

difficulties connected with the ascents of high mountains.

This subject he was particularly fitted to investigate, for he had probably climbed to heights above 20,000 ft. more often than anyone else. For instance, in 1910, in the Sikkim Himalaya, he was nine times above 20,000 ft., the highest altitudes being the first and only ascents of Pawhunri, 23,180 ft., and Chumiomo, 22,430 ft.

He also visited other parts of the Himalaya, the Nanga Parbat district, north of Kashmir, and Garwhal, where last summer he reached 23,600 ft. on Kamet. It was, however, in Sikkim that he did most of his mountaineering.

From time to time he published papers and reports in the *Journal of the Royal Geographical Society* and in the *Alpine Club Journal*. But as he was of a retiring disposition, there are few accounts of his extraordinary mountaineering record. Perhaps his most important paper was on "A Consideration of the Possibility of Ascending the Loftier Himalaya" (*Journal of the Royal Geographical Society*, 1917), in which he discussed all the factors conditioning acclimatisation to high altitudes, and the question whether it was possible to climb Mount Everest. His conclusion was: "A man in first-rate training, acclimatised to maximum altitude, could make the ascent of Mount Everest, without adventitious aids (*i.e.* oxygen), provided that the physical difficulties above 25,000 ft. are not prohibitive."

Dr. Kellas had a unique knowledge of the Sikkim Himalaya, and his death has deprived the Mount Everest expedition of one of its most valuable members, for he had studied the geography of the country round Mount Everest more deeply than anyone else.

WE regret to report the death, on June 26, of Mr. WILLIAM SHACKLETON, at the age of fifty. Mr. Shackleton received his early training at the Keighley Institute, and after completing a three years' course at the Royal College of Science,

became an assistant to the late Sir Norman Lockyer. By his skill and enthusiasm he contributed largely to the success of the early work at South Kensington on the photography of stellar spectra. In 1893, in company with Mr. Albert Taylor, he observed the total eclipse of the sun in Brazil, and was one of the first to obtain photographs with a prismatic camera of adequate power. In 1896, with Dr. E. J. Stone, he took part in the expedition which was conveyed to Novaya Zemlya by Sir George Baden-Powell in his yacht *Otaria*. Favoured by a brief interruption in a snowstorm, he then achieved a notable success in photographing for the first time the complete "flash" spectrum, with perfect definition, notwithstanding that an accident to the yacht had left but little time for preparation. On this occasion some admirable photographs of the corona were also obtained under his supervision. This expedition was further memorable for a meeting with Nansen at Hammerfest on his return from the polar regions.

For some years Mr. Shackleton was occupied with the late Dr. Common in the design of rangefinders and other optical instruments, and a special interest in optics was added to that in astronomy during the remainder of his life. In 1905 he took up an appointment at the India Stores Depôt as Inspector of Scientific Supplies, and scientific workers in India have profited much from his extensive technical knowledge and careful supervision of their requirements. Mr. Shackleton was elected a fellow of the Royal Astronomical Society in 1893, and of the Optical Society in 1913. He was secretary of the Optical Society from 1916 to 1920, and rendered valuable services to the society in that capacity, besides contributing papers of practical importance; he was a vice-president of the society at the time of his death. Mr. Shackleton's health had not been good for several years, but his death came unexpectedly, and will cause deep regret to his many friends in scientific and technical circles.

Notes.

A CHEMICAL laboratory of a new type was opened at the Imperial College of Science and Technology by Mr. A. J. Balfour on June 24. The laboratory is fitted with apparatus of a size which will render it necessary for chemical processes to be carried out under conditions closely resembling those which are present on the large scale. Just as the ordinary scientific laboratory contains specimens of all types of apparatus necessary for small-scale work, the new laboratory contains appliances which will enable the student to carry through the corresponding large-scale operations in a manner which will render it possible for him to study the influence of those factors, such as heat exchange, etc., which are not of vital importance in ordinary laboratory work. Students, and especially research students, whether they intend to follow an academic or an industrial career, will thus obtain a knowledge

of large-scale conditions which it has hitherto been possible to acquire only by actual works experience. Moreover, the means for preparing initial material in large quantities will be of the greatest value for the research workers in the chemistry department of the college. It is hoped that a full description of the new laboratory, with illustrations, will appear in a forthcoming number. The equipment was provided by Mr. W. G. Whiffen, an old student of the college.

WE learn from the *Times* of June 24 that the West London Hospital is in possession of electrical plant capable of delivering current at 200,000 volts for X-ray purposes. The X-rays are of a penetrating character, and are being used for the treatment of patients suffering from malignant disease, on the lines laid down by the Bavarian doctors Seitz and Wintz. The