C. Anderson.

CHARLES ANDERSON:

5th December, 1876–25th October, 1944.

Charles Anderson, youngest son of John Anderson of Moa, Stenness, Orkney Islands, was one of a family of nine. Educational opportunities he forged for himself. From his first school at Stenness he won two bursaries to the Kirkwall Burgh School, from which twice weekly he walked home for supplies, nine miles each way—thirty-six miles weekly. At the Burgh School he acquitted himself so well that he won his way to Edinburgh University, where, by means of scholarship and prize, he pursued his course of study. His career was a brilliant one. He was medallist in every science subject—Chemistry, Crystallography, Geology, Mineralogy, Physics, and Zoology—besides being awarded the Hope Prize Scholarship as the most distinguished student in the Chemical Laboratory. Apart from these awards he obtained distinction in English Literature Latin, and Senior Mathematics, and graduated Master of Arts and Bachelor of Science To achieve this was more than hard work alone; it was hard work performed under hard conditions, conditions which demanded physical strength and tenacity of purpose.

After his graduation he was appointed to take charge of the Ben Nevis Observatory, whence he came to the Australian Museum as Mineralogist. This post he took over on 22nd July, 1901. Almost immediately he applied himself to the task of reorganizing his department, its collections and exhibits—a task which well repaid his labours as those who knew the department previously could testify. Besides these curatorial duties he embarked upon research work in Mineralogy, and for this he was awarded his Doctorate of Science in 1908 by the University of Edinburgh.

In 1911 he visited Europe. The object was a twofold one. He was anxious to see his aging parents, to whom he was deeply attached, and also to study the development of museums and their trends. Following a short interregnum after the death of the late Robert Etheridge, junior, Anderson was appointed Director on 14th February, 1921. It was at this stage that he abandoned mineralogy and crystallography and gave what time his new duties would spare to vertebrate palaeontology, in which field he attained world eminence. He was thus widely known in the scientific world both as a mineralogist and as a vertebrate palaeontologist. During his directorship the Museum developed in many ways. *The Australian Museum Magazine* was founded; more precisely, it was established between the death of his predecessor and his appointment, though the first issue appeared subsequently. To this he contributed many articles upon a wide range of subjects. Popular lectures, begun in 1905, were expanded, though staffing did not permit the full extension hoped for. Gallery displays were improved considerably, and many fine groups were installed. So good were these that they earned the approbation of many overseas authorities. He retired from the office of Director of the Museum on 31st October, 1940.

He was President of the Royal Society of New South Wales (1924), Linnean Society of New South Wales (1932), Anthropological Society of New South Wales (1930, 1931), and the Geographical Society of New South Wales (1941, 1942). He was a foundation member of the Art Galleries and Museums Association of Australia and New Zealand, and a member of the Australian National Research Council. He was also a Corresponding Member of the American Museum of Natural History, New York, and a Corresponding Member of the Zoological Society of London. He was one of the Honorary Secretaries of the Royal Society of New South Wales from 1935 to 1943.

He had an extensive knowledge of the sciences, apart from those he was actively engaged in, and was a good classical scholar and linguist. An ardent Orcadian, he was

steeped in the lore and legends of his native isles, and nothing pleased him more than to tell some folkloristic anecdote of the Orkneys. Many, who had been entertained with these whimsically related tales, when reading Linklater's *White Maa's Saga* later, came across passages with a familiar smack. He was an excellent companion, kindly and friendly, ever ready to help in any capacity. He gave freely of his services and none can say that they approached him in vain. He was a tireless worker, not infrequently working into the wee sma' hours. He was a man of simple tastes. To him a field outing was much more than a collecting trip. To be able to get away to some remote spot, such as Cuddie Springs near Brewarrina, or go trouting on the Goodradigbee, or exploring some new or little known cave, was something to be keenly appreciated. He enjoyed a game of golf, his pipe, and a good book. To those who knew him he was a cordial and sincere friend.

He is survived by a son, Mr. M. S. Anderson, B.V.Sc., and two daughters, Mrs. E. C. Ballek and Miss Margaret Anderson.

His most important contribution to Australian Mineralogy was in the field of morphological crystallography. He published crystal measurements and drawings of some forty-five mineral species from many localities throughout the Commonwealth.

He determined new crystal elements for azurite from his measurements of crystals from Mineral Hill, Condobolin, New South Wales, showing that the axial ratios of this azurite differed from those of the Chessy (France) azurite which was quoted as the standard in most publications. He found that the beautiful and complicated twinning of cerussite from Broken Hill, New South Wales, and Muldiva, Queensland, varied from the true twin position in the same direction as that in crystals from Mapimi, Mexico, and Sardinia previously described by Goldschmidt and Hubrecht respectively.

