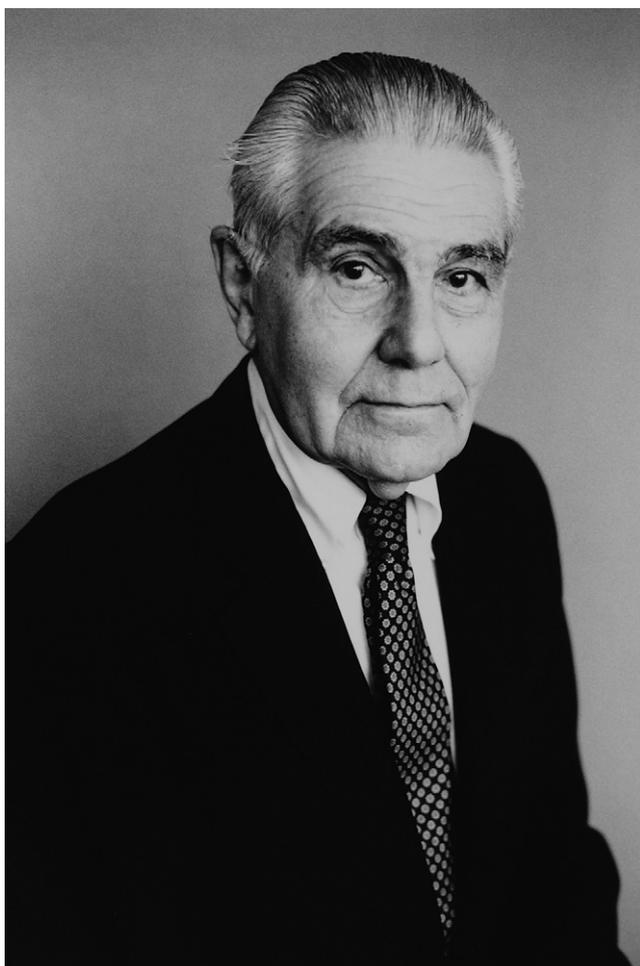


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## Marine and Petroleum Geology

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### Dedication: Amos Salvador (1923–2007)



This dedication was slightly modified by Paul Mann from one originally prepared for the general faculty of the University of Texas by William Fisher, Mark Cloos, and William Muehlberger submitted on March 6, 2008.

Amos Salvador, professor emeritus in the Department of Geological Sciences, Jackson School of Geosciences at The University of Texas at Austin, long known for his contributions to stratigraphic classification, geology and resources of the Gulf of Mexico and Caribbean basins—and most recently for a book on the future of energy resources—died December 2, 2007, of complications from pneumonia while battling a malignant brain tumor. He was 84.

Born in Madrid, Spain, in 1923, Amos spent part of his youth in Havana, Cuba, where his father was stationed at the Spanish Embassy during the period of the Second Spanish Republic. When the Republic fell to Franco's Nationalists, his family moved to Venezuela, where he earned his B.S. in geology from the Universidad Central de Venezuela in 1945. One of his earliest high school friends in Caracas was Georges Pardo, who later went on to work for Gulf Oil and published his lifelong work on the geology of Cuba in an AAPG Studies in Geology volume in 2008.

Amos was first employed by Mene Grande Oil Company, a Venezuelan subsidiary of Gulf Oil, where he had the good fortune to be mentored by Hollis D. Hedberg, the famous Gulf Oil exploration geologist who later taught at Princeton University. Hedberg advised him to earn his Ph.D. from Stanford University, which he duly completed in 1950. He married Lynn Sherwood, a native of Kansas who also graduated that year from Stanford. A Spanish major and fluent Spanish speaker Lynn quickly adapted to her new in-laws and surroundings in Venezuela. A varsity soccer player at Stanford, Amos remained a lifelong fan and contributor to the soccer program at Stanford. He recalled when a team member called him to solicit one dollar for each goal scored in a marathon shooting session. He said, fine, how many goals have you scored and laughed when the team member replied more than 3000.

Amos recounted to Paul Mann his memory of working on geologic maps in the evening by the light of kerosene lanterns in temporary oil camps in remote areas of eastern Venezuela. Company geologists would gather in the presence of Hollis Hedberg around a large table in a central tent walled by mosquito netting and contribute to the evolving surface geologic map and serial cross-sections. In a way reminiscent of surgeons surrounding the patient on an operating table, all would don clean white gloves to avoid smudging the painstakingly handdrawn geologic map with their sweaty hands.

