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A tribute to Marjorie Greenwood, *née* George (1924–2006), a neglected mammalian scientist

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It happens sometimes that great women in science receive little credit from their community or even none at all. The intention of the following notes is to remember the life of such a great lady, whom we both had the privilege to meet in person, but who passed away unknown to many other colleagues ten years ago (Fig. 1). As virtually nothing was known of her life before (Beolens et al. 2009), these notes will fill a gap.

Marjorie Greenwood was born on the 10th of August 1924 in Johannesburg, South Africa. She was the third and youngest child of John and Vittoria George. Her father was born in England and went to South Africa to fight in the Boer War. At the end of the war, he decided that he liked the country, so returned to seek a better life and settled in South Africa. Here he worked as a lithographer in a local printers firm. Marjorie's mother Vittoria Regina George (*née* Novelli) was the daughter of emigrants from Northern Italy to South Africa. Vittoria's parents sadly died in an influenza epidemic, leaving her at the age of eight to be reared by nuns in a Catholic orphanage.

Marjorie was extremely fond of her brother Arthur and elder sister, Eileen. Arthur taught her how to make and use catapults, an activity of which she was later rather ashamed, and both shared a passion for horses, which they kept and rode on the smallholding where the family lived. Eileen was a great support to Marjorie, amongst other things, teaching her how to sew her own clothes. Eileen became a hairdresser and emigrated to England in the 1940s, while her brother Arthur followed in his father's footsteps and became a printer.

Marjorie was educated at Johannesburg Girls High School, sited in the grounds of Barnato Park, and hence the students always referred to the school as "Barnato Park". The school was formerly a mansion, commissioned by Barney Barnato (1852–1897), a diamond mining millionaire.

Marjorie was the first in her family to go to university. She studied Zoology at the University of Witwatersrand in Johannesburg where, after graduating, she had a job as a 'demonstrator' in the Zoology Department. Here Marjorie worked alongside the internationally renowned Australian anthropologist, Raymond Dart (1893–1988) and the South African palaeontologist, James Kitching (1922–2003). Kitching was appointed by the Bernard Price Institute for Palaeontological Research of the University of Witwatersrand to collect fossils and Marjorie immensely enjoyed joining him in many of his fossil-hunting trips to the Karoo and elsewhere in southern Africa.

Fig. 1. Marjorie Greenwood (undated photo provided by Nan Greenwood).

Marjorie also attended the Johannesburg Teachers College (known by its former name of Normal College) to train as a teacher. She taught for a short while after completing the course. It was while working in the Zoology

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Fig. 2. Marjorie and Humphry Greenwood in front of their home in Uganda, with one of their daughters and her friend in the background (photo provided by Jennifer Greenwood).

Department of the University of Witwatersrand that she met her future husband, Peter Humphry Greenwood (1927–1995) (known by his second name of Humphry), who later would become a well-known specialist on African fishes (Howes 1995). Humphry had just returned from the Second World War, where he served in the Royal Navy in the Far East and, as for all war veterans on their return to civilian life, he was granted unconditional access to a university education. As with Marjorie's father, Humphry's parents were British, his father being a mining engineer who worked in the gold mines in Johannesburg.

On 10th January 1950 Marjorie married Peter Humphry Greenwood in Port Shepstone, just south of Durban and on the south-east coast of South Africa. As Humphry had obtained a Colonial Office Fisheries Research Studentship, they travelled to England, where Humphry spent the first part of his studentship at the British Museum of Natural History (BMNH) (now the Natural History Museum, London) studying ichthyology. Their first child, Pamela, was born in November of that year and a couple of months later, in January 1951, the small family travelled to Uganda; quite a challenge with such a young baby. Here Humphry had a posting with the East Africa Fisheries Research Organization (EAFRO) in Jinja, on the northern shores of Lake Victoria. Marjorie loved living in Uganda and always spoke very fondly of her time there. She learned Swahili in order to be able to converse with local people; another language to add to her English and Afrikaans. Her second daughter, Jennifer, was born in June 1953 and her third daughter, Nan, in March 1955 (Fig. 2).

During this time in Uganda, in addition to raising her family, Marjorie studied material collected by Professor Raymond Dart amongst Australopithecine deposits in the Makapan Valley, Transvaal. In the resulting paper (Greenwood 1955) she described a new giant species of fossil porcupine, *Hystrix major,* and a new genus and species of porcupine, *Xenohystrix crassidens*. The first name was preoccupied and subsequently replaced by *Hystrix makapanensis* (Greenwood 1958), while the other porcupine *Xenohystrix crassidens* has remained widely accepted (Winkler, Denys & Avery 2010).

In July 1957 the family left Uganda, travelling by train to South Africa to join one of the Union Castle liners to England. Here the family remained for the remainder of Humphry's long career as an ichthyologist on the staff at the Natural History Museum in London (Howes 1995). In February 1961 their fourth daughter, Philippa, was born.

