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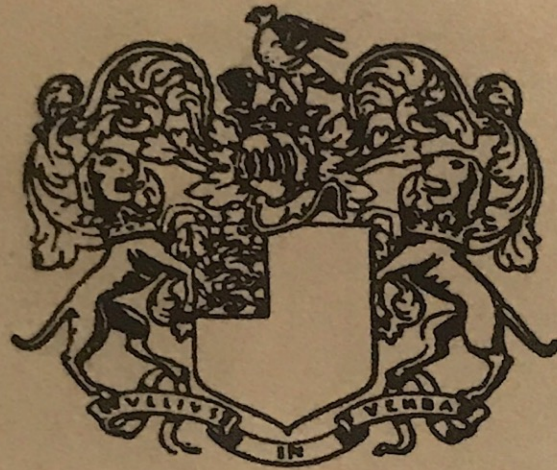
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# THE ROYAL SOCIETY



Exchange Visits of Scientists between  
the Academy of the Socialist Republic of  
Rumania and the Royal Society

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## Report by

Mr N. W. Pirie

on a visit to Rumania in October 1967 under the Agreement of Exchange Visits of Scientists between the Academy of the Socialist Republic of Rumania and the Royal Society

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Other visitors have commented amply on the hospitality of the Rumanians. On this point we heartily concur. We had difficulty, in and around Bucharest, in maintaining a reasonable balance between scientific and social or tourist activities. The scientific visits were triumphs of improvisation, but some time was wasted and trouble caused to our hosts because of inadequate preliminary planning. I do not know whether other visitors managed to work out a programme in advance; this would seem to be a wise step in future visits. The only specific request that I had made that was not agreed to, was a visit to the land reclamation work on the Danube delta. Instead of this useful visit, two days were spent at seaside resorts. The return journey through the vineyards of Western Dobruja was interesting.

Our visit coincided with international congresses on nucleic acids and on animal and plant physiology; this explained part of the confusion. We were present at the opening proceedings (conducted, naturally, in Rumanian) of both and at a social gathering held in connexion with them.

At Nucet (near Ploesti) we saw the buildings and glassware used for collecting fish eggs, by injecting pituitary hormone, and fertilising them; it was too late in the year to see the process itself. The fry are transferred to a series of lakes, totalling 400 ha. in which they grow to marketable size. A mixture of native carp and four recently introduced species of Chinese carp is used. This mixture is more productive than any one species used in isolation because, between them, they eat everything - large water plants, phyto- and zoo-plankton, and molluscs and other invertebrates. To control disease the lakes are regularly drained and treated with lime; as a result, mortality is only 50% per year and they can harvest 2.5 tons (fresh weight) of fish per ha/year. Besides the natural plant growth, the fish get a cereal mixture - about 2 kg



for each kg of fish harvested. The main function of this station, which started 12 million larvae on their developmental course last year, is to supply stock to other establishments. The total area of rigidly controlled fish pond is now 10,000 ha. and it is increasing because, although canned fish is a dominant feature in all food shops, we were told that the average consumption of fish is less in Rumania than in most other European countries.

In the Institute of Biochemistry of the Academy, Professor E. Macovschi explained his theory that the reason for the retention of cell components by undamaged tissue is rather that they are integrated into a structure reminiscent of the "protoplasm" of last century, than that the cell wall was controlled permeability. I remained unconvinced. In that Institute, Dr V. Ghetie is doing very interesting work on the topography of antibodies and on the uptake, degradation and release of antigens. He has good evidence that the intestine, in the rat, plays a greater part in controlling immune responses than I had thought.

Although my old friend and colleague Dr Lydia Mesrobian had not been forewarned of our visit, she and Dr Ion Mesrobian showed us the work of the Cantacuzino Institute of which he is director. This is primarily concerned with the production and standardisation of various vaccines, test sera and antibiotics, but the staff is able to spend a reasonable amount of time on research and on training. The institute is well equipped and, although already large, has an impressive building programme. We were particularly interested in the low-temperature crystallisation of streptokinase, in the purification of a bacterial collagenase and in Dr Lydia Mesrobian's return to work on the gall-forming substances made by B. tumefaciens which she and Boivin studied many years ago.