He paid particular attention to the etched crystals of beryl from Torrington, New South Wales, and obtained similar etch figures by dipping unetched crystals in fused sodium carbonate. In addition he determined the crystal form, optical properties, and discussed the paragenesis and occurrence of the crystals.

Other minerals that he made the subjects of special study were anglesite, cassiterite, cuprite, monazite, orthoclase, topaz, and the zeolites. By these special detailed studies he discovered the following new forms:

Anglesite: Broken Hill, New South Wales, Y(187), X(3·4·12), v and v(598); Dundas, Tasmania, (368).

Azurite: Broken Hill, New South Wales, x($\bar{4}$81).

Beryl: Torrington, New South Wales, θ(30$\bar{3}$1), (90$\bar{9}$2).

Cuprite: Mount Lyell, Tasmania, r(405); Linda, Tasmania, B(155), i(307).

Mimetite: Mount Bonnie, Northern Territory, r(10$\bar{1}$2).

Monazite: Mount Garnet, Queensland, σ($\bar{3}$01); Olary, South Australia, λ(212); Trundle, New South Wales, ρ($\bar{1}$03).

Rhodonite: Broken Hill, New South Wales, A(013), B(0$\bar{1}$5), C(0$\bar{1}$4), D(0$\bar{1}$3), E(0$\bar{3}$7), F(103), G(207), H($\bar{2}$01), K(1$\bar{1}$3), and L(1$\bar{1}$2).

Topaz: Pakenham, Victoria, J(501).

Together with H. S. Jevons he established the fact that the so-called "opal pine-apples" from White Cliffs, New South Wales, were really pseudomorphs of opal after crystals of glauberite which were deposited on the bed of the Cretaceous land-locked sea.

The supposed new mineral petterdite, at that time thought to be a new oxychloride of lead, found in the upper workings of the Britannia Mine, Zeehan, Tasmania, was investigated by Dr. Anderson, who proved that the name must lapse into the synonymy of mimetite.

In 1913 he described and analysed the "Binda" meteorite, the only specimen of eucrite to be found in Australia, and in the same year published a catalogue and bibliography of Australian meteorites.

His "Bibliography of Australian Mineralogy", published by the Geological Survey of New South Wales, in 1916, has proved to be of the greatest use to students of Australian mineralogy. In fact, no student of Australian mineralogy can afford to be without it. The work, largely carried out in his spare time, lists the titles of about

one thousand papers, of which not a few are to be found in foreign journals. Only original matter of scientific value was included, and with the thoroughness that always characterized Dr. Anderson's mineralogical work, he laboriously referred to original sources whenever possible.

Anderson was always keenly interested in the study of vertebrate animals of the past. He received an early introduction to the science of palaeontology as a boy in the Orkney Islands, where he made a collection of fish remains from the Old Red Sandstone. His interest was later stimulated by the brilliant lectures on vertebrate palaeontology delivered during his university days at Edinburgh.

On his appointment as Director of the Museum he took charge of the vertebrate palaeontological section and devoted himself wholeheartedly in this new sphere of scientific research. The first years of this new work were occupied mainly with the exacting details of sorting and cataloguing the collection. Much of this was done in the evenings, and night after night Dr. Anderson's enthusiasm kept him in his office until very late hours.

He decided to devote his researches to the Pleistocene mammals of Australia, and in this regard had a particularly sound foundation to work from, as he followed in the footsteps of Richard Owen.

At this time Dr. Anderson became interested in the extinct Chelonian, *Meiolania*. His first palaeontological contribution, published in 1925, was on this genus. He described a new species from Walpole Island, and in great detail and accuracy recorded his osteological researches on *M. platyceps* Owen. In this paper some interesting conclusions were put forward regarding the occurrence and distribution of *Meiolania* and its importance as evidence of continental land-bridges. In 1930 he published additional information gained from specimens of *M. platyceps* Owen collected from a coral-sand formation on Lord Howe Island. From the evidence of several limb-bones of the one turtle he concluded that *Meiolania* was essentially a terrestrial reptile.

In 1926 he carried out an intensive investigation of the Pleistocene cave-earth deposits in the Wellington Caves, New South Wales, and made a large collection of fossil remains. Many of these specimens served as material for his later palaeontological papers.

