the Strandloper

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Front Page

Thiara cancellata Röding, 1798

In this Issue

Editorial

It has been 9 years since my first opportunity as Editor of *The Strandloper*. My predecessor, Kobie du Preez, did an amazing job enhancing the quality of the publication, inspiring me to try new techniques and to enhance it even further with every opportunity.

Unfortunately the cost of producing a small run for the Society has made it too expensive to print *The Strandloper* in hard copy and a descision was taken to follow the international trend of producing an electronic publication, that will hopefully reach more people.

By using this format we are no longer bound by printing restraints and the high costs of producing the publication. This should see the Society's newsletter be issued more regularly. Even so, this will be a learning curve, and I am hoping that whoever follows as editor, will also strive to improve on what we have done so far.

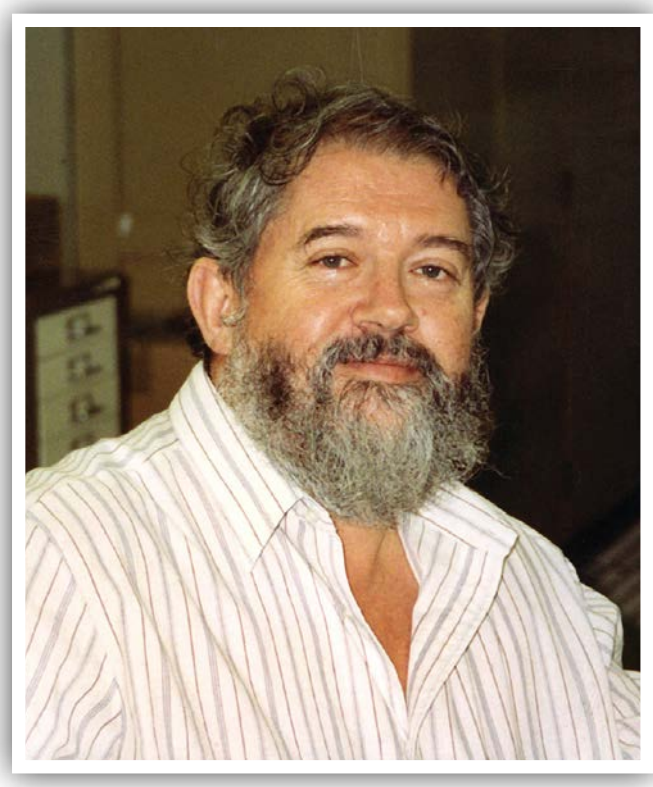
Aricles are the lifeblood of a publication like *The Strandloper*. I am greatly indebted to all the authors that contributed and would like to encourage all members to try their hands at writing small articles. This is their newsletter and the most fun I have had was to enhance and publish articles by our general readers.

"The more that you read, the more things you will know. The more that you learn, the more places you'll go."

— Dr. Seuss, I Can Read With My Eyes Shut!

OBITUARY

Richard ('Dick') Neil KILBURN
(7.01.1942 — 26.07.2013)



Dick Kilburn at the Natural History Museum, London, in 1993.

One of South Africa's foremost malacologists, Richard Kilburn passed away somewhat suddenly on 26 July 2013 at the age of 71. Dick, as he was known to his many friends and correspondents, was born on 7 January 1942 in Port Elizabeth. He attended Grey High School[1] and as a schoolboy developed an interest in sea shells that was to become a passion to which he devoted the rest of his life. Matriculating in 1959, he then took up a clerical job with Barclays Bank in Port Elizabeth, purely to earn some funds so that he could go to university. During this time he corresponded with Keppel Barnard at the South African Museum, the then authority on South African marine molluscs, and he also regularly visited Dolf van Bruggen who was at the time curator of the newly established Port Elizabeth Oceanarium. Thus encouraged to pursue his malacological interests, Dick attended the University of Natal, Pietermaritzburg, majoring in zoology and botany, and graduating with honours in 1967. After a brief spell as a biology teacher in Howick school, near Pietermaritzburg (where he also taught tennis and swimming!), Dick was offered a malacological position at the East London Museum – one can only imagine how pleased he must have been to get this. However, not 18 months later, he was back in Pietermaritzburg as malacologist at the Natal Museum. Taking up this post on 1 September 1969, Dick was to spend the rest of his scientific career at this museum.