Dr Alice Savulescu, assistant director of the Institute of Biology of the Academy, described work in the Institute on various problems connected with plant physiology and biochemistry, infection with fungi and viruses and the bulk cultivation of blue-green algae as foodstuffs. One of her colleagues discussed the evidence he has (I am promised fuller details by post) that during the course of infection of tobacco plants with tobacco mosaic virus there is an accumulation of a protein containing phosphorus in a form other than nucleic acid or phospholipid. Most of the time



in this institute was devoted to a talk by me on our work on plant viruses. Of the laboratories that we saw, this seemed to be the best equipped for work on plant physiology and biochemistry and Dr Savulescu said that visiting research workers were welcomed.

I spent a well-filled morning in the "N. Balcesciu" Agricultural College (Bd. Marasti 59, Bucharest); mainly with Dr M. Dumitrescu, the librarian. He explained the various points of difference between State Farms, which average 3000 ha., and Cooperative Farms, which average 2000 ha. The College produces about 500 graduates a year. Each farm is controlled by from one to five graduates; the supply is about equal to the demand. As a result of this infusion of trained people into agriculture, the consumption of fertiliser (mainly N and P because there is enough K in Rumanian soil when N and P are used at the present levels) is increasing rapidly. If all farms followed the advice they are given there would be a shortage. Production of ammonium nitrate and urea is to be increased three-fold during the next few years. The morning ended with my participation in an official apple grading session in which nine judges from different regions assessed the qualities of 40 different batches of apples. Luckily I had to leave before enough of my conclusions had been recorded to confuse the issue.

At the Vegetable and Flower Research Institute near Bucharest Airport we were given figures for productivity that agreed well with those that I had been given at the Agricultural College. Early cabbage takes 120 days to mature and can be followed by maize; late cabbage takes 160 days and was being harvested at the time of our visit. Thirty tons/ha. is a reasonable yield and 70 is very good. We saw excellent cauliflowers but were assured that Rumanians take little interest in these vegetables and that much of the crop is exported. Flower cultivations is given a great deal of attention - I have never visited a country in which flowers in window boxes, and beds of flowers along the road-side even in rather dilapidated villages, played such a prominent part. Hot houses are therefore important. The largest that we visited covered 2 ha. and had fully automatic ventilation, and spray irrigation and fertilisation. We were told that some cover 100 ha. and are warmed entirely by the waste heat from power stations. An inside temperature of  $26^{\circ}$  can be maintained even when the outside temperature is  $-20^{\circ}$ .



On the last day in Bucharest we discussed the activities of the International Biological Programme with Professors R. Codreanu, C. C. Georgescu and I. N. Salageanu. There is, as yet, no Rumanian programme though Professor Salageanu attended the General Assembly of the IBP in 1966. A National Committee has now been established and sectional committees; Professor P. A. Vasiliu (Central Institute for Agricultural Research, Bd. Marasti) is the convenor for UM. Among possible themes for Rumanian participation we considered:- the productivity of fish ponds (PF), the characteristics of Rumanian gipsies (HA), the yields from Phragmites, Typha and Trapa in the Danube delta (PP and UM), and the possible persistence of primitive strains of wheat in isolated parts of the country (UM). Professor Salageanu expressed an interest in cooperative work on the measurement of the extractability of protein from swamp vegetation and I will be discussing with him the ways in which this cooperation might be arranged.

Two days were spent in Cluj. Here there was a full and carefully worked out programme. They had paid particular attention to the Ophthalmological interests of A. Pirie and she would no doubt be willing to give an account of the research that she saw in Rumania if asked for it. In the Biochemistry Department of the Medico-Pharmaceutical Institute, Dr D. Bedeleanu described the work that was being done on a varied group of metabolic processes. I was particularly interested in their observations on changes in the distribution of copper in rabbits made atheromatous by giving them diets rich in fat. Plasma copper is diminished to about half, whereas the copper contents of the liver, kidney, brain and especially heart were increased. There were also striking changes in the activity of various enzymes in various tissues but the combined effects of rapid enzyme synthesis and destruction, possibly incomplete extraction, and masked enzymes make these effects more equivocal. Professor E. A. Pora, in the Institute of Animal Physiology, outlined the comprehensive comparative study that they are making of endocrine function. They are devoting particular attention to the more mysterious glands such as the thymus, pineal and "bursa of Fabricius". I got the impression of great enthusiasm and activity but know too little about the general state of knowledge about these organs to make it worth while recording any conclusions. Partly because the conversation could be conducted in English, I got a clear impression of the facet of the work for which



