

Professor William Dixon West (1901–1994)

An obituary by B. P. Radhakrishna

Indian geology owes a great deal to the early pioneers from Britain who came over to India to man the newly created Geological Survey. No one studying Indian geology can ever forget the massive contributions to our knowledge by persons like Oldham, Medlicott, Blanford, Holland, Bruce Foote, Fermor and several others. Dr West was the last of these giants.

Early years at Cambridge

West was born on 27th January 1901. There is little information readily available about his early education. It must have been notable for it qualified him to move on to that prestigious centre of learning, Cambridge, where he came under the influence of Prof. A. Harker, the noted petrologist whose famous textbook on Metamorphism had helped to mould the career of many an aspiring geologist. West's career in Cambridge was distinguished by the winning of the Winchester prize in 1922 and the Harkness scholarship.

Geological Survey of India

Soon after graduation in 1923, West joined the Geological Survey of India. His first assignment—the mapping of the Sausar belt in Central Provinces to which region he was introduced by no less a person than Sir Lewis Fermor himself. This area became for West a frequent pilgrimage and we owe one of the best accounts of the ancient schistose rocks of this region to him. In the course of his early work in the Central Provinces he produced evidence, for the existence of a 'nappe' in the vicinity of Deolapar where different facies of Sausar sediments originally deposited far apart were brought together in juxtaposition.

Work in the Simla Himalaya

One of the privileges of being an officer of the Indian Geological Survey was the opportunity it provided for working in some of the remotest and inaccessible

parts of the country. Working in the Nagpur–Chindwara area in the winter months, West moved on to the Simla Himalaya during the summer, working along with G. E. Pilgrim. His work in the Himalaya enabled him to identify large-scale overthrusts and recumbent folds. The results of this early work were published in a classic memoir authored by Pilgrim and West. This was the first attempt at modern interpretation of the structure of the Himalaya. His researches earned for him the DSc degree by the Cambridge University in 1945.



Work on the Deccan Traps

The Deccan Traps, representing a stupendous burst of volcanic activity at the end of Cretaceous, attracted the early attention of West. He got particularly interested in the age and duration of Deccan Trap activity. He found very little evidence of erosion between successive flows of lava and came to the conclusion that the traps were erupted rapidly in quick succession. Recent researches on the age of the Trap rocks have proved the correctness of West's observation.

He also became deeply interested in the picritic basalt flows identified in Cutch and speculated on their origin. West kept himself in close touch with modern developments in this field and in 1983, delivered the D. N. Wadia Memorial Lecture in which he made a comparative study of Deccan with other flood eruptions like the Columbia River Basalts of US, the Karoo Basalts of South Africa, the Tertiary Lavas of Britain and Greenland. His conclusions were that the lavas were mainly tholeiitic, derived perhaps from an eclogitic or peridotitic source in the upper mantle and that the nature of the magma eruption depended on the structural history of the province.

He viewed with disbelief modern developments in the plate tectonic era which invoked the long northward journey of the Indian sub-continent and the possible triggering of volcanism to hot spot activity. He dismissed these as, 'rather heady stuff and too speculative'. Nevertheless, he realized that Deccan Traps represented one of the most magnificent developments of fissure eruption in the world and emphasized the responsibility of Indian geologists to study it from every possible angle.

Quetta earthquake

On 31st May 1935 Baluchistan–Quetta was rocked by a severe earthquake which took a toll of 25,000 lives. West's account of this earthquake is a classic. He paid particular attention to the deciphering of conditions under which great damage was caused. The strain on the rocks arising from severely compressed and looped fold axis in the region of Quetta was considered by him to be probably responsible for the seismic instability of the Baluchistan region. West's presidential address on 'Earthquakes in India' delivered before the Geological Section of the Indian Science Congress in 1937 is a masterly review which every student of Indian geology should read.

In 1940–42 West led a party to Afghanistan in search for coal and was successful in locating workable deposits in the region of Darra-i-Suff.

