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OBITUARY

# Hans Laubscher (1924–2015)

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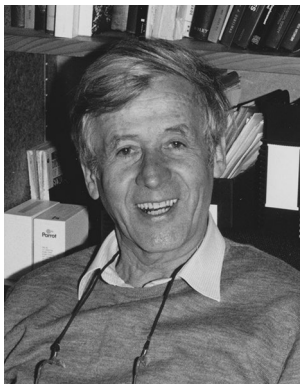

Hans P. Laubscher, Professor emeritus of Geology at the University of Basel, passed away on 2 July 2015, in Riehen, Switzerland. A leading tectonician and one of the great Alpine geologists of our time, he spent his career combining careful fieldwork with deep insight into the theoretical and experimental aspects of tectonics. At the centre of his research was the analysis of tectonic systems, from small-scale folds to mountain belts and the global puzzle of lithospheric plates through geologic time. In 1993, Hans Laubscher received the Gustav Steinmann Medal of the Geologische Vereinigung in recognition of his research on the kinematics and mass balancing of tectonic systems.

Hans Laubscher was born on 11 January 1924, in Muttenz, near Basel. After attending the Classical Gymnasium in Basel, he enrolled at the University of Basel and obtained his PhD degree in Geology in 1947 at the age of 23. He then worked for 10 years with an oil company in the southern foreland of the Venezuelan Andes, first as junior field geologist, and then as a geophysicist and staff geologist combining, as he put it, "dirty geology with clean physics". In 1958, he returned to the Geological Institute in Basel, obtained his Habilitation with a paper on neptunian sandstone dykes and—after a year as guest professor at the University of Illinois in Urbana—was appointed successor of Louis Vonderschmitt as the Head of the Institute in Basel. It was during Laubscher's tenure from 1966 to 1989 that this institute gained international recognition, one might add, despite its relatively limited resources.

Hans Laubscher was not intimidated by the complexities of mountain belts; early on in his career, he liked to unravel what he called "tectonic knots" that evolve from the interference of different orogenic systems. Already during his PhD work, he was intrigued by the folds, thrusts and strike-slip faults in the Caquerelle Zone of the central Jura Mountains. When he returned to Basel from South America, he began to study the Jura Mountains as a tectonic system. In the 1960s, long before balancing profiles became fashionable, he recognized that accurately balanced cross sections are necessary in order to understand the kinematics and mechanics of fold-and-thrust belts. Armed with only paper, scissors and thread (before the days of computers), he constrained shortening in the Jura Mountains by the curvimetric and volumetric analysis of the folds. His brilliant quantitative kinematic reconstruction confirmed Buxtorf's idea of décollement of the sedimentary cover above a rigid

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basement. Indeed, his 1965 cross sections across the Jura Mountains were one of the first, if not the first, attempts at rigorous balancing of sections across a mountain belt. He thus resolved the long-standing controversy between August Buxtorf und Gustav Steinmann in this region by combining Buxtorf's Jura décollement hypothesis with Steinmann's fixist concept that the Rhine Graben faults dominate Jura tectonics. Not surprisingly, this approach did not earn him Buxtorf's friendship, as his new kinematic model also included inherited Oligocene faults, reactivated as transfer zones, as a pre-existing boundary condition for the evolution of the Miocene Jura thrust-and-fold belt.

Whereas the last generation of classical Alpine geologists like Gansser and Trümpy adopted a strongly inductive approach based on careful observation and an encyclopaedic knowledge of field relations, Laubscher's views were more deductive and based on first-order physical principles, making him more open to speculation. This prompted colleagues less given to such speculation to note "that the Basel institute is the only one in Switzerland from which the Alps cannot be seen". Yet, this willingness to speculate, paired with a rigorous geometric-physical approach, is what made Laubscher a forerunner in many respects. In contrast to most Swiss geologists, he embraced mobilistic concepts early on. He was probably the first to look at the Alps in the context of Plate Tectonics. His paper on "Mountain Building", presented in 1968 at the International Geological Congress in Prague, applied an ocean/continental margin model to the Alpine "geosyncline" and described the role of lithospheric subduction in forming the Alps. The ophiolites of Zermatt which he had studied with his friend Peter Bearth (Professor at Basel University) were interpreted as subducted and exhumed remains of Piedmont oceanic crust separating the sediments of the Adriatic margin in the eastern and southern Alps from the European margin in the central Alps. Today this seems self-evident, but in the 1960s most Alpine geologists still sneered at this outlandish idea. The ophiolites ultimately became the Ariadne's thread that allowed geologists to wend their way through the Alpine-Mediterranean labyrinth, enabling the distinction of microplates and their continental margins along the Europe–Africa plate-boundary zone.