It was an insightful appointment. Under Dick's stewardship the Natal Museum's Mollusca collection was to become by far the largest such collection in Africa and a globally important malacological resource. Early in his career, Dick realised that South African malacology was hampered by a number of factors, critical amongst which were the inadequacy of the existing mollusc collections and the unavailability of most of the key literature. It was Dick's goal to address these shortcomings as far as possible and to establish a molluscan research centre at the Natal Museum – in today's parlance 'a Centre

of Excellence for Malacology'.

Fortuitously, in the late 1970s a programme for the rationalisation of natural history collections in South Africa, through mutually beneficial exchange, was initiated. Dick jumped at this, seeing it as an opportunity to acquire the large and historically important mollusc collections of the Albany and Transvaal museums, in exchange for orphaned collections in the Natal Museum. These newly acquired collections proved to contain many unrecognised or supposedly lost types. Other collections were also acquired including those of Rodney Wood (Umtali [Mutare] Museum), by further exchange, and Clarice Connolly, Kurt Grosch and Eva Roscoe, by purchase. When funds were available, Dick also engaged in the strategic purchase of specimens from shell dealers for display purposes and to make the collection more representative of global mollusc diversity.

The availability of literature, particularly old literature, is an essential but often limiting factor in taxonomic research. Certainly this was true at the Natal Museum. However, some important old and rare works were donated with exchanged collections by the Transvaal and Mutare museums, and in 1981 Dick was able to persuade the Natal Museum authorities to apply for treasury funds to purchase the malacological library of Helene Boswell, a well known South African shell-collector. Further literature gaps were filled by the purchase of microfiche editions. Hardly used in today's world of PDFs and web-based libraries such as the Biodiversity Heritage Library, microfiches were a valuable resource in pre-internet days.

To further address the first shortcoming, Dick commenced an active programme of field research including shore collecting and dredging, focussing on neglected areas, notably the Transkei region of what is now E. Cape. In March 1981, Dick managed to secure a few day's sea-time on board the RV *Meiring Naudé*, for some exploratory dredging work off southern Natal. Greatly excited by the material collected, Dick applied to the CSIR for further, more regular sea-time and later that year was awarded an annual slot of 10 days aboard the *Meiring Naudé* for a six year dredging programme on the continental shelf and slope off the Transkei coast. Thus began the Natal Museum Dredging Programme and Dick's annual battle with the sea – he loved dredging, but was not a good sailor. Though he tried every possible remedy, conventional and homeopathic, nothing really helped. After the initial six years, further ship-time was granted and the project moved to Zululand (1987–1990) and then to W. Cape (1991–1993), mostly on board the Sea Fisheries Research Vessel *Sardinops*, as the *Meiring Naudé* had been sold off to private enterprise in 1990. Details of the programme were provided by Kilburn & Herbert (1994). The scientific value of the material thus obtained is inestimable. Hundreds of new species were collected, as well as the first living specimens of many taxa and a great many new records for the South African fauna. By this means, therefore, Dick made an enormous contribution to enhancing the extent to which the Natal Museum's mollusc collection reflected the true diversity of the South African marine mollusc fauna.

Nonetheless, for Dick, ship-based collecting was a means to an end, what he really enjoyed was shore-based fieldwork. Complementing the dredging done off the Transkei, Dick visited numerous localities along the Transkei coast in the 1970s and 1980s, to collect intertidal material. In addition, he also got his first taste of tropical molluscs in 1970 when he visited Inhaca island in southern Mozambique. A second taste, visiting Eva Roscoe in northern Mozambique in 1974, had him hooked. He loved collecting the exotic molluscs of tropical climes, over the years visiting Mozambique a further two times as well as Mauritius, Reunion, Egypt, Malaysia and Indonesia. It was this that also led to him participating in the Tropical Marine Mollusc Programme for the first time in 1997, paying further visits to India, Thailand and Vietnam. His unpublished 'memoirs' of these trips, detailing his experiences along the way, the quality or otherwise of the food and the beer, as well as his observations on the people he encountered (not always complimentary!) make entertaining, though probably unpublishable, reading.

