ARTHUR LENNOX COULSON

(1898–1955)

Foundation Fellow

ARTHUR LENNOX COULSON (Lennox after his ancestor Lord of the Isles) was born on January 25, 1898 at Elsternwick, Victoria, where his family had a Victorian villa on large grounds including a tennis court. His father owned, with his brother, Coulson Carriers for customs and general carriers, later on of oil, fuel, etc. Both brothers were owners in the firm. Coulson was the middle son of a family of four; three boys and one girl.

He went to Caulfield Grammar School where in due course he followed the example of brother Will and was the Dux of school and a member of the Cricket XI and the Football XVIII. He was admitted to the Melbourne University at the age of sixteen as an undergraduate in science, majoring in geology. He broke his university studies to enlist in the Australian Infantry Forces as a private in the first World War. In 1919, he resumed his studies in Melbourne. J A Dunn became a fellow student in the same year. After obtaining his BSc, Coulson continued on post-graduate work for his MSc in 1920 and 1921. Award of Kernot Research Scholarship and the Wyselkie Scholarship for Natural Sciences in Geology enabled him to proceed to London, where he joined the Imperial College of Science for further post-graduate work and on which he was awarded the Diploma of the Imperial College (DIC). Latar in 1933, Melborne university Conferred on him the DSc degree.

SERVICE IN INDIA—POSTS HELD

From London he was appointed to the Geological Survey of India which he joined in November 25, 1922 as Assistant Superintendent (now known as Geologist). During his career in the Survey, he was the Curator (1927-1929), the Assistant Director (1932-1934), and then acted for a short time as the Palaeontologist (1934). He was promoted as the Superintending Geologist in 1936, having previously officiated in that grade for short term during 1930, 1932 and 1939

SCIENTIFIC CONTRIBUTIONS

In the Geological Survey of India, Coulson was attached to the Central Indian Coalfields Railway's Survey Party during the season 1922-23. His reports, submitted to the Railway Board in 1923, and to various other bodies are characterized with meticulous details.

His field work in India is broadly divisible into two parts—the years to the end of 1930, spent mainly in mapping in Bundi and Sirohi States, Rajputana and the later years from the end of 1935, spent in the North-West Frontier Province, Waziristan and Kashmir. The results of his early years of mapping are best known from his paper on Bundi, published in the *Records,* and his *Memoir* on Sirohi. In Bundi, rocks are mostly shales, slates, phyllites, limestones etc. The phyllites have abundant mica and occasionally well twinned crystals of staurolite. Some limestones approach marble in physical features and are used extensively as a local building stone. Coulson's most extensive geological survey has been in Sirohi. The chief geological interest lies in its igneous rocks, whether intrusive or extrusive. Across the centre of the area, lies a belt of ancient schists irregularly interrupted by tongues or intrusive Erinpura granite and its associates.

After completing the geological survey of yester Bundi State in Rajasthan, Coulson commenced the survey of yester Sirohi State of which Mount Abu is the most fantastic landmark of the region. It is made up of Erinpura granite, strongly foliated gneissic rock, the relative eminence of which is perhaps due to dominance of biotite which facilitated the more ready weathering of the rock than the surrounding rock types. He completed the survey of Sirohi in the field seasons 1925-27. During 1927-29, he was stationed in Calcutta as Curator (now designated as Petrologist) in-charge of the geological collection of the Asiatic Museum in Calcutta, except for a few days from April 20-27, 1927 when he was asked to report on the hill slopes around Naini Tal in Uttar Pradesh. Our knowledge of the Dethi's and other rock formations of Rajasthan is mainly based on the works of Coulson and others. It was conferred that Rajasthan underwent intense diastrophism in post-Delhi times where other regions were comparatively undisturbed. Coulson examined the basic rocks and their metamorphism which led him to conclude Sirohi and Ajabgarh series as contemporaneous lava flows. There is no detailed published account of his years of mapping in the North-West apart from summaries in the Director's Annual Reports, and some economic papers. In South Waziristan, field work was limited to areas around the camps and forts of the South Waziristan Scouts and pursued, under armed escorts of scouts and local levees, but tribal unrest finally compelled the cessation of his work in that region in 1937.