Director of the Geological Survey of India

West became the Director of the Geological Survey of India in 1945 and held that office at the time India gained Independence. It was during this time that the Centenary of the Geological Survey of India was celebrated and he played host to many distinguished geologists from overseas who visited India on that occasion.

War had disrupted geological activities and it was given to West to reorganize the work of the Survey and enlarge its scope. He created new sections for Mineral Development, Engineering Geology and Groundwater. Separate wings were created for Geophysical Investigations, Exploratory Mining and Drilling. New sections for Petroleum Exploration and Rare Minerals were started. These, later blossomed into separate organizations like the Oil and Natural Gas Commission and the Atomic Minerals Division of the Department of Atomic Energy. Mineral investigations gained in importance. In 1951, he retired from service giving place to Dr M. S. Krishnan who took over as the first Indian Director of the Geological Survey of India.

West remained a bachelor and missed 'the enduring elegance of female friendship'. Nevertheless, he is credited with taking the first step at recruiting ladies into the Survey both in the scientific and administrative sections. During a long life he had the good fortune of cultivating enduring friendship with a large number of colleagues and students who held him in great esteem.

The Narmada–Son line

He joined the Saugar University in 1955 and remained there till the end of his life. He took interest in geomorphological studies. Spending a good part of his life close to the Narmada river, West was struck with the structural importance of the Son–Narmada valley. He was the first to draw attention to the fact that there were no Gondwana rocks north of the line and no Vindhyan representatives to the south. Using this and several other evidences, a new theory has been recently put forward that the Indian continent is made of different crustal

blocks, geologically unrelated to each other, which have been brought into juxtaposition and sutured together during different periods of earth history (see Radhakrishna, *J. Geol. Soc. India*, v. 1989, 34, 1–24). The classic work of West in Central India provided the impetus for the formulation of the above theory.

Interest in geological education

Throughout his career, West was interested in geological education. As a member of the Survey he took classes at the Presidency College, Calcutta. Later, he visited the geological departments in different Universities to gain first-hand knowledge of the facilities available for training of geologists recruited to the Survey and submitted a report

Professor Dudley Stamp, the famous geographer has the following tribute to pay to West:

'Dr West epitomizes in his own person the tradition between Survey and Education and in the length and breadth of his work and interests has nobly maintained the standards set by a string of illustrious predecessors. When he might reasonably have retired from strenuous field work to a life of ease, he chose rather to help the students of India to further the knowledge of their country and resources and to devote to them his organizing ability and the fruits of his accumulated experience. His work has been followed with interest and admiration the world over.'

Every one of these statements is true and not in the least exaggerated. The Central Province Manganese Ore Co. (CPMO) had made a bequest of Rs 5 lakhs (a considerable sum in the fifties of this century) for the starting of a geology department at Saugar, and West was invited to undertake the responsibility of organizing the department. Saugar, even now, is a remote and backward region and it is surprising that West not only accepted the assignment but chose to make it his home. He soon converted the department into a Centre of Advanced Study in Geology. The services he has rendered not only to the geological department at Saugar, but to university education in general, is remembered with gratitude.

Honours and awards

West was a founder Fellow of the Indian National Science Academy (1935) and the Geological Society of India (1958). He was General Secretary of the Indian Science Congress (1932–1938). He was decorated with the Star of Afghanistan in 1942. In 1947, he was awarded the CIE by the British Government. The prestigious Lyell Medal was awarded to him by the Geological Society in 1951. The Asiatic Society of Bengal awarded the P. N. Bose Medal in 1959. The Indian National Science Academy awarded the D. N. Wadia Gold Medal somewhat belatedly in 1983. For a number of years he served on the Council of the Indian National Science Academy.