From 1950 to 1955, Amos worked for Gulf Oil out of their New York office as a regional and surface geologist and performed extensive fieldwork in North Africa, Europe, and South America. He left to work for Creole Petroleum Corporation, an affiliate of Esso (now ExxonMobil) in Venezuela, and from then until 1980 worked for several Esso affiliates before retiring after nine years as chief geologist of Exxon Company, U.S.A.

Amos and Lynn moved to Austin in 1980 when he accepted a faculty position as the first Alexander Deussen Professor of Energy Resources in the Department of Geological Sciences, University of Texas at Austin. The Geology Foundation recognized Salvador's dedication to teaching by awarding him the Houston Oil & Minerals Corporation Faculty Excellence Award in 1988. In 1990, he was appointed the Morgan J. Davis Professor of Petroleum Geology.

Amos was a careful and organized teacher who would write out by hand his lectures on sheets of paper to insure he was fully prepared for each class. He retired from formal teaching in 1993.

Amos Salvador's remarkably long and productive career included a 35-year career as a geologist in the petroleum industry followed by 27 years as a distinguished member of the faculty at Texas. His positive outlook on science and people inspired all who knew him. He mentored many geology graduate students while at the University of Texas, with a special fondness for those from Latin America who visited his office regularly. He provided wise counsel that helped them achieve success in the profession and life in general. He taught the principles of stratigraphy to every undergraduate major for more than a decade. At the graduate level, he supervised the completion of nine masters theses and four dissertations. Many of these students went on to become leaders of the oil industry when they returned to their respective countries. As many of his graduate students were international students with English as their second language, he devoted immense amounts of time helping them improve their mastery of scientific writing in English.

Before becoming a faculty member, Amos had a long record of publication, presentations at international meetings, and professional service. He published several articles and three guidebooks concerning the geology of Venezuela and the Gulf of Mexico that focused on regional stratigraphy and petroleum geology (Salvador, 1963; Salvador and Hotz, 1964; Salvador, 1975; Salvador and Buffler, 1982). An early seminal paper by Salvador and Stainforth (1965) on a theme that this special issue of *Marine and Petroleum Geology* promotes was called: "Clues in Venezuela to the geology of Trinidad, and vice versa", characterized by carefully drawn maps of structures mapped mainly from surface mapping, rudimentary seismic reflection profiling, and drilling. Up to this time, geologic studies were confined to one country or the other but made no effort at attempting a more regional scale of geologic integration that would span political boundaries. Rodulfo Prieto, a 1987 Ph.D. graduate from UT Austin, states that "highly creative and innovative thinking" by Amos Salvador in the late 1950s about the Eocene geology of Venezuela was rediscovered in the 1980s. This different paradigm helped pave the way for the discovery of the El Furrial Field in 1986, the largest oil discovery in Latin America in the previous 25 years and what later proved to be the cornerstone in a group of giant oil fields in eastern Venezuela described in this volume using subsurface data (Duerto et al., Salazar and Moscardelli, Parra et al., this issue).

Throughout his career, Amos along with many other leading geologists of the time remained skeptical of large-scale displacements in the Caribbean plate as predicted by plate tectonic models that became more widespread in the 1970s and 1980s. His fixist views were reinforced during his years working with Exxon on the Gulf of Mexico and Caribbean and were expressed in a review paper published with fellow Exxon geologist Art Green in 1980 called: "Opening of the Caribbean Tethys". In this paper they engaged in thinking of the common evolutionary links shared between the Gulf of Mexico and Caribbean. In the 1980s and 1990s this regional tectonic approach would become widely accepted.

In 1986, Amos (1986) sparred in a reply and discussion in the journal *Tectonics* with John Dewey and Jim Pindell over the total offset of the right-lateral Bocono strike-slip fault of Venezuela. Using stratigraphic data from the Merida arch, that intersects the Bocono fault and Merida Andes at right angles and that he mapped in the 1950s while with Mene Grande Oil Company, Salvador argued that the offset of the fault was much less than the hundreds of kilometers predicted in the discussion by (Dewey and Pindell, 1985).

Amos was a member of the International Union of Geological Sciences Commission on Stratigraphy from 1952 until his death. He was elected and re-elected chairman of the Subcommittee on Stratigraphic Classification serving from 1976 to 1992 (Salvador, 1985). His profound interest in stratigraphy dates back to his experience as a young petroleum geologist who had to ride mules to access surface outcrops in remote parts of eastern Venezuela. As a faculty member at the University of Texas he taught a stratigraphy course to undergraduates that stressed the fundamental principles he felt that were being shortchanged in a changing educational scene.