In contrast, Dick did not like collecting land snails. A brief foray into this realm when we started working on our *Field Guide to the land snails and slugs of eastern South Africa* (Herbert & Kilburn 2004) firmly convinced him that land snail collecting was far too much like hard work! The catch per unit effort simply did not justify the sweat and toil. Dick was not a fitness fan – he once memorably quipped 'I get

enough exercise fighting the current when I pull the plug out of the bath'! He much preferred fossicking leisurely in tropical habitats, snorkeling in lagoons and scrutinizing strandline grit whilst lying on his stomach in the sun.

Besides enhancing the museum's Mollusca collection, Dick also motivated for additional dedicated staff. When he arrived, the department was essentially a one-man- show, and he had to make do with only occasional short term technical assistance. In 1978, however, he managed to persuade the museum authorities that dedicated full time technical support was needed and Mrs Ruth Fregona was appointed as his assistant. Then again in 1983 Dick was successful in motivating for a second malacology research position, as a result of which I joined the staff in 1984. This augmentation of the staff was an important step towards Dick's goal of creating a centre of malacological expertise at the Natal Museum and was facilitated by support from the museum's then director, Brian Stuckenberg.

Early in his career, Dick's publications essentially represented isolated species descriptions and collations of his taxonomic research findings relating to an assortment of taxa, as and when new material and information was acquired, much coming from shell-collectors. The collections and literature available to him at the time did not allow much more. These collations he published as his 'Taxonomic Notes' (Nos 1–5, from 1970–1975) and 'Taxonomic Studies' (Nos 1–2, 1977, 1980). As the available resources expanded, however, and as his knowledge and confidence grew, his approach soon matured. He began to undertake studies of a more revisionary nature, documenting the entire southern African fauna of selected groups of molluscs, as a result producing more comprehensive and scientifically valuable papers. He started with the Naticidae in 1976, but soon realised work of this nature necessitated that he examine material in overseas museums. Thus in 1978 he spent four months in Europe visiting twelve different museums to examine type material and consult literature not available in South Africa, making valuable personal contacts at the same time. Subsequently he revised the South African fauna of many other groups, usually including Mozambican species as well. His revision of the genus *Ancilla*, published in 1981, was world-wide in scope. For this he was awarded his PhD degree in 1982 by his *alma mater*, the University of Natal. Other highlights of his revisionary work include, *inter alia*, his revision of the Epitoniidae of southern Africa and Mozambique (1985) and of course his series of papers on the regional fauna of Turridae (*s.l.*), beginning in 1983.

Once bitten by 'turrids', this group dominated much of Dick's research endeavour for the remainder of his career, including his retirement. Latterly, his grand plan was to publish an illustrated and annotated catalogue of the shallow-water Turridae (*s.l.*) of the Indo-West Pacific, based primarily on type material. By then his research interests had expanded well beyond the southern African fauna. Sadly, this ambitious goal was never realised, perhaps it was simply too big a project. Nonetheless, after his retirement, Dick continued to publish papers on Indo-West Pacific turrids, often in collaboration with overseas colleagues who turned to him for advice.

Although these revisionary studies represent the core of Dick's malacological legacy, a landmark publication in his career was his book (illustrated by Elizabeth Rippey) *Seashells of Southern Africa*, published in 1982. Aside from scientific papers, this was the first serious book to be published on South Africa's marine molluscs since Krauss's *Die südafrikanischen Mollusken* (Krauss 1848). Despite its coverage not being fully comprehensive, it contained a wealth of unpublished information on the country's marine molluscs, as well as a distillation of Dick's wide knowledge of molluscan biology. A fascinating book that proved to be an extraordinarily useful reference work for southern African marine biologists as well as malacologists far and wide, and one that has been extensively cited.

As a person, Dick was a jovial and rather gentle soul. He had a terrific sense of humour and could always be relied upon for a witty quip or pun. He was, to say the least, an interesting colleague and in many ways a larger-than-life character. Sartorial elegance was not a topic on his agenda – he often arrived at work in rather elderly shorts and shirts, home-made by his wife Jimpy. Conversely, food was a very important item and he loved cooking. Travelling always represented and opportunity for him to explore new taste sensations – sometimes with adverse gastrointestinal side effects. Dick also had a great

fondness for *Oscar*, a stuffed bat that was awarded annually, with much pomp and ceremony, to the Natal Museum employee who had committed the biggest blunder in the preceding twelve months. Of course, he received the award himself several times and always took great pleasure in documenting the errors and transgressions of others when, one year later, it was his turn to pass *Oscar* on to the next recipient. Such frivolity and independence of spirit seems to be missing today.

