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A tribute to Burkart Engesser

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Burkart Engesser is one the most renowned specialists on Cenozoic rodents and insectivores worldwide. His career as palaeontologist started 50 years ago as he entered the Natural History Museum Basel (NMB) in 1962 to work as assistant of Johannes Hürzeler. This period lasted until 1968 when he decided to undertake a PhD thesis under the supervision of Hürzeler who was then head of the Department of Osteology at the NMB and honorary lecturer at the University of Basel. He studied the famous Middle Miocene locality of Anwil located in the vicinity of Basel. Burkart then started to be interested in small animals because the rich locality mainly yielded tiny teeth, which he started to fall in love with. There is indeed an impalpable emotion in bringing tens of millimetre-sized species back to life that are extracted from tons of sediments through the hard and time-consuming collecting-sieving-picking process. He became Doctor in Zoology in 1971 and his seminal work was published in a regional Swiss journal a year later. His talents as scientific illustrator became widely known as he illustrated the hundreds of teeth himself, with incredible accuracy and remarkable aesthetics.

Right after this, he was invited to the United States, at the Carnegie Museum in Pittsburgh as a visiting museum specialist for 9 months. There he further developed his field experience in various regions and met several mammal specialists including the curator for vertebrates, Dr. Mary Dawson, who participates in this volume.

After coming back to Basel, he had the chance to take over the curator position at the NMB after Hürzeler's retirement until his own retirement in 2007. His Museum work includes research, for which he dedicated a large part of his time publishing more than 50 papers in various journals including the most prestigious ones. His contributions cover the fields of systematics, phylogeny, biochronology or palaeoecology mostly of the European continent and the Swiss Alpine foreland basin, but several articles and monographs also deal with faunas of the New World and Asia (see publication list below). But Museum work is also about conservation, in which he involved himself in keeping a high collection standard and in greatly enriching the collection inherited from his famous predecessors Rütimeyer, Stehlin, Schaub and Hürzeler among others. This enlargement is barely visible since tens of thousands of teeth of rodents and insectivores take only a couple of compactor columns in the vast collection, the tons of sediments he brought to Basel being now washed away, probably by the Rhine River! Working in collections also means that you meet colleagues from the whole world, and this is the part Burkart always preferred. Most of the contributing authors of this volume met him in the "Bunker" of the NMB (for those who do not know the expression, it is a typical Swiss bomb shelter to protect scientific goods) and developed projects with him while discussing biochronology or systematics. Besides research and

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collection work, Burkart created parts of the always-to-be-seen permanent exhibition of the NMB on recent and fossil mammals. And he did put a lot of himself into the proboscidean part, as an admirer of these giants, probably a reaction to working constantly on a binocular microscope. Burkart also helped along the successful exhibition on Chinese Dinosaurs presented in 1990, and became close friend with several researchers of the Institute of Vertebrate Palaeontology and Palaeonthropology in Beijing, three of whom he already knew having met them at the International Neogene Congress in 1979 in Athens.

One of us (Qiu Zhanxiang), then head of the Neogene Group of the IVPP, was deeply struck by the richness of the European Plio-Pleistocene large mammal fossils in Stehlin's collection when he visited the Naturhistorisches Museum Basel in the framework of the exhibition in 1990. Burkart, being himself a micromammalogist but always extremely kind to palaeontologists specializing in any other animal group, decided to help him to realize his wish to undertake a comparative study of Chinese and European materials. Supported by the Swiss National Fund, Qiu Zhanxiang had the opportunity to spend about 10 months in Basel between 1991 and 1995 to study the European Plio-Pleistocene large mammal fossils, including canids, machairodonts, tapirs, and pigs. These experiences turned out to be of fundamental importance when work started on the Longdan fauna, one of the earliest Quaternary faunas, around 2.2–2.5 Ma, found in Gansu, China. It all ended up with a monograph published in 2004.