D. N. Wadia Medal lecture

West delivered the D. N. Wadia Medal lecture before the Indian National Science Academy in the year 1990, in his 90th year. He chose the 'Deccan Trap and other Flood Eruptions' as the subject of his address. Making a comparative study of four provinces of flood eruptions located in India, South Africa, United States and United Kingdom, he attempted to discern a common pattern in all those flood eruptions, while over a major part flood eruptions were composed of tholeiitic basalts, in structurally disturbed, rifted and faulted areas, picritic basalts, alkaline rocks and rhyolites made their appearance. He emphasized the importance of determining the stratigraphy of the traps through continued petrographic, geochemical and palaeomagnetic studies.

He advocated the formulation of a project covering the whole range of problems associated with the eruption of the Deccan Trap Flood Basalts which according to him would yield significant results of world wide importance.

Deep love for India

His deep love for India and Indian geologists was expressed at the time of receiving the Lyell Medal. He said,

'You Sir, have referred in generous terms to the little I have done to encourage geological science in India. But, I doubt if you realise how

fortunately I have been, firstly to have had the privilege of working in India, with the wonderful range of geological problems and, secondly, to have had the companionship of so many Indian geologists.'

His writings are models of clear exposition aimed at advancing our knowledge of the subject. Early in his career he attempted a series of review articles which were published in *Current Science* entitled, 'Some recent

advances in Indian geology'. They were masterly reviews marked by clearness and insight and revealed his capacity for assimilating a large volume of data and distill from it the very essence for the edification of others.

In his 86th year, he said there was little remaining for him to accomplish except to light the way for the younger generation to become good geologists. This he did sincerely and to the best of his ability. He will be remembered for a long time to come for his classic

contributions to Indian geology and the role he has played in geological education in this country.

He apparently remained in good health till the last. He took ill and was shifted to Bhopal where he passed away in the early hours of 23rd May 1994.

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We extract below excerpts of West's earliest writings contributed more than sixty years ago to the newly started journal, 'Current Science'. These are of the nature of review articles entitled 'Recent Advances in Indian Geology'. Although a great deal of new information has been added and vast changes have taken place in our understanding of the geological evolution of the Indian continent, these early observations made prior to the advent of the Plate Tectonic Era which has revolutionized earth science have a charm of their own. It will be seen that West had a prophetic vision and had anticipated many of the modern developments.

— Editor

Some recent advances in Indian geology

W. D. West

Geological Survey of India

Introduction

The Editor of *Current Science* has asked me to contribute an article on recent advances in Indian geology. The following notes, dealing with certain aspects of the subject with which I am more familiar, have been put together in the hope that they may prove to be of interest not only to students of geology in India, but also to geologists outside India who have not the time to keep in touch with developments in this country.

Perhaps the most disturbing feature of modern scientific work is the immense output of literature which is continually appearing in every branch of science. So great is this becoming that it is a matter of difficulty for any worker to keep in touch with the progress that is being made, even in his own subject. This difficulty applies with particular force to geology. Modern geology has become so comprehensive, and its various aspects have become so specialised, that it has been said that there are no longer any geologists but only specialists in various branches; while specialists have been defined as those who know more and more about less and less. India is a large place, with a very varied geology and the considerable number of papers on Indian geology that are continually appearing, overburdened as they often are with the details of their subject, make it difficult for anyone not directly interested in them to appreciate fully the progress that is being made. In writing these notes, therefore, I have tried

as far as possible to draw attention to the main lines along which our understanding of the geology of India is developing, rather than to summarize every paper that has recently appeared, which would in any case be impossible within the limits of a series of short articles.

I have divided this account into five sections: (1) The Archæan Rocks of Peninsular India, (2) Deccan Trap volcanic activity, (3) The geology of the Himalaya, (4) The geology of Burma, (5) The geology of the Salt Range.

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The Archæan Rocks of Peninsular India

The Archæan rocks of India occupy a greater area than any other formation. They are important economically in containing rich deposits of gold, iron, manganese and mica. It is unnecessary to stress the importance of pure scientific research in the bearings which it may have on economic development; and a detailed study of the Archæan rocks in India, such as is being carried on in certain areas, needs no further justification

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