JOHN BICKNELL AUDEN
(1903–1991)

We reproduce below the tribute paid to J. B. Auden by another great Himalayan Geologist Dr. Augusto Gansser—Ed.

55 years ago, on a beautiful pre-monsoon spring Arnold Heim and the writer met John Auden in his mapping area, the hills of the Mussoorie region in the Kumaon Himalayas. Following special arrangements with the Geological Survey of India which we had previously visited in Calcutta, we had the great privilege to be introduced into the Himalayan geology by one of its greatest experts, John Auden.

During one week we walked through the hills, covered by large red flowering rhododendron trees and with a background of over 200 km of the glacier-covered High Himalayas, dominated by the Badrinath and Nanda-Devi groups, glistening in the brilliant sunshine. During these days John Auden acquainted us with the facts of the highly complicated geology of the Krol belt, the subject of one of Auden's best publications, 'The geology of the Krol belt, 1934'. He clearly recognized the various lithologies and structures, but he was very cautious in assigning ages based on the scarce and unconvincing fossil evidence. No rock sequences in the whole Himalayas have subsequently changed their stratigraphy as much as the deposits of the Krol belt.

John Auden had a very convincing way explaining the field facts which I immediately tried to sketch into my field book (Fig. 1). In the evenings, in the various very well organized field camps followed an animated discussion, not only about local problems, but we were able to listen to Auden's reminiscences from his many traverses done just a few years before, from the Karakorum in the west to Sikkim in the east. On the last day, we followed the long ridge leading to Mussoorie. Auden striding ahead with his long legs and his curly blond beard, still walking through rhododendrons and the far High Himalayas with rising cumulus clouds. In the Savoy Hotel of Mussoorie we soon became civilized and ended the day with a game of ping-pong. Mussoorie was still a small place, superb with blooming gardens. It became famous already in 1832, when George Everest choose it as his head-quarters for one of the greatest achievements of those days, the measurement of the great meridional arc over a distance of 2400 km from Cape Comorin to near Mussoorie.

The farewell in Dehra-Dun came much too soon and it was only 35 years later that we met again, when I had to deliver the William Smith lecture in London.

With the war, John Auden was transferred to assignments in economic geology and had to leave Himalayan research. In a letter, in connection with the publication of his Wadia Memorial lecture, written in September 1982—he was then 79 years old—he told me: 'It seems another era when you, Arnold Heim and I were together in the Dehra Dun foothills. My great regret was being transferred as soon as the 1939–45 war broke out to work on economic, engineering and groundwater geology. Not that work was not of absorbing interest, but the transfer meant that it was impossible to continue with the Himalayan work, except for periodic visits to the mountains in connection with dam sites and diversion tunnels.' While working
on an alternative alignment for a diversion of the Sun Kosi through the Mahabharat Lekh in 1965 and 1966 a Pilatus Porter plane would drop me down on a 200 m. alluvial terrace and pick me up 2-3 weeks later. The same plane later unfortunately crashed near Bodhinath Temple, Kathmandu, killing Hilary’s wife and daughter. His last letter, about 1 year before he died (no date given) still showed the surprising regional interest in geological matters: ‘ . . . I type this note as writing with the right hand is almost illegible, and the eyes function badly . . . . It looks now as if you have decided to be near the inland waters of Maggiore, Ceresio and Lago di Como. Two of these have maximum depths 178 m and 212 m below present sea level, presumably due to glacier erosion. The Indus at Tarbela dam in Pakistan rests on 215 m of gravels with a base below the level of bedrock at the Attok Narrows’.

John Auden’s greatest contribution to the geology of the Himalayas were the results of his regional reconnaissance expeditions from early 1933 to 1935, covering the large areas from the Karakorums to Sikkim and published in the Records of the Geological Survey of India in 1935 and 1937. Many of the problems which still occupy the Himalayan geologists of today were already realized through Auden’s careful field observations and critical deductions, this in spite of being himself critical on the results of regional traverses. ‘It is realised that there is often danger in early generalisation from incomplete observations such as are made on traverses. The Himalaya are so vast, however, that years will elapse before they are mapped geologically in detail, and it seems desirable therefore to place such observations on record, so as to build a scaffolding for the later formulation of geological structure which will eventually emerge from detailed work. Such results may also have a bearing on the understanding of the geology of the small areas where mapping is at present at hand’. (Introduction to: Traverses in the Himalaya, Records, 1935).