However, Dick disliked confrontation and being overtly challenged. He did not at all like the increasingly competitive research milieu. He was devoted to his work and wanted to be left alone to pursue that which he thought was interesting and needed to be done. Some might consider this a luxury, but Dick's legacy attests to the benefit of not being overly prescriptive when dealing with passion-driven individuals such as he.

During his career Dick published 102 scientific papers, 11 book chapters and two books (Herbert & Davis 2013). He also wrote numerous popular articles for *The Strandloper*, the bulletin of the Conchological Society of Southern Africa, of which he was patron for many years. In total he described 361 new species/subspecies, as well as 27 new genera/subgenera. More may well be published in co-authored papers completed posthumously by his collaborators (we are aware of a further eight new species currently in press). He also had one new genus and 38 new species named in his honour. A complete bibliography together with an inventory of his new molluscan taxa and a listing of taxa named after him is published in the following paper. Dick certainly made his mark in the malacological world and particularly in southern Africa. When he arrived at the Natal Museum in 1969, the institution's mollusc collection comprised only about 9,000 catalogued lots – it now contains nearly 150,000 catalogued lots. This growth has been achieved through the strategic acquisition of important collections and an active departmental fieldwork programme. It is testament to Dick's early vision and ultimately his success in building up a regional centre of malacological reference and expertise with an international profile.

At heart Dick was a dedicated taxonomist and he relished the detective aspects – digging around in the old literature to check identifications and synonymies, comparing types and cited illustrations, following up loose ends and clarifying nomenclatural uncertainties. His tally of 363 species descriptions is, by today's standards, exceptional. Ironically, although such work remains very much needed, endeavour of this kind is no longer valued in today's museums. Scientists of Dick's mould may be a thing of the past. For South African museums, anomalies in channels of governance have meant that fundamental biodiversity research has limited relevance to the funding bodies. Financial strictures resulting from this mismatch led to Dick being forced to retire at 60, something he did not want to do. He was hurt and angered by this turn of events, perhaps understandably so, and sadly, this prematurely curtailed his enthusiasm and productivity, and also regrettably, his involvement with the department that he had done so much to build up.