Dr A. Abraham is responsible. He is correlating the thymolytic effects of steroids with their structure and has demonstrated that the enhanced proteolysis that causes the thymus to shrink after puberty, or treatment with steroids, is specific for that organ and is not found in other organs such as the spleen. Some preliminary observations on the mechanism have not gone further than the recognition of differences in the UV absorption spectra of acid extracts of thymuses from rats treated with different steroids.

In the Biochemical Department of the Agricultural College in Cluj, I was shown several lines of work. They have a long-standing interest in the biochemical basis for the effects of heterosis in maize. An elaborate series of measurements of the content of reduced and oxidised glutathione in the seed and during germination showed no consistent trend. Recent measurements suggest that there is a greater percentage of both types of nucleic acid in hybrid seed. This much has been published. Work in progress suggests that this increase is not simply a consequence of the grain being smaller, while containing the same absolute amount of nucleic acid, that the conditions of growth have little effect on the nucleic acid content of the grain, and that the extra deoxynucleic acid is not within the chromosomes.

I was told that research is no longer needed for the use of urea in cattle feeding. It is now standard practice in the Cluj region to add enough to contribute about one quarter of the nitrogen in the fodder. Cluj we also visited the Botanic Garden which, as others have emphasised, has a fine site on a ravined hillside. It is therefore not only an excellent collection but also a very pleasant and much frequented resort. On the second evening I lectured on the origins of life.

The journeys to and from Cluj were made at night by train. Apparently in compensation, we were taken on what was essentially a sight-seeing trip through the Carpathians to Brashov: compensation was not so complete as it might have been because the outward journey was made in the dark. At the Agricultural Experiment Station a few miles north of Brashov the work that is done there on sugar beet and potatoes was described to us. It was too late in the year to see any of this for there was already snow a few hundred feet higher up the mountains. There is an extensive potato breeding programme in which 200,000 plants a year are tested for various desirable



qualities. I was assured that they had a strain containing 3.5% protein on the wet weight. This is hard to believe. I suspect linguistic confusion or some confusion between wet and dry weights or protein and nitrogen contents. They promised to send me the details. No area in Rumania is suitable for growing healthy seed potatoes in the manner familiar in Scotland. Instead they have to build up stocks in "closed zones". Within a total area of about 9000 ha., mostly occupied by forest or crops other than potatoes, a small central area is planted with potatoes. In this area a clone is grown until, in three or four years, there is enough seed for commercial use. The tubers are carefully tested each year both serologically and by "biological testing" which appears to be a visual search for signs of infection when the tubers are grown. In use the clone "degenerates" through stages called Foundation, Super Elite, Elite and Original. We had considerable discussion about the nature of "degeneration". They claim that it is not all to be attributed to virus and other forms of infection, but denied vigorously that the postulation of some other form of change smacked of Lysenkoism - Lysenko. I was assured, had been completely discredited. For one with my prejudices it was difficult to see what else "degeneration" could mean. The constant need for new clean clones, and the difficulty of growing them in Rumania, prompted me to ask whether they had considered importing Scotch seed. This was not considered a good idea. Nevertheless, it still seems to me that an enterprising Scotch grower might look into the requirements of the Rumanian potato farmer, and that a visit by someone fully conversant with work on potatoes in Britain could be both scientifically and commercially useful.

I have not visited a communist country for six or seven years and so have no up-to-date standard of comparison. Perhaps all of them now have the same affluent air that was an unexpected feature of Rumania. We heard constant complaints about the difficulty of getting foreign currency for equipment and books, but there was no sign of any shortage of Rumanian currency. Domestic, industrial and scientific building seemed to be booming and the shops were well filled with both goods and customers. Language presents little difficulty; my contemporaries in laboratories speak French and/or German and the young speak English.