In 1931, India faced the world economic depression. The Geological Survey of India suffered from a drastic retrenchment, except for the Director (now Director-General) and another senior officer, all the elderly officers were retired and field work was curtailed. The geologists were then considered as costly cultural personnel, and even some ventured the opinion that the Geological Survey of India had outlived its useful existence. The posts of Superintendent (now Director) were reduced from six to three. Coulson was appointed as Assistant Director during 1932-33 and stationed in Calcutta. During this period he also acted as Palaeontologist of the Survey. He went on leave out of India for about $8\frac{1}{2}$ months from October 1934 and returned in June 1935. He was posted as Curator and part-time Lecturer at the Presidency College but before long officiated in place of Dr A M Heron as

Superintending Geologist in charge of Southern India. During 1935-36, Coulson worked in North Western Province and South Waziristan, and was appointed as Superintending Geologist in April 1936 and detailed for work there, continuing the survey of North West Frontier Province. He also investigated the water supply problem in central parts of Baluchistan in January 1937. He visited the Makerwal colliery from February 4 to 6, 1937. In the course of his survey of Mardan district, he examined the marble and dolomite deposits of Ghundai Tarako forming the boundary between the Swalic tehsil of Mardan and the Buner track of Swat. The deposits are perhaps the largest and finest in North West Frontier Province. He reported on frequent occurrences of copper ore in South Waziristan. Before closing his field season in August 1937, he examined the Malakan Hydel Project.

In 1938 Coulson received unofficially a Rockfeller scholarship for study tour in Britain, at the Sorbonne in Paris, at Bonn in Germany at Basle in Switzerland. Mrs Coulson as well as his mother-in-law accompanied him. During this period he obtained his MSc and later DSc from the Melbourne University. He proceeded on leave out of India from the field on 14 April 1938 and returned to duty on the 7 November, 1938. On return from leave, he left for field work in North-West Frontier Province on 5 December 1938.

During 1939-40 Coulson was placed in-charge of the Assam party. He made some geological survey of North Cachar, and Mikir Hills and investigated the water supply in Darrang district in company of P N Mukherjee. He reported on coal in the Cherra sandstone in North Cachar, water supply of Lumding in Nowgon district. Coulson proceeded on leave out of India preparatory to retirement on October 17, 1940.

His best-known works on economic geology are his *Memoirs* on Barytes and Asbestos deposits in the ceded districts of Madras, the sequal to a season in South India during 1931-32 and on the mineral resources of North West Frontier province (1940-41). But his interest in minerals ranged over a wide field : asbestos coal chromite, dolomite, gold, limestone, lollingite, oil shales, pyrite, zinc, spinel etc.

Coulson also attended to economic enquiries. In 1922-23, he traversed some coalfields of Madhya Pradesh as geologist accompanying the Central Coalfields Railway survey party but without finding in superior quality coal outcrop. He collected tuffaceous rhyolites from near Injan Dheri, Mardan District, Pakistan, which on assay yielded 0.3 to 4·3 dwt. of gold per ton. He reported on limestones, dolomites and marbles of North West Frontier Province and found some of them are of excellent quality. In 1932, he carried out systematic investigations of barytes in Cuddapah, Anantpur and Kurnool districts in Andhra Pradesh and recorded 55 new important deposits. Most of these deposits are found as either replacements of fissure veins in the Vempalle lime-stones, or in intrusive dolerite and basalt sills. He reported on the superior quality in the Cuddapah district.

While carrying on investigation of barytes in Kurnool district, Coulson found previously unrecorded ancient diamond working in the Dhone taluk. He believed that ancient sills were the original home of the diamond.

It is his opinion that all the supplies of good water from the Calcutta tubewells are derived by percolation from the Ganga and Brahmputra rivers which lie mo

than 100 miles to the north; the rate of percolation being probably a mile or so annually. He was of the view that constant sinking of tubewells without some official control of their locations might eventually lead to the deterioration of the quality of water.

In Mardan and Peshawar districts of North West Frontier Province of Pakistan, Coulson recorded unusual case of water supply; here a barrier of impervious slates crossing the Indus gorge at Attock has restricted the drainage of the Kabul valley and caused equalisation of groundwater and possibly rendered it harder.

He submitted many unpublished reports on engineering geology, ranging from rail and road alignments, to hill stability and bridge and dam foundations. His investigations on the geology and underground water supply of Calcutta with special reference to tube wells and water supply of Darrang district, Assam and Meanwali district, Punjab are valuable.