From 1994 onwards, Burkart, accompanied by Clemens Mödden, Daniel Oppliger, and Friedrich Heller in separate trips, began to be involved in surveys of the Tertiary continental basins in North-West China. During the field seasons in 1994–2000 and together with their Chinese colleagues, they travelled along the upper reaches of the Huang (Yellow) River, especially in the Lanzhou and Linxia Basins, and the Gansu Hexi Corridor in Gansu. The work in the Lanzhou Basin, conducted by joint teams composed of Swiss, American, and Chinese colleagues, may be considered to be the highlight of the field activities there. More than a hundred fossil sites were found, including some producing micromammal remains screen-washed by Burkart. As a result, five successive reference local faunas were established for the Xianshuihe Formation: the Nanpoping (late Early Oligocene), Xiagou (Late Oligocene), Zhangjiaping (Early Miocene), Duitinggou (Early–Middle Miocene), and Quantougou (Middle Miocene). Despite the publication of preliminary results, it should be noted that the micromammal fossils found from the Lanzhou Basin are so numerous that a large number of them remain undescribed, waiting to be studied.

Also in 1994 Burkart, accompanied by one of us (Qiu Zhuding), visited some fossil localities in eastern and southwestern China, including Shanwang in Shandong province, and Lufeng, Yuanmou and Chenggong in Yunnan province. These Chinese Neogene and Pleistocene localities also attracted his attention because of their abundant or well-preserved mammal remains. Burkart became fascinated with some taxa showing close affinities with European Miocene counterparts, especially those from the hominoid localities of Yunnan, and some relatives of these taxa still living in the tropical or subtropical areas of the Oriental Province. He firmly believes that quite a few of the small mammals living in Yunnan, such as some genera of uropsilines, hylomyines and platacanthomyines, are affiliated with European Miocene forms, and Europe might have had similar ecological conditions during the Miocene as in some current areas of Yunnan.

To investigate these relict forms, he began to explore the forests in Wuliang Mt and Ailao Mt with Daniel Oppliger and his Chinese zoological and palaeontological colleagues in the spring of 2002. He joined Dr. Jiang Xuelong, a zoologist from the Kunming Institute of Zoology, Chinese Academy of Sciences, in the forests to collect specimens and investigate the ecotope of these small mammals during five field seasons until 2007. He paid special attention to some monotypic genera, such as *Neotetracus* and *Typhlomys*, which may be closely allied to the Miocene European *Lantanotherium* and *Neocometes*, respectively. A manuscript publishing his investigations is ust came out in Vertebrate PalAsiatica (see references). Since the dentition of these hedgehogs have been neither described nor figured in detail so far, their careful character analysis is instructive and will be very useful for palaeontologists and neontologists. Another article on *Neotetracus* dealing with its external appearance, biotope, behavior in captivity and DNA comparisons with *Hylomys*, and *Neohylomys* will be published elsewhere.

The work of Burkart during his career is not only impressive due to the amount of fossil specimens he studied from America, Asia and Europe (Burkart named about 60 taxa all of them being still valid today, see below), but also due to the broad array of disciplines he has been working on. Indeed, besides being a worldwide recognised specialist of rodent and insectivore systematics (two of the most diversified orders of mammals), Burkart also published reference papers about the stratigraphy and biochronology of Europe, especially about the Cenozoic Swiss fresh water molasse and also showed a constant interest in biogeography, palaeoecology and mammalian evolutionary history in his publications. For all this, the contribution of Burkart to the fields of palaeontology and geology is invaluable.

Burkart officially retired in 2007 but keeps on working in Basel and in China; his monograph on the insectivores of the Middle Miocene of Sansan, France, published in the

Schweizerische Paläontologische Abhandlungen—for which he served as chief editor from 1985 to 2010—together with his recent work on hedgehogs are the best evidence of his still active involvement in the field of Palaeontology.

With this special issue dedicated to him, we wish to bring together friends and colleagues who sometimes knew Burkart from the beginning of his career until today. The Swiss Journal of Palaeontology is the successor of the Schweizerische Paläontologische Abhandlungen and we are happy to celebrate Burkart here.

