

(Glasgow). Other papers were presented by Profs. G. Breit, A. Klein (Pennsylvania) and Dr. Iwadare. The effect on the theory of the photodisintegration of the deuteron of the spin-orbit force within the n - p system stimulated much discussion.

The fourth session of the conference was devoted to the question of binding energies and elastic scattering of light nuclei at low energies. The review papers were given by Prof. H. S. W. Massey and Dr. P. G. Burke (University of London) on the three-body problem and on the elastic scattering of nucleons by alpha-particles. There were also two invited papers from Los Alamos: Dr. L. Cranberg reported on experimental results concerning total and differential cross-sections and also polarization measurements in the scattering of low-energy neutrons from ^2D , ^3H and ^3He , while Dr. L. Rosen reported on charged particle scattering from ^2D and ^3H at energies up to about 20 MeV. These experiments led to several new checks on charge symmetry and time reversal invariance.

The contributed papers included one on the ground-state energy of the triton, by Prof. J. M. Blatt (Sydney). Using the Gammel-Thaler potential, no bound state was found for reasonable trial wave functions. Among other papers from Los Alamos, Dr. J. L. Gammel gave a preliminary account of attempts to integrate the n - d problem numerically and discussed the feasibility of spin-correlation experiments using ^4He as an analyser.

Polarization measurements in n - d and p - d scattering at low energies, reported by Dr. H.-J. Gerber (Zurich) and Dr. R. E. Segel (North-western University), indicate that there is very little polarization at about 4 MeV. A contribution from Dr. N.

Vlassov (Moscow), read by Dr. I. A. Baz, on the interaction of protons and deuterons with light nuclei ended this session.

The last session, with a title "Reactions Involving Four or More than Four Nucleons", was opened by Dr. B. H. Bransden (Glasgow) with his paper on the collisions of neutrons and of deuterons with ^3H and ^3He . This paper was followed by a number of papers involving the application of the resonating group structure method to binding energy and scattering calculations. This method, as did the impulse-approximation method at higher energies in a previous session, aroused considerable controversy during the discussion. Nevertheless, it was felt that some progress had been made, since one type of mixture of exchange forces does seem to be simulating the exact force in more than one situation involving light nuclei.

Prof. G. Skornyakov (Moscow) then gave his paper on n - d scattering in the zero-range force approximation, this being a contribution to the previous session. The three-particle problem is solved accurately in this limit. He also read a paper by Dr. T. Y. Barit on p - T scattering and allied reactions.

The final papers were preceded by a review given by Dr. V. J. Emery (Harwell) of the calculations of the binding energies of nuclei using the Brueckner method. Prof. Brueckner himself also presented a paper on the Hartree-Fock method for strongly interacting systems. The conference concluded with papers by Profs. N. Austern and S. Meshkov (Pittsburgh) on preliminary calculations concerning the structure of ^6Li and ^{12}C .

T. C. GRIFFITH
E. A. POWER

CHAGAS'S DISEASE

CHAGAS'S disease or South American trypanosomiasis, occurring chiefly in Brazil and other countries of South America, is caused by *Trypanosoma cruzi* and is spread mainly by reduviid bugs. The disease was first discovered and described fully in 1909 from the State of Minas Geraes in Brazil. All the significant observations regarding the causative agent, the vector, mode of transmission and symptoms were made then, by that creative genius, Carlos Chagas. In order to commemorate the fiftieth anniversary of this discovery, an international congress on Chagas's disease was held at Rio de Janeiro during July 5-11.

Foreign delegates from European countries, Israel and the United States of America numbered more than seventy. Approximately 300 others from Brazil and the neighbouring countries of South America also attended. At a short historical session at the Ministry of Education and Culture on July 4 the life and work and significance of the discoveries made by Chagas were described by various speakers.

The inaugural meeting of the congress was held on July 5 in the National Faculty of Medicine from 9 p.m. until midnight, when addresses were delivered by Prof. Alessandri (Chile), Prof. Lemoigne (Pasteur Institute, Paris), Dr. Candau (director general, World Health Organization), a student in the Medical Faculty, Prof. Moraes, director of the Medical School and dean of the University, and replied to by Prof. Carlos Chagas Filho.

The real business of the congress began on the following morning at 9 a.m. and lasted until 6 p.m. in a pavilion within the grounds of the Instituto Oswaldo Cruz. Two or three sessions took place concurrently to discuss the disease in its different aspects. In one of the lecture theatres simultaneous translations from English, French, Spanish, Portuguese and German were provided. Chagas's disease in the American continent was discussed from the pathological aspect and the different forms encountered in the various South American countries described, including the clinical findings on the two human cases thus far reported from the southern United States. Other papers on transmitting agents, animal reservoirs, including the opossum and armadillo, and their relation to the epidemiology of the disease as well as the characters of the human strains, were discussed. Public health questions were reviewed in relation to the geographical distribution of the principal transmitters of the disease which infest human dwellings. The anatomy and respiratory system of *Triatoma infestans*, the chief vector in Brazil, was described. On the following day the subject discussed in one section was the aetiological agent, with emphasis on the physiology, metabolism and nutrition of the parasite. Electron microscope studies of parasitized cells were included. In another section immunological aspects of the disease, including complement fixation reactions, precipitin and skin tests, were dealt with and the isolation of