The breadth of his interests is well illustrated by his publications on meteorite and on earthquakes. His Catalogue of Meteorites was the most complete descriptive catalogue of meteorite falls upto 1939, with special reference to Indian falls and finds and to speciments in the Indian Museum. He himself having described several meteorite falls in Hyderabad (NAOKI) and Bengal (Patwar and Perpeti and one in sua). Coulson's interest in earthquakes originated with his paper on the North West Himalayan earthquake of February 1, 1929, and he estimated its depth of epicentre at about 25 miles north west of Abbotabad (Pakistan). He also gave an account of the Hindu Kush earthquake of November 14, 1937 and of Shocks in Burma during 1929-30 and earthquake of the Great Pamir in 1940-41.

Teaching Assignment

In 1927-29 and 1935 he served as a part-time Lecturer in Geology at the Presidency College, Calcutta. He was the President, Geological Institute, Presidency College (1935-38) and played a leading role in inaugurating the first issue of the Institute's organ *Bhuvidya* in 1937.

Honours

Coulson was elected a Fellow of the Geological Society of London and a Foundation Fellow of the National Institute of Sciences of India (now INSA). He was for sometime Honorary Joint Secretary and Member of Council of Mining, Geological and Metallurgical Institute of India.

Family

In 1925, Coulson married Dr Violet Gertrude Eddy. There was one child, Rosemary Lennox by the marriage. The husband and wife had known each other many years prior to marriage and spent many happy days on geological excursions, with the

consent of Professor Skeath and Professor Sumess. Mrs Coulson was allowed to go in for playing tennis, boating and swimming. In India, they spent their time camping together on geological surveys, and in Calcutta their recreation was tennis, golf, swimming and rowing. Holidays were spent in Australia or Britain or locally at Puri, Darjeeling, Mount Abu or in Kashmir.

Return to Australia

Towards the end of 1940, the onset of a serious illness was suspected, and he was advised to travel immediately by air to Australia. He never returned to India and retired from the Geological Survey of India on invalid pension in 1942.

In the early stages of his illness, his past experience and fine analytical faculties were called upon the Australian military forces during the later part of World War II. As a Major in the Australian Engineers he advised on ground water supply for the military forces in various parts of Australia and New Guinea.

In 1946, Coulson was demobilised and lived privately at Kew in Melbourne for three years but his illness worsened and he spent his remaining years at Heidelberg Repatriation Hospital, Melbourne, and finally at Angac Hostel for TPI. The effects of his illness became increasingly severe and he died in 1955, leaving behind his wife, Dr Violet Gertrude Eddy, and a married daughter Rosemary.

Epilogue

Dr Coulson was a man of intense study and wealth of scientific interest. A born geologist, he gave his best to India and is remembered for his likable good nature and friendly personality. He took keen interest to scientific affairs of India.

A K Dey
A K Ghosh

BIBLIOGRAPHY

1927. (With Dey A K) Barytes from the Anantapur district, Madras. *Rec. geol. Surv. India.*, **60**(4).
— The Geology of Bundi State, Rajputana. *ibid.*, **60 (2).**
— (With Tunnicliffe) Landslips in and around Nainital. *ibid.*, **61**, 47–53.
1928. Note on Leucopyrite from Kodarma. *ibid.*, **61(2).**
— Note on the barytes in Orhha State. *ibid.*, **60**, 431–432.
— (With Arkchristu W) A zinc-spinel from Southern India. *ibid.*, **61(3).**
— A new Indian meteorite : the Lua fall. *ibid.*, **61** (3).
— Lollingite from the Hazaribagh district, Bihar and Orissa. *ibid*, **61(3).**
— An occurrence of allophane at Tikak, Assam. *ibid.*, **61(3).**
1929. New Chromite localities. *ibid.*, **62(1).**
— The epicentre of the North-West Himalaya earthquake of the 1st February. 1929. *ibid.*, **62(2).**
— Note on the occurrence of atacamite in Bihar. *ibid.*, **62(2)**, 291.
— Pyromorphite in the Bhagalpur district. *ibid.*, **62(2).**
— The Naoki (*Hyderabad*) meteoric shower of the 29th September, 1925. *ibid.*, **62(4).**
1930. The albite—Ala Burning of plagioclase falsper in certain acidic rocks from Sirohi State, Rajputana. *ibid.*, **65(1).**