Not long after the birth of her last child, Marjorie started work with Professor Percy Butler (1912-2015) of Roy-

Fig. 3. *Iris innominata*, water colour by Marjorie Greenwood 1993 (courtesy of Jennifer Greenwood).

al Holloway College, London University (Twigg 2015), studying the fossil shrews and bats of Olduvai Gorge in Tanzania (Butler & Greenwood 1965a, b), as well as Pleistocene hedgehogs and elephant-shrews (Butler & Greenwood 1973, 1976). This working partnership with Professor Butler was to endure for many more years but with only a few intermittent publications. She was based in the Mammal Section of the BMNH, using the Recent collection of shrews and bats for comparison with the fossil specimens. Since the bulk of the fossil shrews from Olduvai consisted of mandibular fragments, the work involved patient, painstaking care in handling, many hours spent peering through the eyepieces of a microscope, and meticulous note-taking and drawing in order to work out the available characters to distinguish one species from another. Her ink line drawings, which illustrated several of her and her co-authors' papers, were of high quality. Such work exemplified her general attitude to life. In 1966, long before the publication of their second paper on shrews (Butler & Greenwood 1979) she evidently sufficiently impressed the French taxonomist and shrew-expert Henri Heim de Balsac (1899–1979) for him to name a shrew, *Crocidura greenwoodi*, in her honour (Heim de Balsac 1966). This extant species is endemic to the Horn of Africa (Hutterer 2008). Their work on the Pleistocene shrews of Olduvai not only revealed a number of species new to science (Table 1), but also had a strong impact on subsequent research on extant African shrews. Ten years later, they used the subtle characters elaborated by Marjorie in her studies of the shrew mandibles to analyse relations among extant species of *Crocidura* (Butler et al. 1989).

Marjorie had her own desk in the Visitors Room of the Mammal Section of the Zoology Department, and it was here and in the Fossil Mammal Section of Palaeontology that Marjorie met many of the visiting small mammal researchers. Although basically a shy and retiring person, she was nevertheless very kind, helpful and encouraging to students and young researchers. Recognising the aptitude and dedication of one vacation student, she encouraged him to consider a medical career. Several years later, after successfully graduating and completing a Masters' degree in Zoology, he suddenly announced a change of course, embarked on an escalated medical degree and qualified as a doctor.

Humphry's work entailed visits to many parts of the world and Marjorie greatly enjoyed accompanying him to Sweden (for which she attempted to learn Swedish), Holland and Spain, and was much impressed by China and its people. She also attended palaeontological conferences and returned to South Africa a number of times to meet up with friends and family. A dedicated letter-writer, she sent long, detailed letters back to the family during her trips abroad and remained in regular contact with old school and university friends in South Africa and the many long-term friends that she had met during her travels.

A steadfast homemaker, Marjorie's family came first and foremost in her mind. While her shrew and bat work was a source of great enjoyment to her and she might have wished to have been a professional zoologist and palaeontologist, she nevertheless devoted herself to providing her four children with the best possible home-life and support. She was extremely open-minded, with a huge enthusiasm for learning and a life-long thirst for knowledge and was interested in practically everything. She was always keen to share this enthusiasm and knowledge, encouraging her children to study hard and to enjoy learning, especially about the natural world and the environment. A strict vegetarian and an inveterate saver and mender, she was ahead of the times when it came to her concern for the environment, and the need for waste control and recycling.

Marjorie was a keen gardener, who loved birds and flowers. She was an extremely accomplished water-colourist, with a special interest in botanical illustration, her favourite flower being irises, of which she painted many varieties (Fig. 3). She was a perfectionist with limitless

Table 1. Taxa of fossil mammals named by M. Greenwood and colleagues.

Lipotyphla
Erinaceus (Atelerix) ***broomi*** Butler & Greenwood, 1973: 8 (replacement name for *Atelerix major* Broom, 1937, preoccupied by *Erinaceus major* Pomel, 1858)
Crocidura ***balsaci*** Butler & Greenwood, 1979: 366 (Olduvai Gorge)
Suncus varilla ***meesteri*** Butler & Greenwood, 1979: 357 (Olduvai Gorge)
Suncus ***leakeyi*** Butler & Greenwood, 1979: 363 (Olduvai Gorge)
Sylvisorex ***olduvaiensis*** Butler & Greenwood, 1979: 351 (Olduvai Gorge)
Chiroptera
Cardioderma ***leakeyi*** Gunnell, Butler, Greenwood & Simmons, 2015: 7 (Olduvai Gorge)
Scotoecus ***olduvensis*** Gunnell, Butler, Greenwood & Simmons, 2015: 10 (Olduvai Gorge)
Myzopoda ***africana*** Gunnell, Butler, Greenwood & Simmons, 2015: 3 (Olduvai Gorge)
Nycticeinops ***serengetiensis*** Gunnell, Butler, Greenwood & Simmons, 2015: 17 (Olduvai Gorge)
Hystricoidea
Hystrix ***major*** Greenwood, 1955: 79 (Makapan Valley, limeworks quarry)
Hystrix ***makapanensis*** Greenwood, 1958: 365 (replacement name for *H. major* Greenwood, not Gervais, 1859).
Xenohystrix Greenwood, 1955: 81
Xenohystrix ***crassidens*** Greenwood, 1955: 81 (Makapan Valley, limeworks quarry)

patience and determination, coupled with a huge capacity for observation and an extraordinary attention to detail. Often her intermittent visits to the museum over several months would be dedicated to a single specimen.

Lively and active to the end, Marjorie was writing up her latest research during the last few months of her life. The final paper to which she and Percy Butler contributed was published posthumously (Gunnell et al. 2015). She died in Guildford Hospital on the 4th of March 2006, after a short bout of pneumonia and was cremated at Putney Vale Crematorium.

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