immune polysaccharides from the organism described. The occurrence of toxins in cultures of the organism appeared to be doubtful. The epidemiology of the disease was discussed in seven papers. Polymorphism which occurs in African trypanosomes was compared with that met with in *T. cruzi*, and observations made on the nature of their evolutionary cycles. The session was concluded by the showing of a film dealing with methods of eradication of the tsetse fly, which transmits the disease in Portuguese Africa. On the same evening a meeting was held in the Brazilian Academy of Sciences from 9 p.m. until midnight, at which a paper was read on "Chagas as Protozoologist", and others on the metabolism, phylogeny and growth of the parasite. The following day was devoted to the pathology of acute and chronic cases of the disease in different parts of the South American continent, throughout which the virulence of the causative agent varies. Discussions took place on the myocardial, nervous, cerebrovascular and blood protein changes involved, as well as on the condition of megacolon and megacæso-phagus now believed to be causally related to the disease. Further papers on epidemiology dealt with animal reservoirs and with the feeding habits of domestic and wild types of reduviid bugs. The danger of blood transfusion as a means of spread was also dealt with. Prophylaxis was best effected by spraying the sites where the vector was found, along with general hygienic measures. Workers from different areas of South America, where the nature of the problem varies with the transmitting agent, contributed also on the following day. The different clinical forms and diagnosis of the disease, including that met with in congenital cases, were described in seven papers. At a special session the nature of the infection caused

by *Trypanosoma rangeli* was described. This parasite was first described in 1920 by Tejera in Venezuela, where it infects *Rhodnius prolixus*, which is also the chief transmitter of *T. cruzi* there. The first forms were seen in human blood in Guatemala in 1946, and now 795 cases of infection have been described in Venezuela, chiefly in children, but the infection is not of serious character. At an evening session in the National Academy of Medicine further papers were read. On the last full working day of the congress, eighteen papers were read, chiefly on the relationship of cardiac and nervous disorders, including megacolon and megacæso-phagus, to Chagas's disease. Discussions also took place on chemotherapeutic agents, but the sad fact remains that no curative agent is known for this disease. A short ceremony took place during the morning at which a plaque, presented by the Argentinian delegation, to the memory of Carlos Chagas was unveiled.

On the same day a paper was read by Prof. Jean Coudert on the action of *T. cruzi* extracts on cancer cells, another by William Frye on antibiotics in tropical disease, and Rene Dubos gave a talk on general aspects of infection.

The final meeting on July 11 was devoted to round-table discussion of the subjects dealt with earlier in the week. Resolutions were also submitted regarding the holding of another international congress within the next few years, but no definite decisions were arrived at. During the week more than 150 papers were read. Two medals were struck to commemorate the congress, each with the head of Carlos Chagas on one side, but differing on the obverse side. The proceedings of this inspiring congress will be published in due course.

J. D. FULTON

SPECIAL CERAMICS

THE challenge of temperature, which has inspired the metallurgist to some of his more notable developments, has in recent years been renewed and has been taken up by the ceramist, who is seeking materials of low creep resistance, high thermal shock resistance and high hot-strength to meet the demands of propulsion engineering, high-speed vehicles and nuclear engineering. The ceramist has for many years made his own special contribution to communications engineering, chiefly in the exploitation of oxide-type materials; the field of non-oxide materials remained largely unexplored, but it is now being opened up by the drive for new materials in other engineering applications. The British Ceramic Research Association has for the past five years had a small group devoted to these studies and has been working in close co-operation with various Service departments and industrial concerns. It was felt that some attempt to set up a forum for the exchange of ideas would be timely, and the outcome was a Symposium on Special Ceramics held at the Laboratories of the British Ceramic Research Association in Stoke-on-Trent during July 13-15. About 150 delegates attended the symposium and seven countries were represented. The subject-matter of the symposium was divided into four sessions dealing with: (1) properties and structure, measurements; (2) preparation and properties of nitrides; (3) preparation and properties of other non-oxides; and (4) furnaces, techniques, analysis, applications, etc.

After a welcome to the delegates by the chairman of the Association, Mr. E. James Johnson, and the director, Dr. A. T. Green, the deputy director, Dr. N. F. Astbury, gave an introductory lecture on the fields of application for new ceramic materials, and spoke of the special ceramics research programme of the British Ceramic Research Association, in which particular reference was made to boron nitride, a machinable dielectric capable of withstanding high temperatures, and to a new form of self-bonded silicon carbide and to silicon nitride. Both the latter materials are being actively studied in connexion with rocket engineering. The dependence of macroscopic properties on crystal structure and the trends observed in groups of materials of the same structure were discussed in a paper by Dr. S. N. Ruddlesden (British Ceramic Research Association), who illustrated her arguments by non-oxides such as silicon nitride and boron phosphide, the latter being a new compound of the III-V series of zinc-blende structures. Like silicon carbide, boron phosphide is very hard and it is a semiconductor with an energy gap of the order of 5 eV.

The greatest challenge that ceramics must face in meeting metals in their chosen field is the absence of ductility and their comparatively low breaking strain. The reply to this is being sought by a study of the properties of certain oxide crystals, and it was of special interest, therefore, that Dr. F. J. P. Clarke (U.K. Atomic Energy Authority, Harwell) was able