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FOREWORD

This is the third and last of three issues of *American Journal of Science* dedicated to the memory of Alfred Kroner, who passed away just a few months short of his 80th birthday in 2019. A total of 26 papers constitute this series of special issues, all submitted by friends and colleagues as a mark of respect to Alfred. His boundless energy and razor-sharp observational skills were legendary, with Alfred loving nothing better than practicing these out in the field. But to this he added a talent for microanalysis and critical thinking, melding them together to investigate major geological issues at both the local and regional scale. Alfred worked in all continents but Antarctica, and was always well aware of how his work fitted into the global picture. The subtitle of these special issues '***From Cratons to Orogens***' indicates Alfred's long-standing interest in how continental crust formed and how it was modified through time, and this is reflected by the ten papers that constitute this final volume.

The first paper is by **Christoph Heubeck and co-workers** and involves one of Alfred's favorite stomping grounds – the Kaapvaal Craton of southern Africa (Alfred is a co-author). The study re-investigates the 3.2 Ga Moodies Group in South Africa and Swaziland (Eswatini) in order to identify the source of the sediments. A comprehensive suite of sandstones and associated rocks were analyzed to determine their age and provenance. The zircon data are consistent with derivation from felsic components in all units of the Barberton Greenstone Belt, especially from the Onverwacht anticline. However, the quartz and some of the feldspar appears to require input from an extraneous source, although there is no evidence for a significant contribution from the Ancient Gneiss Complex. We then move to the Indian subcontinent where **Ishwar Kumar Cukkemane and co-workers** investigate the felsic rocks of the Karwar Block in western India. Two types of TTG are recognized, both of which formed at 3.2 Ga, accompanied by granites emplaced at 2.9 Ga as a result of melting of earlier TTG. All of these are associated with 3.0 Ga mafic rocks (now amphibolite). Older components are present in the TTG and a combination of geochronology, isotope and whole-rock geochemistry is used to evaluate the Paleo- to Mesoarchean tectonic evolution of the Karwar Block, interpreted to result from a combination of both plume-related and subduction-related processes. **Dingyi Zhao and Min Sun** then take us to the North China Craton, another favorite hunting ground for Alfred, to examine how the high-grade Tianzhen gneisses in the Huai'an Complex provide constraints on the pre-collision development of the northern part of the Trans-North China Orogen that separates the Eastern and Western blocks of the North China Craton. They identify two types of Neoarchean TTG; one with low-Yb, and interpreted to have formed from subducted oceanic crust at depths of 15-20 kbar, and another with high-Yb, also interpreted to have evolved from oceanic crust, but at shallower depths with pressures of 10-15 kbar. They argue that these rocks constituted part of an arc formed prior to collision of the Eastern and Western blocks that led to formation the North China Craton in the Paleoproterozoic. Leaving the Precambrian behind, **Xing Cui and co-workers** evaluate the high-grade paragneisses in the Qiongkuer domain of the southern Chinese Altai. There has been controversy surrounding their age, with some considering them part of the Precambrian basement, whereas others suggest they are Paleozoic in age. The new results establish that the youngest detrital zircon population has an age of ~440 Ma, with the metasediments also cut by ~410 Ma granite, thus confirming their Paleozoic (Silurian) age. The original sediments were considered to have evolved along an active continental margin that extended for a considerable distance along the western margin of the Ikh-Mongol arc. Moving now to the North Qaidam Orogen, located on the eastern margin of the Tibetan Plateau in Western China, **Xin Chen and co-workers** investigate anatexis of deeply-subducted Neoproterozoic continental crust, by using zircon, monazite and xenotime geochronology and mineral chemistry to characterize anatectic felsic veins within eclogite and gneiss at Luliangshan. They identify three discrete pulses of magmatism spread over ~30 Ma in the Silurian-Devonian. The anatectic veins developed under progressively lower metamorphic conditions from eclogite, through granulite, to amphibolite facies, and their chemistry reflects both depth of generation and the lithologies involved. This has wider implications for granitoids generated in syn- and post-collisional environments. Working in another major Chinese orogenic belt, **Zaili Tao and co-workers** investigate granitoids that appear transitional between S- and I-types in the South Tianshan Orogenic Belt of northwest China. The granites are Carboniferous (~300 Ma) in age and are explained as being generated from slightly older Carboniferous sedimentary rocks, whose compositional variation likely led to their mixed character in terms of rock classification. There is no evidence for involvement of Precambrian basement. The authors propose slab rollback of the subducting South Tianshan Oceanic plate to explain the generation of these granitoids. **Liang Li and co-workers** now take us to the Eastern Tianshan Orogenic Belt where they investigate early Carboniferous gabbros, diorites and monzogranites that evolved over ca. 5 million years from 348-353 Ma, and were followed by emplacement of later gabbros at ~334 Ma. Their work in this segment of the Harlik arc indicates that mafic magmas were generated from partial melting of the asthenosphere, fluxed by fluids derived from a subducting slab. The monzogranites were the result of partial melting of Ordovician supracrustal rocks upon emplacement of the first generation of gabbros. This activity was considered to be generated by southward roll-back of the northward-subducting Paleo-Asian Ocean plate. The paper by **Bing Xu and co-workers** transports us further east in China to the Inner Mongolian segment of the Central Asian Orogenic Belt. Here, in the southeastern segment of the orogen, the ~300 Ma Erenhot monzogranite pluton of I-type affinity was derived from a dominantly juvenile source. However, neodymium and hafnium-in-zircon model ages, together with slightly older zircon xenocrysts, indicate a contribution from older crust. The authors conclude the pluton was emplaced in a continental arc setting during the final stages of closure of the Hegenshan Ocean, with subduction beneath the Uliasti Continental Margin. Staying in this area of the Central Asian Orogenic Belt, **Fu Wei and co-workers** interrogate segments of two reprocessed deep seismic profiles obtained across the southern margin of the Mongolian Terrane, traversing the Uliasti, Hegenshan and Baolidao belts. Both profiles show consistently well-defined northward-dipping reflectors, with some passing into the mantle, although the Moho remains relatively flat. When combined with available geological data, the authors favor progressive northward closure of the Paleo-Asian Ocean in the late Carboniferous-early Permian. Arched reflections in the crust are attributed to emplacement of Mesozoic magmatic intrusions. The final paper in this volume is by **Zhen Wang and co-workers**, who provide evidence for the rollback of the Neo-Tethys Ocean plate in the western Tibetan Plateau; an event that took place in the latest Mesozoic. By obtaining U-Pb zircon geochronology (~70 Ma trachytes) and whole-rock geochemistry from volcanic rocks of the Dianzhong Formation in the western Gangdese Belt, and combining their data with published information, the authors conclude that the rocks formed at an active continental margin, with volcanism commencing in the latest Cretaceous. This was initiated by rollback of the Neo-Tethyan oceanic plate prior to the India-Asia collision.

Finally, as Guest Editors, we would like to thank all authors who contributed to these three special issues of the *American Journal of Science*. Many knew Alfred Kroner as a friend and colleague, whereas others were touched in some way by his infectious personality and obvious love for geoscience. With his passing, Earth Science has lost one of its strongest ambassadors – and the world is a poorer place because of this. Rest in Peace, Alfred.