

Revitalizing historic and iconic Trinidad type sections through archival research within Hans G. Kugler's Legacy in Basel, Switzerland

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Cenozoic planktonic foraminiferal biozonations originated largely in Trinidad, SE Caribbean. Renowned micropalaeontologists like A Senn, HH Renz, J Cushman, PW Jarvis, RM Stainforth, P Brönnimann, B Carr-Brown, HM Bolli, and JB Saunders erected historic type sections there. Their efforts were economically driven within companies like Trinidad Leaseholds Ltd. Less known to the micropalaeontological community was that these pioneering works were orchestrated by Chief Petroleum Geologist Dr. Hans G. Kugler (1893-1986). He prioritized the use of microfossils while drilling for oil in Venezuela and Trinidad. Kugler, Father of Trinidad Geology, built the foundation of Trinidad's geology where microfossils played an essential role.

Kugler's Legacy is unique and highly treasured for Caribbean micropalaeontology. It is home to the world's largest Trinidad collection, stored at Natural History Museum Basel (NMB), Switzerland. The Legacy comprises an 85 box archive, field books, maps, photo collection, rock and microfossil collections, raw sediment samples, and a very special hand library. Kugler and collaborators, in the 1930s-1970s, established iconic type sections in Trinidad. From these type sections, replicate samples were distributed around the world (e.g. Natural History Museum London and The Smithsonian Institute, USA), though the majority is stored at the NMB. Among others, these Trinidad type sections became international standards for biostratigraphy.

For this project, all archival documents were read, contextualized, catalogued, and where possible, reconnected to original objects at the NMB. Very important documents were digitized. This project is the first deep investigation into Kugler's archive. We found that Kugler meticulously preserved practically all relevant information, including that of his collaborators. The Legacy was originally systematically built with numbered documents and books. However, order was lost when shipping the Legacy from Trinidad to Basel in batches and bits. Our current research has shown that the original numbering system is extremely useful in finding virtually any relevant information. Kugler's archive also details advances in field mapping, aerial photography, oil well drilling, and electrical logging.

Unique to Basel, Kugler's Legacy is the only means to restore scientific context (age, location, date, author, etc) to Trinidad type material stored at the NMB and around the world. From our research, original type samples can be restored to their original geographic position using literature, photos and maps within the archive. Interestingly, many Trinidad type samples are encrypted with a peculiar biostratigraphic code, rendering them unsuitable for new scientific investigations. We have, however, uncovered ciphers within the archive that decode the samples, something largely unknown for over 25 years.

Our new research will allow the construction of age-depth models and subsequently contribute to quantitative refinement and help decipher age information of historical reference samples around the world, that otherwise would be lost to science forever. Our effort may thus inspire similar studies on other Trinidad classical type localities using archival materials and collections held at other museums around the world. We also call to draw much more attention to linking micropalaeontological archives with their collections – such as those maintained at NMB and others around the world – which reflect much of the historical rise of the petroleum industry, its influence on micropalaeontology, climate research, and man's attempt to tackle current global climate deteriorations.