1930. Second note on the North West Himalayan Earthquake of the February 1, 1929. *Rec. geol. Surv. India* **63(4)**.
— Tremolite from near Jasidih, Bihar. *ibid.*, **63(4)**.
— On a titaniferous augite from E Chandrawati, Sirohi State, Rajputana. *ibid.*, **63 (4)**.
1931. On the zoning and difference in composition of turnned Plagioclass felspars in certain rocks of Sirohi State, Rajputana. *ibid.*, **65(1)**.
1932. Study of the Indian seismological records of the chief shocks which occurred in the North-East Frontier region of Burma during 1929-30. *ibid.*, **66(3)**, 356–387.
1933. The Kalava (Calwa) 'Wall' in the Kurnool district of the Madras Presidency : an example of monoclinal folding, accompanied by faulting, probably along an old line of weakness. *ibid.*, **66(4)**, 438–448.
— The Geology of Sirohi State, Rajputana. *Mem. geol. Surv. India.*, **63(1)**, 1–166.
— Barytes in the Caded districts of the Madras Presidency : with notes on its occurrence of other parts of India. *ibid.*, **64(1)**, 1–142.
1934. Asbestos in the Ceded districts of the Madras Presidency : with notes on its occurrence in other parts of India. *ibid*, **64(2)**, 143–266.
— Geological notes on traverses in Tibet made by Sir Henry Hayden in 1922. *Rec. geol. Surv. India.*, **67(2)**, 242.
1935. Barytes in Manbhum district, Bihar. *ibid.*, **68(2)**.
1936. The Patwar Meteoric shower of the 29th July, 1935. *ibid.*, **69(4)**, 439–457.
— Meteorites. *Trans. Min. geol. metall. Inst. India*, **30(2)**, 143–158.
1937. Testing the wear of road metals and aggregates. *ibid.*, **41(3)**, 227–251.
— Gold in the North West Frontier Province, *ibid.*, **33(2)**, 191–203.
— The Perpeti meteoric shower of the 14th May, 1935. *Rec. geol. Surv. India.*, **71(2)**. 123–143.
— Octahedral pyrite crystals from the Kohat district, North-West Frontier Province. *ibid.*, **71(4)**, 436–437.
— Marble of the North-West Frontier Province. *ibid.*, **71(3)**, 328–344.
— (An) Inclusion of coaly shale in Deccan trap at Indore, Central India. *ibid*, **71(4)**, 434–436.
1938. (The) Water-supply of the Isakhel and Mianwali Tahsils of the Mianwali district, Punjab. *ibid.*, **72(4)**, 440–466.
— Marble and Dolomite of Ghundai Tarako, North-West Frontier Province. *ibid*, **72(2)**, 227–234.
— Pleistocene glaciation in North-West India, with special reference to the erratics of the Punjab. *ibid.*, **72(4)** 422–439.
— (The Hindu Kush earthquake of the 14th November 1937. *ibid*, **73(1)**, 135–144.
1940. (A) Catalogue of meteorites : with special reference to Indian Museum, Calcutta as on August 1, 1939. *Mem geol. Surv. India.*, **75**, 1-346.
— (The) Geology and underground water supply of Calcutta Bengal, with special reference to tubewells. *ibid.*, **76**, Water supply No. 1, 1–150.
— (An) Earthquake in the Great Pamir. *Rec. geol. Surv. India.*, **75**, Paper (12)
1941. (The) Underground water supply of the Peshwar and Mardan districts of the North-West Frontier Province with an appendix on the Kohat Valley. *ibid.*, **74(2)**, 229–259.
— Coal in the Mirzapur district, United Province, and in the adjoining parts of the Singrauli coal-field, Rewa State, Central India. *ibid.*, **74(4)**, 433–466.
— Chromite. *ibid.*, **76(2)**, 1–30.
1942. Water-supply of the Darrang district, Assam. *Mem. geol. Surv. India.*, **76**(3), 1–152.
1946. Catalogue of publications of the Geological Survey of India and index of Geological Maps upto March 1946. *ibid.*, **77**, 1–129.