In 1933 Dr. Anderson achieved one of his ambitions when he organized and superintended extensive excavations at Cuddie Springs, near Brewarrina, New South Wales. He had hoped on this occasion to find some remains of the extinct lizard *Varanus* (*Megalania*) *priscus* Owen, but none were unearthed. He had already described the dentition and several leg-bones of this lizard in 1930 and had become particularly interested in its skull, of which little is known. He concluded that the length of this giant lizard must have been from fifteen to seventeen feet. From his researches on *Megalania* he was able to produce sufficient data to allow a reconstruction of the head to be made and this model is now in the fossil gallery of the Australian Museum.

At the Hobart Meeting of the Australasian Association for the Advancement of Science in 1928, Dr. Anderson read a paper on the food habits of *Thylacoleo*. His theories were advanced after a study of the skull structure and the extraordinary dentition of this so-called Cave Lion. The lack of development of the canines is very significant and a number of theories explaining this character have been propounded. Dr. Anderson described the dentition in detail and suggested that the food was in all probability some vegetable which might have been a member of the family Cucurbitaceae, with a hardened wall and soft pulpy interior. He put forward a suggestion that *Thylacoleo* also fed on the starchy pith of certain cycads such as *Zamia* and *Macrozamia*. His researches on this strange Pleistocene animal were published in the RECORDS OF THE AUSTRALIAN MUSEUM in 1929.

Dr. Anderson began a much-needed revision of several Macropod genera in 1929. During that year he described a recently discovered and almost complete skull of *Macropus titan* Owen, recording a good deal of additional information regarding its cranial osteology and dentition. Continuing this work he published in 1932 a revision

of the genera *Procoptodon* and *Sthenurus*. During the course of this work he prepared a complete redescription of the skull structure and dentition of *Sthenurus occidentalis* Glauert, from the Mammoth Cave, Western Australia.

At the time of his retirement he had a paper on the revision of the genus *Macropus* nearing completion, and included in it were descriptions of five or six new species. He had hoped to return in his leisure years and complete this work, but unfortunately was unable to do so.

The giant kangaroo, *Palorchestes*, was of special interest to Dr. Anderson, and he was always seeking additional fossil material.

In his Presidential Address before the Linnean Society of New South Wales in 1933, Dr. Anderson gave some indication of the vast knowledge of Australia's vertebrate fossils he had gathered in the few years he was actively engaged in their study.

During this address he carefully described the historical advance of knowledge regarding this fauna and the accumulation of present-day knowledge. He also compiled an extensive bibliography of Australian fossil mammals which is of the greatest assistance to workers in this field.

Dr. Anderson was of the opinion that the fossil mammals of Australia throw little light on the evolution of our present-day mammalian fauna, or their relation to marsupials, living or extinct, in other parts of the world. He concluded that this information could be obtained only when the older Tertiary mammals of Australia, which must have existed in abundance, but are practically unknown, have been found and critically examined.

In 1937 Dr. Anderson recorded the first known remains of fossil marsupials from New Guinea, when he described *Nototherium watutense* from the Watut River district. The remains consisted of two mandibular rami and were collected from beds of Pleistocene age (overlying Tertiary volcanics) or of very late Tertiary age. The importance of this occurrence was the direct evidence of land communication between Australia and New Guinea. Dr. Anderson concluded that the small size of the New Guinea species suggested the possibility of its being an outlying representative of a slightly older fauna which may yet be found in the Australian Tertiary. He was of the opinion, however, that the Australian Pleistocene marsupials and their contemporaries represent a development peculiar to the Australian continent.

The following list includes his more important contributions to Palaeontology:

1925. Notes on the Extinct Chelonian *Meiolania*, with a Record of a New Occurrence. REC. AUST. MUS., Vol. xiv, 4, pp. 223–242.

1928. The Food Habits of *Thylacoleo*. *Rep. Austr. Assoc. Adv. Sci.*, xix, Hobart, 243–244.

1929. Palaeontological Notes, No. I. *Loc. cit.*, xvii, 1, pp. 35–49.

1930. „ „ No. II. *Loc. cit.*, xvii, 7, pp. 309–316.

1932. „ „ No. III. *Loc. cit.*, xviii, 7, pp. 383–387.

1937. „ „ No. IV. *Loc. cit.*, xx, 2, pp. 73–78.

1933. The Fossil Mammals of Australia. *Proc. Linn. Soc. of N.S.W.*, lviii, ix–xxv.

Note.—This account of Dr. Anderson and his work has been compiled from notes prepared by Messrs. W. A. Rainbow (Librarian), T. Hodge-Smith (Mineralogist) and H. O. Fletcher (Palaeontologist).—ED.