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D. G. Herbert

Thalassoid gastropods

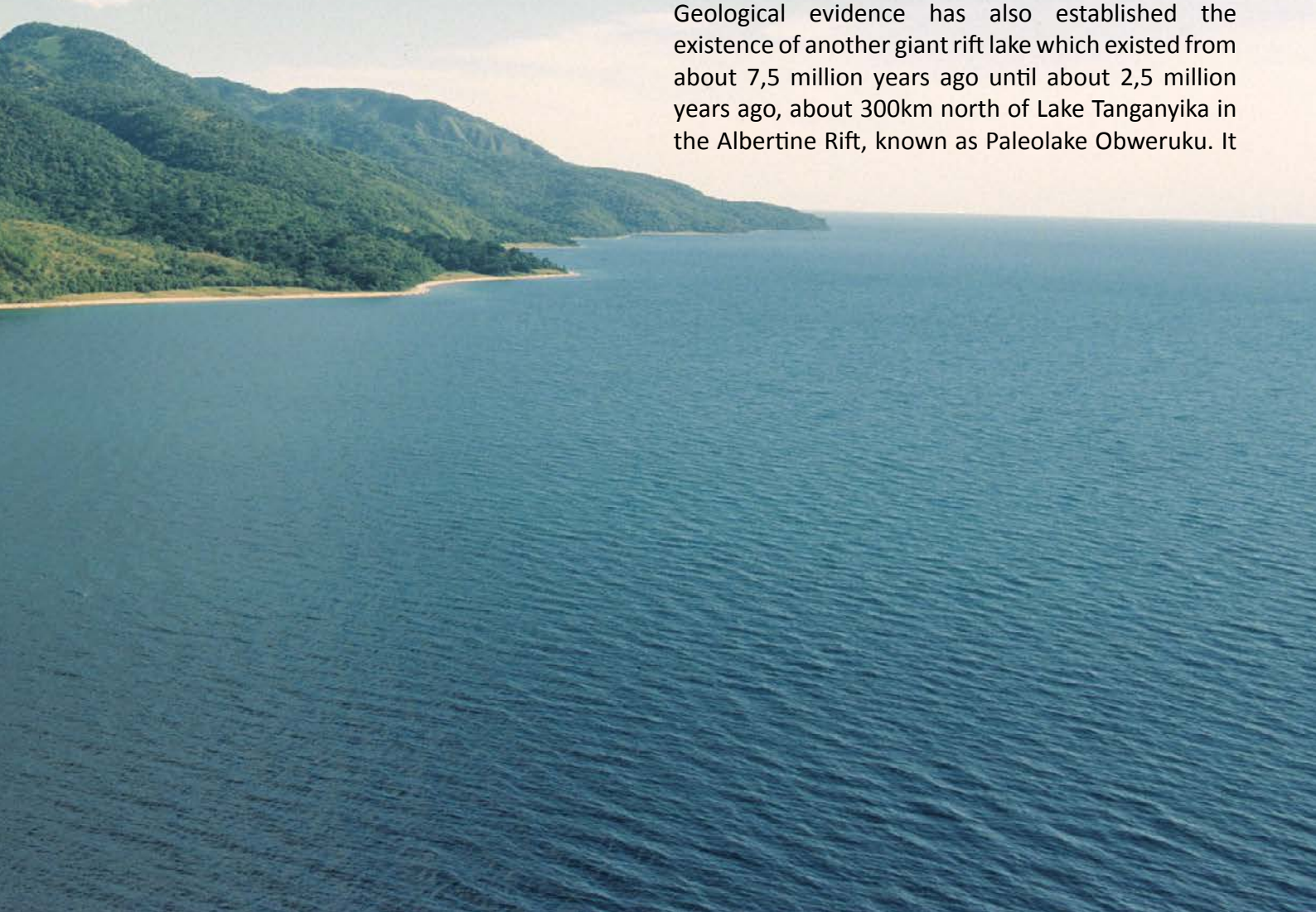
Appearances can be deceiving

by Ken Brown

I wrote a series of articles on the major lakes of the African Rift Valley for *Strandloper* in the late '80's. I was recently photographing my collection and was again fascinated by the thalassoid or "marine-like" appearance of the freshwater gastropods of Lake Tangakyika. The term "thalassoid" was coined by Bourguinat in the late 1800's to describe the marine-like appearance of these shells, and examining the thalassoids of the lake, there are similarities between them and marine *Trochus*, *Natica*, *Nassa* and *Murex* shells. I am still puzzled by a number of issues that I do not think have ever been properly addressed by scientific investigations, such as why present-day thalassoid gastropods seem restricted to, and endemic to Lake Tanganyika, and why they evolved to have marine-like appearance in the first place.

Lake Tanganyika has a surface area of 32,900 square km and a maximum depth of 1,470m, being the world's second deepest lake after Lake Baikal. It is over 650km long and has an average width of 50km. About 25 million years ago two rift valleys tore East-Africa apart as part of a process of plate tectonics that is still ongoing today. The valleys that rifted the continent were over a thousand metres lower than their surroundings, and with time collected great volumes of water, largely as a result of the disruption of previous east-west drainage systems. The western branch of the rifts is known as the Albertine Rift and includes many of Africa's great lakes, including Lake Tanganyika. Latest techniques in age determination of the lake utilise reflection seismic-radiocarbon dating to estimate lake age. Age estimates from this method have indicated that the basins of central Lake Tanganyika began to form between 9-12 million year ago[1]. Evidence indicates that Lake Tanganyika may have consisted of three separate basins that merged into a single lake with a rise in water levels over time. This is borne out by estimates that the northern and southern basins are younger than the central basin. This dating method determines the age for Lake Tanganyika as considerably younger than most prior estimates. The existence of these three isolated basins is postulated as a reason for thalassoid speciation.

Geological evidence has also established the existence of another giant rift lake which existed from about 7,5 million years ago until about 2,5 million years ago, about 300km north of Lake Tanganyika in the Albertine Rift, known as Paleolake Obweruku. It



is estimated as having been 27 000 square km and therefore similar in size to Lake Tanganyika, and its depth was also similar. The significance of Paleolake Obweruku is that it is the only other African rift lake that has also had similar levels of thalassoid fauna, as evidenced by its fossil record. Its fossil thiarid records are particularly rich, and 35 species and 7 genera have been conservatively estimated[2].

