

that took place. When the academic body was properly arranged on either side of the huge platform, the President of the Republic and members of the Government walked in and occupied an imposing position in the gallery of the platform. During the whole of the proceedings and even during the Rector's dignified address, bulbs flashed and cameras clicked and high-powered lamps illuminated the platform party while films were being made. It was all very impressive; the organization was good, and one sensed an atmosphere of academic dignity.

On the same day we were transported to the Auditorium Maximum of the Carolinum, a renovated hall of the Charles University of the fourteenth century. An honorary degree of doctor of technical science was awarded to Prof. D. Blochincev, director of the United Research Institute of Nuclear Physics. Owing to illness, a similar award could not be conferred on Dr. M. Roš, director of the Federal Research Institute for Testing and Research in Industry, Zurich.

Another important part of the celebrations was the international scientific conference in the Assembly Hall of the Congress Palace. It lasted for three days, with morning and afternoon sessions. To begin with, each foreign delegate was called to a microphone in the centre of a large platform and conveyed his congratulations and felicitations to the rector and staff of the Technical University of Prague. At the same time, scrolls and appropriate presents were ceremoniously handed over to the chairman of the meeting. The hall could seat approximately 2,000 people, yet each one could listen in to all the speeches in one of the official languages—Czech, Russian, English, German and French. Apparently there were interpreters for other languages like Chinese, Korean and Arabic. At the conference eighty-five scientific papers were read, thirty-nine of which were by foreign scientists interested in the branches dealt with at the Technical University of Prague, namely, constructional building, architecture and civil engineering, mechanical engineering, electrotechnics, sylviculture, geodesy and engineering economics.

Everything possible was done to make the visit of each foreign guest pleasant and profitable. For example, each day a car with chauffeur was put at the disposal of Mr. Cardwell and Prof. Rankin, to transport them to any factory or place of interest within a day's journey of Prague. Both spent a pleasant day at Karlsbad, and lunched in the palatial Moscow Hotel, which would be difficult to surpass anywhere in food and furnishings. In all visits a young engineering lecturer, good-natured, intelligent and modest, acted as interpreter. One met many men of this type, and the material progress of their country should be bright if they are given the proper encouragement and incentives.

The university engineering laboratories were well equipped, and much useful research has been done. The education of technologists is being pursued with vigour, and from the figures supplied it would appear that the Czechs are producing at least twice as many highly qualified technologists per million of population as Britain. The various technological courses seem to be somewhat longer than in a British university or college, and the standard attained in each subject is quite high.

Bus tours were also arranged to take the delegates to various industrial centres, such as the Tesla Works

at Vrchlabi, where a large proportion of the workers are women who were undoubtedly highly proficient.

Many social evenings were arranged. A visit to the opera, and two receptions at which music and dancing were indulged in, were much appreciated by all the delegates. One had the opportunity of making friendly personal connexions, especially with the rectors, professors and lecturers of the Universities of Prague.

I shall always remember the kindness and friendliness of the Czechs I met, and will watch the future development of their country with understanding, sympathy and good wishes.

J. S. RANKIN

NON-SPECIFIC IMMUNITY

DURING the spring meeting of the British Society for Immunology, which was held during May 10 and 11 at the Westminster Medical School, an afternoon was devoted to a symposium on "Non-specific Immunity", with Prof. A. A. Miles (Lister Institute) in the chair.

Prof. Miles attempted to define the rather vague field of non-specific immunity, and concluded that the term was largely, though not wholly, synonymous with effective defences against pathogenic parasites that were not mediated by the specific action of antibodies or presumed antibodies. In the analysis of non-specific immunity, it was essential, not only to identify various single factors—cellular or humoral—that might contribute to immunity, but also to relate them to the constitutive and adaptive defence mechanisms of the metazoan host as a whole. It is probable that the non-specific immunity in different anatomical sites of infection and in different cellular and humoral systems of the body can to some extent vary independently in the infected animal.

Dr. G. Biozzi (Paris) described investigations of the phagocytic functions of the reticulo-endothelial system carried out in collaboration with B. N. Halpern, B. Benacerraf and C. Stiffel. The rate of blood clearance of carbon particles injected intravenously was used for measuring the total phagocytic function of the reticulo-endothelial cells of the blood vessels, involving mainly the liver and spleen, which together accounted for 90 per cent of the phagocytic activity. During infection with *Salmonella* or tubercle bacilli there was an increase in the phagocytic activity which lasted throughout the period of infection. In severe infections attended by death, the initial hyper-reactivity was followed by a rapid drop when the defences were overwhelmed. The substance found responsible for the variations in phagocytic function during infection with Gram-negative organisms was the lipopolysaccharide endotoxin. Overstimulation before the infection allowed the recovery of 80 per cent of rats injected with a dose of *Salmonella* organisms 100 per cent lethal for controls.