For the Institute in Basel, 1968 was the *annus mirabilis* of the New Global Tectonics and associated notion of global material cycling; these concepts ushered in a new era and became the guideline for a new curriculum. Hans Laubscher and his students applied the principles of mass balance that they had developed in the Jura Mountains not only to other parts of the Alps (most notably the Southern Alps), but on a larger scale to the Mediterranean basins and mountain belts and to the northern Andes (Venezuela). Subduction-related processes intrigued Laubscher from his earliest days as a geologist when he first saw the well-preserved eclogitic pillow lavas near Zermatt. It immediately became clear to him that Alpine subduction could only be understood within a three-dimensional framework, inspiring a series of seminal papers in the 1970s—in both English and German—on the rates of tectonic mass transport and heat transfer in the Alps, Apennines and Dinarides, as exemplified by his landmark paper "Bewegung und Wärme in der Alpinen Orogenese". These arguably form the core of his oeuvre and mark his most productive period. In particular, the Insubric Line and its relationship to the exposed mantle and lower crustal rocks of the Ivrea Zone in the arc of the Western Alps drew his attention repeatedly. As Laubscher once stated rather categorically, "Not understanding the Insubric Line means not understanding the Alps". Other tectonic singularities, like the "collisional knot of Liguria" between the Western Alps and the Apennines led him to propose that the Neogene kinematics of the Alpine-Mediterranean system must be described by block rotations within a regime of dextral transpression. Laubscher's contributions to understanding the deep structure of the Alpine edifice, the recognition of lithospheric breaks and plate rotations are indeed novel. It was thus fortunate that in the 1990s, Laubscher brought his experience to a Swiss National Science Foundation Priority Program on the Deep Structure of the Alps (NFP 20) that imaged subduction of the European lower crust and mantle below the Adriatic microplate and the accretion of upper crust in the Alpine nappes. After his retirement in 1987, he returned to the study of his beloved Jura Mountains—his Jurassic Park—remapping problematic areas. He remained devoted to 3D kinematic studies of the Jura and, on a much larger scale, of the Alpine-Mediterranean belt. He continued to publish well into his 80s.

Hans Laubscher was a *solitaire* in a twofold sense of the word. He was brilliant, and he paid little attention to prevailing opinions or fashions. His lectures were structured, but if a new paper or theme caught his attention, he would not hesitate to abandon all structure and devote a few lectures to the problem. This was his way of developing new ideas. He was not easily accessible on a personal or even intellectual level, especially for students, although in later years he mellowed. His concise publications—some of them written in the first person and in narrative style—are not always easy to understand; he often published alone and seemed content to write for those willing to be interested … *the happy few*. However, for a small community of modern tectonicians, he was "one of the world's leading geologists" (Robert Hatcher in his laudatio for the Geological Society of America, 1993). In many respects, Laubscher was ahead of his time, as witnessed by the fact that most of his publications have withstood the test of time. He had a good (sometimes black) sense of humour. Dealing with so many knots in geology and life, he also developed a

refined sensibility for the absurd and chaotic sides of reality that, nevertheless, did not render him a cynic; he remained a pragmatist to the end. Not a few colleagues and young geologists in Switzerland and abroad owe him much for his help and encouragement. He will be remembered as a creative and innovative scientist, an inspiring if rather idiosyncratic teacher, a critical partner in profound discussion; in sum, an original personality.