One of the earliest hypotheses for the existence of thalassoid gastropods was given by Moore, who theorised that the lake had at one time been connected to the ocean, using the "accumulating mass of the strongest kind of zoological evidence" to reach his conclusion[3]. This evidence included not just the thalassoid gastropods, the bright and coral-reef-like nature of its fishes, its adapted freshwater snakes, but also the existence of a freshwater jellyfish in the lake. This theory has been dismissed on the basis of modern geological evidence, with the most acceptable present theory being that the endemic fauna of the lake has evolved in response to the unique opportunities and niches that the Lake has provided over its long period of existence.

So back to my questions as to why present-day thalassoid gastropods seem restricted to and endemic to Lake Tanganyika, and why these gastropods developed a marine-like appearance. A number of interesting and not necessarily convincing theories have been postulated.

To my way of thinking one of the less acceptable, but recent theories, is that the lake's thalassoid (but not other?) shells developed strong shell sculpture and thick shells as a defence mechanism to protect against attack by crabs, fish and other shell breaking predators[4]. I believe such an approach is at best partial as it ignores the fact that such predators are present in most freshwater environments, and does not explain why only a limited number of thassaloid shells in only one extant lake on the planet evolved thicker marine-like shells to protect themselves against predation.

A more plausible and honest assessment was given by Hubendick in 1952, that the similarities with marine-like shell features of endemic gastropods of Lake Tanganyika, are a result of a chance convergent evolution which could "hardly avoid parallelism".

If this convergent evolution is helped along, as researchers assert, by high concentrations of calcium carbonate in the water and exposure to specific physical conditions such as deep and stable waters which have changed little over an extended period, allowing for more rapid speciation rates, then these have all been cited as contributory elements in the process. However I fail to see the relevance of lake depth as a factor conducive to speciation, as waters below 150m probably have too high a hydrogen sulphide content for molluscs to survive in any event, and water at greater depths is anaerobic, and would preclude the survival of molluscs.

There is little doubt that Lake Tanganyika is significantly older than any other of great African lakes such as Lake Malawi, Lake Victoria or Lake Albert (which all evidence only a nominal divergence from fluvial specimens), and which have only been suitable habitats for freshwater molluscs for the last 95 000 – 130 000 years. The far greater age of Lake Tanganyika, coupled with its variety of biotopes, are ascribed by most scientists as being the dominant reasons for diversity in its endemic molluscs. The lake's location in the tropics is also seen as a reason for greater endemism than a lake such as Baikal (the

world's deepest) which is situated in a far colder climate, as warmer waters would allow a greater number of generations to reproduce and adapt than those in colder waters.

There is evidence that a number of thalassoid snails, such as the genus Potamoides, are derived from ancestral species before the creation of the lake. Recent studies show that "a significant proportion of the genetic diversity of the endemic gastropods presently found in Lake Tanganyika predates the formation of the lake basin"[5]. The stability of the lake's waters is seen by scientists as the most important factor in maintaining and diversifying many pre-existent ancient gastropods (this may of course change quite rapidly in the future as pollution levels in most of Africa's great lakes continue to rise rapidly and unchecked).

Freshwater fauna has evolved far more slowly than its marine or terrestrial counterparts, and Hubendick asserts that "a poorer fauna and consequently also a slower evolution are true characteristics of freshwater fauna"[6]. He contends than many lakes evolve in isolation but it is the actual conditions of the isolation which promote speciation. It is thought it is the long isolation of Lake Tanganyika and its special niches that has promoted speciation. Darwin identified the main factors inducing speciation as being isolation and local adaptation to different environments across a species' range, and Lake Tanganyika clearly meets these criteria, but why speciation was induced only in limited endemic thalassoid populations is far less clear, unless one somewhat unconvincing argues that special niches in the lake have been key in the evolutionary process of speciation. When one looks at the present-day geographic spread of thalassoids in Lake Tanganyika as provided by Brown (see below), the majority of species are found lake-wide, albeit in defined areas such as rocky shores or at depth in muddy substrata. This would negate the principle of select geographic niches in the Lake being the key catalyst in speciation.

