

amount of precipitation depend upon the moon's nodes. These cycles are shown very distinctly over the few years that he was able to bring under discussion, but his explanation has not been generally accepted. This is a small matter in comparison with the value of the information which he was able to furnish, and which has contributed in no small degree to the prosperity of the colony. This collection of observations will be of the greatest service in subsequent inquiries.

Mr. Russell has left a character for industry and closeness of application that cannot but prove stimulating to future astronomers in the southern hemisphere. He was much esteemed by many friends in this country, who regretted his retirement from the observatory; and besides being a Fellow of the Royal Society, to which he was elected in 1886, he was a member of many learned bodies, and was well known as a contributor of frequent and welcome papers.

W. E. P.

DR. ALLAN MACFADYEN.

BACTERIOLOGICAL science in England has sustained a great loss by the early death of Dr. Allan Macfadyen, who passed away on March 1, a martyr to that science he loved so well and to which he had devoted his best days, his last illness being caused by accidental infection in the laboratory.

Dr. Macfadyen was a distinguished graduate of Edinburgh University, and subsequently studied at Bern, Göttingen, and Munich. One of his earliest investigations was on the behaviour of the bacteria in the digestive tract, in which he proved that the gastric juice and intestinal secretions protect but little against the invasion of pathogenic microbes. This was soon followed by a joint paper, with Prof. Nencki and Dr. Sieber, on the chemical processes occurring in the small intestine of man, in which the intestinal contents were examined and the exact chemical changes produced by several intestinal microorganisms in pure cultures were studied. With Sir Lauder Brunton, an investigation of the ferment action of bacteria was contributed to the Proceedings of the Royal Society, and his chemical bent was further shown by a paper on the action of bacteria on albumins and peptones, which appeared in the Reports of the Local Government Board. The thermophilic bacteria, organisms which thrive at high temperatures, attracted his attention, and with Dr. Blaxall he carried out an investigation on them in which, almost for the first time, a number of species were differentiated and their action studied. With Dr. Harden, Mr. Rowland, and the late Dr. Morris, researches were conducted on the nature of the yeast zymase of Buchner, and the phosphorescent bacteria and problems of disinfection were other subjects in which he made additions to our knowledge.

Dr. Macfadyen was early inspired with the idea of the paramount importance of the contents and extracts of the unit of life—the cell—and the happy culmination of Sir James Dewar's researches on low temperatures gave him an unlooked-for means of obtaining these in a comparatively unaltered state. He showed that the low temperatures of liquid air and of liquid hydrogen had little or no effect on either the vitality or the functions of microorganisms. With Mr. Rowland he attacked the problem of grinding up bacteria with liquid air, and by a number of ingenious devices he finally succeeded in obtaining the juices of bacteria in sufficient quantity for investigating their characters. The comparative failure of attempts to produce therapeutic sera for such diseases as tuberculosis, typhoid fever, cholera, pneu-

monia, &c., the organisms of which produce little or no extra-cellular toxins, suggested that the juices of these organisms, the "endotoxins," obtained by liquid-air grinding, might be used for immunising. He showed successively that the virulence of an organism varied directly with the amount of endotoxin that could be obtained from it, that an animal might be immunised by means of these endotoxins, and that the serum of such an animal possessed immunising and curative properties.

The application of these principles to the typhoid bacillus, cholera vibrio, pneumococcus, and hog-cholera bacillus was described in a series of papers. Latterly, the application of the results to the treatment of human disease occupied Dr. Macfadyen's attention with encouraging prospects, and it is a tragic circumstance that he should be cut off just as his life-work seemed to be nearing completion.

As secretary and head of the Bacteriological Department of the British, Jenner, and Lister Institute of Preventive Medicine, as it was successively named, Dr. Macfadyen had a large share in the organisation of the institute at Chelsea, and much of the bacteriological work that emanated from there was inspired by him. As Fullerian professor of physiology at the Royal Institution, 1901-4, his courses of lectures on the cell, antitoxins, physiology of digestion, and other subjects made him known to a wide circle.

R. T. H.

NOTES.

THE following candidates were selected on Thursday last by the council of the Royal Society to be recommended for election into the society:—Frank Dawson Adams, Hugh Kerr Anderson, William Blaxland Benham, Lord Blythwood, William Henry Bragg, Frederick Daniel Chattaway, Arthur William Crossley, Arthur Robertson Cushny, William Duddell, Frederick William Gamble, John Ernest Petavel, Henry Cabourn Pocklington, Henry Nicholas Ridley, Grafton Elliot Smith, and William Henry Young.

PROF. W. A. TILDEN, F.R.S., has been elected a member of the Athenæum Club under the provisions of the rule of the club which empowers the annual election by the committee of three persons "of distinguished eminence in science, literature, the arts, or for public services."

A DEPUTATION representing the Anthropological Institute, the British Science Guild, and other scientific bodies, waited upon the Prime Minister on Tuesday to urge the establishment of a national anthropometric survey. Mr. R. C. Lehmann, M.P., who introduced the deputation, said that, in the first instance, the survey should have for its object the periodic measurement of children and young people in schools and factories. Besides this, a comprehensive survey of the general population of the whole country should be undertaken. The sum asked for is 4000*l.* or 5000*l.* The need for such a survey was described by Dr. D. J. Cunningham, Mr. J. Gray, Dr. Gow, Sir Lauder Brunton, and Dr. A. C. Haddon. In his reply to the deputation, Sir Henry Campbell-Bannerman confessed that he has been much impressed by the arguments adduced as to the great lack that there is in this country of knowledge of the quality of the population. It is obviously desirable to have a record of the kind proposed in order to be able to study the changes in the condition of the people at large as a guide to action in administration and in legislation regarding it. Any test applied to the condition of the inhabitants of any district is a test of their surroundings, of the mode in which they live