Besides gathering his publication list and the list of the taxa he described along the course of his carrier below, this issue proposes a wide range of disciplines and systematic studies on groups and time periods on which Burkart worked.

To start with, Lorenzo Rook provides an account on the long tradition that linked the Natural History Museum Basel and Tuscany. Indeed, since the second half of the 19th century, Basel palaeontologists were actively working on Tuscan fossils and Burkart followed up the tradition.

Mary Dawson opens the scientific contributions with a biogeographic study of a Palaeogene pantodont genus, which she notes herself was never something that entered the array of Burkart's expertise but when one knows his sense of humour, he will appreciate seeing such a paper dedicated to him!

A third contribution by Marguerite Hugueney, Pierre Mein, and one of us (Olivier Maridet) proposes a detailed description of Early and Middle Miocene Heterosoricinae, Soricinae and Crocidosoricinae from France, they update the systematics of these groups and show the importance of the very rich French localities of this time period. Then, our Chinese colleagues Ni Xijun and one of us (Qiu Zhuding) describe new remains and species of the peculiar tupaiine tree shrews and dedicate a new species to Burkart. This study improves the knowledge of the evolutionary history of tree shrews that until now has been blurred by a relatively poor fossil record. Hans de Bruijn together with Constantin Doukas, Lars van den Hoek Ostende, and Willem Jan Zachariasse provide new data on a Greek fauna that helps determine the chronological context of the deposits and thus the timing of the immigration of murine rodents on Crete. The next contribution by Meinhof Hellmund and Reinhard Ziegler investigates the first micromammal fauna of the Pliocene of Central Germany; detailed description of the material leads to the identification of 13 species of bats, rodents and other insectivores and permits interpretation of the palaeoenvironmental conditions that prevailed. Jérôme Prieto investigates a rodent genus first described by Burkart Engesser in 1979, *Eomyops*; he reviews the evolutionary history of this genus around the Middle-Late Miocene transition. Wang Banyue and one of us (Qiu Zhangxian) then describe new muroid rodents from China and dedicate a species to Burkart. Their contribution tends to confirm the peculiarities of genus *Tachyoryctoides* and the difficulties in assigning it to a known family. Lagomorphs are usually less abundant than rodents or insectivores but are constantly represented in Neogene fossil faunas; Chiara Angelone and Lorenzo Rook review the Late Neogene Italian lagomorph record; a good part of this material in the collection of the NMB was collected by Burkart and his colleagues during the 1970s, 80s, and 90s. Burkart's career also led him to Spain to investigate the Neogene faunal record and he met researchers there who became good friends; Salvador Moyà-Solà and Meike Köhler are among those, and, together with David Alba and Imma Roig, add a contribution on primates to this issue. Their work studies the calcaneal biomechanics in primates and helps provide interesting insights into the locomotor capabilities of Palaeogene European Euprimates.

The two last papers of this volume are dedicated to reconstructions of palaeoenvironments and investigations of palaeoecological parameters of two important Late Palaeogene and Early Neogene European localities framing the Oligocene–Miocene transition. The first one, Rickenbach, is the reference locality for the Palaeogene European biochronological reference level MP 29 and is situated in Switzerland. Burkart is one of the leaders of the understanding of the Swiss Palaeogene–Neogene biostratigraphy and biochronology and as such worked himself on the small mammals of Rickenbach. Bastien Mennecart, Laureline Scherler, Florent Hiard, Damien Becker and Jean-Pierre Berger pay a tribute to his long Swiss experience in describing the large mammals of Rickenbach and reconstructing its palaeoenvironment. Lastly two of us (Loïc Costeur and Olivier Maridet) together with Stéphane Peigné and Elmar Heizmann study the palaeoecology and palaeoenvironment of one of the richest mammalian localities of the European Aquitanian, Ulm-Westtangente in Germany.