In Sikkim and eastern Nepal, John Auden observed already that the section between the Dalings and the Darjeeling gneisses ‘may be regarded as illustrating a true progressive increase in metamorphism upwards’ (Records, 1935, p 163), a fact still vividly discussed today and which as early as 1878 led Louis de Loczy, while visiting the Darjeeling area, to suggest large recumbent folds (nappes). In northern Sikkim Auden emphasized the presence of discordant white tourmaline granites (leucogranites) within the gneisses of the High Himalayas, clearly cutting folds but also intruding some gneisses in lit-par-lit fashion, a fact stressed by Heron—then Director of the Geological Survey of India—already in 1922 in the Everest region. ‘All that can be stated at present is that the white, fine-grained tourmaline-granite of northern Sikkim appears to be the youngest of the intrusives present, and, by analogy with the Chumbi granite, is probably Tertiary, while the intrusives it cuts may be either Tertiary or older’ (Records, 1935, p 166). Auden was further convinced that crystalline rocks, reminiscent of the northern Indian shield—where Auden worked for 10 years prior to his Himalayan assignment—were involved in the Himalayas. ‘The Aravalli strikes found locally in rock structures in the Garhwal Himalaya also suggests a northward extension of Peninsular rocks into the Himalaya. These rocks have been subsequently involved in the Tertiary movements, without, it is believed, the original structures having been rotated by the later movements so as to lose their former orientation.’ (Records, 1935, p 157). This most important statement was later found valid in many parts of the 2500 km long Himalayan chain, variously stressed by K. S. Valdiya and the writer.
Figure 2. Section across the Bidhalna window and the Banali outlier in Tehri State after J. B. Auden, 1937.

Autochthon: S = Simla slate (Pre-Cambrian?); n = Nummulitic, calcareous shale and quartzite; erosive surface on the Simla slates; IS = lower Siwalik; uS = upper Siwalik; D = Dun gravel.

Krol-Nappe, normal series: C = Chandpur (green and purple slates); N = Naghat (variegated quartzite); B = Blaini; K = Krol; IT = lower Tal (micaceous slates) passing to uT = upper Tal (quartzite). Garhwal-Nappe (Amri-N.): Chandpur (sericite schists).
Himalayan geology received a decisive impulse by John Auden's recognition of large crystalline thrust sheets such as the Garhwal nappe, in 1935, fully confirmed in the field a year later by Heim and Gansser (Fig. 2). It was Auden's merit to reach these conclusions purely by Himalayan field interpretations and not influenced by the famous Alpine export product.

Later theories, such as the indiscriminate application of plate tectonics to the Himalayas 35 years later, left John Auden rather sceptical. He just could not fit the thousands of kilometres of travelling India into his geological frame. In his last major paper in honour of his friend D. N. Wadia with the inspiring title 'India's former crustal neighbours' (1981), we read: 'It would seem to the author that India has had a relatively close association with Eurasia throughout the Phanerozoic, notwithstanding the allowance which must be made for the crustal shortening during the formation of the Himalaya.'

And now that one of the greatest Himalayan geologists has passed away, we may recall him, striding with his long legs through blooming rhododendrons with a background of hundreds of kilometres of glaciated High Himalayan peaks to whose understanding he had contributed so much.

Via Rovello 23

-CH–6900 Massagno (Lugano)

A. GANSSER

DATING OF CARBONATE ROCKS

A recent report which has appeared in the December 1990 issue of 'Geology' (Bor-ming Jahn, J. Bertrand-Sarfati and N. Morin, J. Mace, 'Direct dating of stromatolitic carbonates from the Schmidt-sdriif Formation (Transvaal Dolomite), South Africa, with implications on the age of the Venterdsorp Supergroup', vol. 18, pp. 1211-1214) describes a method of directly dating stromatolitic carbonates and should prove to be of interest to our readers. Our geochronologists in this country should give serious thought to the method devised by Bor-ming Jahn and start attempts at dating the stromatolitic limestones from the Indian Precambrian. Answers to many unsolved problems like the age of Krol-Tal sequence of the Himalaya, the limestones occurring at different horizons within the greenstone belts and the limestone sequence in the different Proterozoic sedimentary basins of India could become available. The great potential of employing U-Pb system of carbonate rocks for direct dating of sedimentary sequence is full of promise and has to be pursued with vigour.—(Ed.)