remarks as the chairman of the afternoon session, the value of electrophoresis to chemical diagnosis. Apart from gross abnormalities, the wide range of natural variation in human protein components prevented it from having more than a modest place as a clinical laboratory tool. However, he was slightly more optimistic toward starch-gel electrophoresis investigations of specific proteins such as haptoglobins or isoenzyme systems but this approach was still in the research stage.

Dr. H. J. Cruft (Biochemistry Department, University of Edinburgh) dealt with the attractions of polyacrylamide gel electrophoresis and pointed out that this was a gel system which was far more clearly defined, simpler in preparation and more stable than starch-gel. The range of gel concentrations was considerable and it was even possible to use additives for 'tailoring', such as acrylic acid, which gave the material starch-gel characteristics (1 per cent carboxyl addition) as indicated by their investigations on calf thymus histones.

Mrs. Ruth M. Clayton (Institute of Animal Genetics, University of Edinburgh) gave a paper on the techniques and applications of immuno-electrophoresis, which she was using for genetic and other investigations. She directed attention to its application in a number of fields and mentioned the investigation of lens proteins. Dr. E. R. Skinner (Biochemistry Department, University of Aberdeen), in opening the discussion, described similar techniques that were being used by him.

Dr. F. S. Steven (Biochemistry Department, University of St. Andrews) then spoke on high-voltage electrophoresis (defining this as > 50 V/cm) as a way of rapidly separating small molecular weight materials. He mentioned the electrochromatographic 'fingerprinting' of proteins and their success with partial protein hydrolysis by ion-exchange resins—rather than by enzymes. Dr. J. L. Simkin (Biochemistry Department, University of Aberdeen) felt that the 'above 50 V/cm' definition was a little severe and gave evidence for useful separations of simple carbohydrates over the 25–35 V/cm range especially where complexing buffers were used. In the general discussion which followed, Dr. C. B. Coulson (Arthur D. Little Research Institute) mentioned the poor results with high-voltage electrophoresis when such high molecular weight substances as proteins or humic acids were examined. Dr. D. J. Bell (Poultry Research Centre, Edinburgh) suggested that this was probably due to the fact that compounds were not in an adsorption equilibrium with the support.

Dr. Ivor Smith (Courtauld Institute of Biochemistry, London) favoured the holding of a similar symposium on column chromatography of proteins, which was a cheap technique. Prof. Frazer agreed that there was a case for another symposium on electrophoresis for the east and north of Scotland, and that it should be considered two years hence. Dr. J. K. Duxbury (Department of Scientific and Industrial Research Scottish Office, Edinburgh) agreed to pursue the two suggestions and stated that similar symposia, under the auspices of the Mutual Assistance Scheme, were planned for Glasgow and the west of Scotland.

C. B. Coulson
J. K. Duxbury