Other colleagues and friends of Burkart would have liked to join us but professional impediments prevented them to do so. Most of them did, however, participate to this issue by reviewing the present papers. We wish to thank all the authors and reviewers for their contributions to this tribute to Burkart Engesser and hope this issue will stimulate research in the fields of systematics, biostratigraphy, biochronology, palaeobiogeography, palaeoecology, palaeoenvironmental reconstructions, which were and still are of great interest to the work of Burkart.

List of taxa erected by Burkart Engesser(genera are indicated in bold)

LIPOTYPHLA
ERINACEIDAE
Mioechinus tobiensis Engesser, 1980
Schizogalerix Engesser, 1980
Schizogalerix anatolica Engesser, 1980
Schizogalerux pasalarensis Engesser, 1980

TALPIDAE
Desmanella Engesser, 1972
Desmanella stehlini Engesser, 1972
Desmanella cingulata Engesser, 1980
Desmanella sickenbergi Engesser, 1980
Desmanella amasyae Engesser, 1980
Archaeodesmana bifida (Engesser, 1980)
Asthenoscapter ziegleri Engesser and Storch 2008
Desmanodon Engesser, 1980
Desmanodon minor Engesser, 1980
Desmanodon major Engesser, 1980

DIMYLIDAE
Dimyloides hecki Engesser and Stoch, 2008
Plesiodimylus johanni Kälin and Engesser, 2001
Plesiodimylus crassidens Engesser, 1980
Pseudocordylodon rigassii Engesser, 1976a

PLESIOSORICIDAE
Plesiosorex schaffneri Engesser, 1972
Plesiosorex martinii Engesser and Storch 2008

SORICIDAE
Dinosorex Engesser, 1972
Dinosorex pachygnathus Engesser, 1972
Dinosorex zapfei Engesser 1975a
Dinosorex huerzeleri Engesser 1975a
Dinosorex pusillus Engesser and Storch 2008
Quercysorex Engesser 1975a

RODENTIA
GLIRIDAE
Anthracoglis Engesser, 1983
Anthracoglis marinoi Engesser, 1983
Paraglirulus Engesser, 1972
Paraglirulus werenfelsi Engesser, 1972
Tyrrhenoglis Engesser 1976a
Tyrrhenoglis majori Engesser 1976a

EOMYIDAE
Eomyodon Engesser, 1987
Eomyodon volkeri Engesser, 1987
Eomyodon weidmanni Engesser 1990b
Eomyodon mayoi Engesser 1990b
Eomyodon staudachensis Engesser 1990b
Pentabuneomys Engesser 1990b
Eomyops Engesser, 1979
Eomyops oppligeri Engesser 1990b
Eomys huerzeleri Engesser, 1982
Eomys molassicus Engesser, 1987
Eomys ebnatensis Engesser, 1987
Pseudotheridomys bernensis Engesser 1990b
Pseudotheridomys werneri Engesser and Storch 2008
Pseudotheridomys rolfoi Engesser 1990b
Rhodanomys hugueneyae Engesser, 1987
Ligerimys oberlii Engesser 1990b
Keramidomys mohleri Engesser, 1972
Keramidomys anwilensis Engesser, 1972

SCIURIDAE
Petauristodon Engesser, 1979

DIPODIDAE
Plesiosminthus winistoerferi Engesser, 1987

CRICETIDAE
Eucricetodon hesperius Engesser, 1985
Heterocricetodon hausi Engesser, 1987
Neocricetodon nestori (Engesser, 1989)
Megacricetodon robustus Kälin and Engesser, 2001
Collimys longidens Kälin and Engesser, 2001
Schizocricetodon Kälin and Engesser, 2001
Schizocricetodon huerzeleri Kälin and Engesser, 2001

MURIDAE
Anthracomys lorenzi Engesser, 1989
Apodemus etruscus Engesser, 1989
Huerzelerimys oreopitheci (Engesser, 1989)

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