THE GEOLOGY OF THE ALBULA PASS AREA, EASTERN SWITZERLAND IN ITS TETHYAN SETTING: PALAEO-TETHYAN FACTOR IN NEO-TETHYAN OPENING

"quot homines tot sententiae"

by

A. M. Celâl Şengör

A Dissertation

Submitted to the State University of New York at Albany

in partial fulfillment of

the requirements for the degree of

Doctor of Philosophy

College of Science and Mathematics

Department of Geological Sciences

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ABSTRACT

This study deals with the tectonic evolution of Tethys during the Mesozoic. A critical question concerning Tethyan geology is how far the Tethys ocean extended westwards in the Mediterranean region. Because this question can only be answered by studying in detail the opening history of the Alpine ocean, a critical area involving Triassic and Jurassic sediments was mapped in the Albula Pass area in eastern Switzerland. The mapping shows that the main rifting in the Alps took place during the Lias with a very weak extensional event during the medial Triassic. The record of these events is now found in the Lower and Middle Austroalpine units, which deformed through a complex sequence of events involving a hitherto unknown early south-vergent folding of the Middle Austroalpine Aela Nappe. The stratigraphic analysis undertaken during this study demands that the Aela Nappe be placed farther north than hitherto believed, near the Lower Austroalpine facies realm, mainly because of the demonstration that the typically Lower Austroalpine Alv Breccia also occurs in the Aela Nappe. In order to place the Jurassic and the Triassic rifting events into their appropriate tectonic settings, a regional tectonic synthesis of the Mediterranean Alpides was undertaken. This synthesis shows that the Triassic and Jurassic rifting events in the Alps was related to the opening of Neo-Tethys and to the opening of the Atlantic ocean respectively. Because only Jurassic rifting eventually led to generation of ocean-floor, the Alpine ocean and the Mesozoic-Cainozoic oceans west of it formed as parts of the Atlantic Ocean and are tectonically unrelated to Tethys. The two oceanic systems merged in the western Carpathians. Neo-Tethyan opening, which controlled the Triassic rifting events in

the Alps was controlled and was largely coeval with the closing of the Palaeo-Tethys, described in detail for the first time in this dissertation. The closure of Palaeo-Tethys generated an orogenic belt, extending from the Carpathians to the Pacific Ocean. It is herein named the Cimmerides and follows closely the later Alpides, products of Neo-Tethys, throughout southern Eurasia. This spatial association resulted in complex overprinting of the Cimmerides by the Alpides, which hindered the recognition of the former for nearly a century. The Cimmeride orogenic system was completed by the latest Jurassic with some late events during the early Cretaceous along the Great Khingan-Shitka suture in the Far East. An important result of this study is the recognition of the dominating effect of the Palaeo-Tethys on the tectonic evolution of the Mediterranean Alpides until the latest Triassic.

THIS THESIS IS DEDICATED TO THOSE WHO MADE IT AND ITS AUTHOR POSSIBLE:

MY PARENTS

&

THE OTTOMAN IMPERIAL FAMILY

ACKNOWLEDGEMENTS

The research reported in this thesis began many years ago, much earlier than the start of my university education, when I first developed an interest in the evolution of Tethys in 1966 through the books that my parents had bought me. Since then a large number of individuals have assisted me in my quest for knowledge concerning both Tethys and other things. They are so many that it is impossible to acknowledge their individual contributions that made an evolution possible, which culminated in this dissertation. However, a number of them stand out such that their names must be mentioned in tones of respect and gratitude for without them I could not have existed as I now do!

Drs. Kevin C.A.Burke, John F. Dewey, and W.S.F.Kidd taught me not only the essential language of Geology, but they have been, for many years, my most cherished conversation partners in that magical language, in which we have questioned and been generously instructed by our beloved Planet. In Istanbul I have enjoyed a similar privilege with Drs. Nezihi Canitez, Sirri Erinç, Ihsan Ketin, and Yücel Yilmaz. That Geology is only a part of the intellectual activity created by the intelligent curiosity has been taught to me when I was still very young mainly by two outstanding people, the late Mr. Mustafa Bahaeddin Gürfirat and Dr. Mim Kemal Öke.