After becoming a faculty member at Texas, Salvador embraced a wide range of academic endeavors. He was a distinguished lecturer for the American Association of Petroleum Geologists during 1980–1981. That lecture tour was the topic of what became a highly cited 1987 paper: "Late Triassic–Jurassic paleogeography and origin of the Gulf of Mexico Basin (Salvador, 1987)." He served six years as an associate editor of the *Geological Society of America Bulletin* and guided numerous papers to publication. A remarkable accomplishment was organizing a major volume for the *Geological Society of America's Decade of North American Geology Series* (DNAG). Salvador not only edited the 568-page, 18-chapter volume on "The Gulf of Mexico Basin," but he also wrote two of the chapters and co-authored two others (Salvador, 1991a,b,c). This 1991 volume was one of the very best sellers of the 16-part DNAG series and is still widely marketed by GSA both in hard copy and on CD as no other publication has emulated its level of systematic coverage and detail for the stratigraphy of the Gulf of Mexico and surrounding areas. Not only was the geologic coverage about the Gulf all-encompassing, but it was noted for the uniformly-high quality illustrations and six large wall maps with cross-sections that were published in a separate slipcase. Of particular value was his thorough review of the geology of Mexico described mainly in Spanish language papers that were difficult to access outside of Mexico. This new regional framework allowed Mexican geology to be related to the offshore geology of the Gulf of Mexico. Amos was pleased that he was able to raise funding from industry to enable redrafting where needed and to assure publication of many high-quality, colored maps that appear as both figures in the chapters and as folded map enclosures in a map slipcase. This DNAG Gulf of Mexico is considered a benchmark contribution from which all other works on the Gulf of Mexico basin will forever build. Amos was always deeply grateful and appreciative of the excellent skills of the University of Texas and GSA publication staff that helped him produce this publication and other documents over the years.

After retiring from teaching at UT in 1993, Amos continued to work on matters concerning stratigraphic classification and began intensive research on estimating consumption and possible sources of energy in the 21st century. He strongly believed that stratigraphy is a fundamental element of geology and that growing neglect of the principles disturbed him. He also had an abiding concern for the growing demand on Earth resources by its expanding population.

Amos's work in stratigraphy culminated in his editorship of the widely-used Second Edition of the *International Stratigraphic Guide* that was published in 1994 (Salvador, 1994). He co-authored an abridged version that was distributed in 1999. A reviewer of the *Guide* described it as a "fundamental text" for all engaged in the description, mapping, and analysis of strata.

On the matter of stratigraphy, Amos made it a mission to protest efforts to eliminate the Tertiary and Quaternary periods from official classifications of the geologic time scale. The Tertiary and Quaternary have long been accepted as periods within the present geologic era of the Cenozoic. In 2000, the International Commission

on Stratigraphy published a time scale in which the term Tertiary was eliminated. In 2004, they eliminated the term Quaternary as well. For Amos this was such folly that he was provoked to write a paper published in 2006 titled, “The Tertiary and the Quaternary are here to stay” in which he clearly presented the historical and logical reasons to maintain these subdivisions of geologic time (Salvador, 2006).

Upon retirement from teaching, Amos stated he would now have time to pursue interests related to the world’s energy supply and how this supply could affect the future of mankind. He stated to Paul Mann that his goal was to make as accurate assessment as possible of the facts surrounding all the various energy types including oil, natural gas, coal, etc., and put this information into a single volume that would be accessible to everyone interested in this complex topic. To do this, he tirelessly pursued information from various governmental and private agencies to insure that his data was derived from primary sources. His multi-year, comprehensive and single-handed research culminated in the 2005 book, *Energy: A Historical Perspective and 21st Century Forecast* (Salvador, 2005). The American Association of Petroleum Geologists (AAPG) honored this publication with the 2006 Robert H. Dott Sr. Memorial Award. This award is presented to the author or editor of the best special publication that was published by AAPG in the previous year. A major part of this effort involved compiling data from various governmental and open access sources which he was able to access through the internet or by directly contacting the individuals producing the data.

Salvador maintained not just academic rigor until the day in early August, 2007, when the symptoms of brain cancer first appeared, but his extraordinary physical condition as well. He retained the physique of his soccer playing days at Stanford. Well into his seventies, he jogged and walked several miles most evenings around the steep hills of his Texas Hill Country neighborhood in northwest Austin. He was a field geologist who remained capable of extended fieldwork until the very end.

Amos Salvador, a gentleman-scientist, is survived by Lynn—his wife of 57 years; his children, Phillip, Michael, and Rosario; and his grandchildren, Solomon, Leo, Claire, Lucas, and Carla. He will be missed by a worldwide legion of relatives, former students, and friends of all generations.

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