Dr. C. H. Lack (Royal National Orthopaedic Hospital) described the role of non-specific factors affecting susceptibility to tuberculosis. Leucocytes could inhibit tubercle bacilli by release of lysozyme or by the production of lactic acid. On the contrary, most keto-acids and polycarboxylic acids favoured mycobacterial growth. Another important factor

was oxygen, and pathogenic strains distinguish themselves by their ability for survival at low oxygen tensions. In the human lung most infections resulted in the embedding of bacilli in solid caseous foci in which they rapidly decreased. Rapid bacillary multiplication followed softening of caseum, presumably due to increased availability of oxygen, and possibly to the release of nutrients by proteolysis. It is the softening of caseum that is usually responsible for tuberculous disease as distinct from infection. Solid caseation followed by softening was not found in the hyperimmune animal injected with bacilli in adjuvant. Dr. Lack has shown that human plasmin can digest human caseum. The increased morbidity of females between 15 and 35 years could possibly be related to enhanced plasmin activity at the pre-menstrual period. Abnormal plasmin activation may also be the mechanism of the rapid cavitation following severe psychical trauma. The study of the factors of such mechanisms was the most fruitful approach to the problem of human tuberculosis.

Dr. E. Suter (University of Florida) described the effect of phagocytosis on the respiration of microorganisms. The important contribution of the phagocytic system to natural resistance can be mediated through either bactericidal substances (for example, phagocytin and leukin), or through subtle influences upon bacterial metabolism and on enzymatic breakdown of bacterial components. Using organisms labelled with carbon-14, the fate of bacillary carbon can be followed in the intracellular environment. Tubercle bacilli maintained their respiratory-rate within phagocytes. Furthermore, little or no bacillary carbon was handled by phagocytic enzymes and appeared in the respiratory carbon dioxide. This metabolic resistance of tubercle bacilli to the phagocytic environment seemed to depend upon their structural intactness. Thus sonic vibration of bacilli or the presence of non-ionic detergents altered this relationship to the advantage of the cell. The findings were quite different when organisms were phagocytosed which were less resistant to intra-cellular environment, such as *Mycobacterium phlei*, *Bacillus subtilis*, *Staphylococcus albus* and *aureus*, and *Streptococcus pneumoniae*. Their metabolic activity was reduced within one or two hours to one-tenth or one-hundredth of their original activity, and bacillary carbon appeared very quickly in the respiratory carbon dioxide of the phagocytes.

Dr. D. Rowley (St. Mary's Hospital) described the work of J. G. Howard, A. C. Wardlaw and himself which derived from the observation, some years ago, that injection into mice of small quantities of cell walls of Gram-negative bacteria produced rapidly developing immunity to subsequent infections by other Gram-negative organisms. This non-specific immunity was of short duration (up to 14 days) and was not accompanied by any significant changes in the level of complement or natural antibody. Lipopolysaccharide from cell walls produced this immunity in doses as small as 1 μ gm. per mouse, and more recently the lipid A fraction of this has been found highly active. Although injected lipopolysaccharide rapidly increased the serum properdin, it is unlikely that this accounted for the immunity, for this extended to organisms not affected by the serum bactericidal activity of properdin and complement. The intravenous injection of lipopolysaccharide labelled with phosphorus-32 resulted in the rapid removal of most of this by the reticulo-endothelial

system. Using the rate of removal of this labelled material as a test of function of the reticulo-endothelial system, it was shown that increased phagocytic activity accompanied the development of immunity.

Dr. D. G. Evans (Medical Research Council, Hampstead) discussed the immunity produced in mice by intraperitoneal injection of pertussis vaccine against the intracerebral challenge of living virulent organisms. The steep immune response without lag was unlike that associated with antibody production, and occurred before circulating specific antibodies were detectable. This early immunity was transient and declined at 10-14 days, to be followed by the slower development of a true antibody type of immunity, which reached maximum at 28 days. The early and later immunity were associated with a common factor so that vaccines with a good early response also elicited a good later response. The purified pertussis antigen of Pillemer produced both responses. The production of early immunity by pertussis vaccine was non-specific, for Dubos has shown that marked protection detectable within a few hours was produced in mice against staphylococcus and tubercle bacilli. This early immunity is probably not due to an increase in properdin, for it has been shown that mice given properdin at the time of challenge were no more resistant than normal mice.

STEROIDS IN PHARMACY AND MEDICINE

THE chairman's address to the British Pharmaceutical Congress held at Bristol during September 2-6 was given by Mr. Frank Hartley. In it, he surveyed the broad field of the steroids, beginning with the earliest known members of the group, the sterols, and ending with some of the latest researches on anabolic steroids.

He referred briefly to cholesterol, the bile acids and antirachitic vitamins, mentioning some of their significance for pharmacy. He then directed his attention to the steroid hormones, dealing in turn with oestrogens, progestational substances, adrenocortical hormones, steroids as anaesthetics, androgens and anabolic agents. It is difficult to select, from this masterful survey, a few topics for special comment, and what follows must necessarily reflect my particular interest.

Mr. Hartley discussed some of the recent developments in the search for clinically useful steroids among the progestational substances, adrenocortical hormones, androgens and anabolic substances. The 19-nor-steroids came in for a good deal of attention under several of these headings. 19-Norprogesterone is more active than progesterone, as is 19-norethisterone than ethisterone. 17 α -Methyl-19-nortestosterone (methylcortrenolone) is among the more potent of the new oral progestational substances; other derivatives, such as 17 α -ethyl-19-nortestosterone (norethandrolone) and 17 α -ethynyl-5(10)-cortrenolone, also exhibit progestational activity. Some of these compounds have marked anabolic properties as well.

Mr. Hartley mentioned the Δ^1 derivatives of cortisone and hydrocortisone, the now well-known