In my pursuit of knowledge I have been most profoundly influenced by my following teachers throughout my career: Miss Nuriye Güneyi (Natural History in junior high school), Mr. Tarik Inözü (Geography in high school), Mr. Münir Aysu (Turkish

Literature in high school), Mr. James Lovett (English Literature in high school). In Albany, in addition to Burke, Dewey, and Kidd, I have learned a great deal about small-scale structural geology from Dr. Winthrop D. Means. Dr. Akiho Miyashiro not only taught me most of what I know about metamorphic rocks and processes, but has always been an enourmous source of encouragement. Dr. Stephen E. De Long has enriched my understanding of many a geochemical problem and has been a delightful discussion and work partner. So was Dr. Jeffrey Fox.

The work in the Albula region in particular and on Tethys in general would not have been possible, had I not enjoyed the active support and encouragement of Dr. Rudolf Trümpy of Zürich (ETH). He visited me regularly in the field and essentially made my field work possible.

Drs. Albert W. Bally, B. Clark Burchfiel, Ian Evans, Augusto Gansser, K. Jinghwa Hsü, and Olivier Monod have helped me in various ways both in relation to Tethys and otherwise.

The actual field work in the Albula area had the benefit of the assistance of Mr. Steve Tanski and Dr. Naci Görür. The thin section work was much helped by the supervision of Drs. Naci Görür and Yücel Yilmaz. Mr. Gültekin Savci was very helpful in connection with the micro-scale structural interpretation; he also helped me with the draughting of many of my plates. Without the help of Mr. Gregor Eberli, it would not have been possible to identify the Kössenerschichten in the Albula area.

Life in Albany was possible largely because of the friendly hospitality of the Burke, Dewey, and Fox families. Dr. P.C.Benedict has done marvels to dampen my incurable nostalgia for my home continent.

Mr. David G. Gallo deserves a very special place in these acknowledgements, for it was he who has been my closest friend in the American population. With his broad knowledge, contagious enthusiasm, and gentlemanly character, he has always been a fine example, which I have not always been capable enough to follow. I owe much of what I know in oceanic tectonics and geophysics, and also on strike-slip systems to Dave's patient explanations. He also taught me much on the philosophy and history of science.

In the Albula Pass, the Schwab Family looked after me for three years and provided a lovely environment for living. There I also enjoyed the close friendship of Mr. Hermann Bearth, Alpenhirt , philosopher, and gentleman.

In Zürich, Mrs. Claudia Colombini, formerly of the Geologischen Institut of the ETH, gave me much friendly help. Miss Esther Chappuis, the librarian of the Geological Institute, was a constant source of assistance during my stays in the ETH.

To Miss Maja Pool of Vicosoprano I am grateful not only for her very friendly help during my stay in the Albula Pass in the Summer of '79, but also for her warm friendship that I have enjoyed ever since. Most important, I think, has been Maja's role in keeping me closer to humanity than would have been possible otherwise.

This thesis began under the supervision of Prof. Dr. John F. Dewey, and was concluded under that of Dr. W.S.F.Kidd. Drs. Burke, Kidd, and Means read the final draughts of this thesis and made many helpful comments. Greatly appreciated and critical was their role in allowing me to complete my PhD requirements in about one week. Mrs. Diana Paton, the Departmental Secretary at SUNYA, has done the impossible of seeing to it that I got finished in the one week that was available. She also largely typed the final manuscript.

Last, but not least, I owe nearly all I have accomplished to my parents and to my sister. Above all else, they have provided me with a home and family, which I consider to be the most valuable things I own.

Albany, Summer 1982

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