The presently accepted argument therefore remains that increased thalassoid speciation is able to occur only where lakes are of considerable age, have suitable water stability, temperature and chemical composition and depth, with isolated and conducive habitat niches. However, this does not explain why Lake Tanganyika surpasses any other similar lake for its endemism and speciation. Simply ascribing suitable conditions as the springboard for an evolutionary adaptation appears too facile an explanation, and also does not explain why only a limited number of species would adopt thalassoid features in the same

conditions and environment, and in a single lake on the planet only.

The most likely reasoning for thalassoid development, I believe, is that these molluscs were in fact descended from a number of thalassoid ancestral species which existed even before the formation of Lake Tanganyika, and whose thalassoid development continued after the lake's creation. The question of course then begs to be asked where these ancestral species themselves derived from, and why they were restricted to the area of the lake's future impoundment, which no researchers have as yet commented upon.

Following on from this, if one applies the nebulous determination of thalassoid appearance, then I believe there are many more thalassoid molluscs than just those limited to Lake Tanganyika. Purely on this unscientific and arbitrary external classification of thalassoid appearance, a number of purely fluviatile specimens immediately spring to mind with strongly thalassoid features, and which I can see no reason for not being regarded as thalassoid. For example, there is a definite thalassoid appearance to *Thiara cornuta*: the specimen I have was found in the Ivoloina River near Toamisina in Madagascar, which has a very heavy and thalassoid appearance, as well as *Thiara cancellata* and *Thiara macrospira*, both found in rivers north of Cebu in the Philippines.

It may just be that there are a good number of extant fluviatile thalassoid molluscs around the globe which with proper and balanced research will show the entire debate about thalassoid molluscs being a Lake Tanganyika phenomenon, is just too far removed from reality to be a credible classification, and that thalassoid features are indeed just a form of chance evolutionary parallelism in no way limited to a single African lake. If one considers the generally accepted evolutionary principle that all terrestrial and fluviatile life originally derived from the oceans, then perhaps the more pertinent and interesting discussion should be why so many of these species exhibit no thalassoid appearance, and have evolved away from their thalassoid ancestry....

Even within existing endemic classifications for Lake Tanganyika, there also appears to me to be a somewhat arbitrary determination as to why only certain shells are identified as being thalassoid. Brown lists a table of gastropods of Lake Tanganyika, and shows *Lavigeria nassa* and *Lavigeria grandis* as being endemic but non-thalassoid[7], when both shells exhibit a strongly marine-like appearance. There seems to be little justification for excluding *Lavigeria* as thalassoid except for the fact that genus appears more closely related to the Potadomoides than the Thiaridae, although as indicated above, Potamoides appears to have derived from the same ancestral gene pool which initiated thalassoid development in Paleolake Obweruku.

The reality is that whatever the scientific reasonings of the past, and hopefully more credible still to come, thalassoid shells as well as a number of others that certainly look thalassoid but are somehow excluded, are an integral part of Lake Tanganyika's endemic fauna. According to Cunnington over 70 % of Lake Tanganyika's animals are endemic[8], and Brown estimates that there are over 25 species of endemic thalassoid species in the lake, out of a total of 51 endemic molluscs[7]. Brown lists the endemic thalassoid gastropods of the lake as all belonging to the Syrnolopsinae and Paramelaniinae subfamilies of the Thiaridae, which now more properly fall under the Paludomidae:

Anceya giraudi Bourguignat 1885
Found at Mlilo on the western shores of the lake, and to depths of 100m. Up to 12 mm.

Anceya terebriformis (Smith 1890)
No real data on where collected in the Lake. Up to 12 mm. This species is known only from two empty shells. Recent survey work has failed to find this species.

Martelia tanganyikensis Dautzenberg 1908
Found at Mpala on the western shore. Up to 2,3 mm.

Syrnolopsis lacustris Smith 1880
No real data on where collected in the Lake. Up to 11,5 mm.

Syrnolopsis gracilis Pilsbry and Bequaert 1927
No real data on where collected in the Lake but dredged at 116m. Up to 4,3 mm.

Thiara cornuta (Lea, 1850)

Thiara cancellata Röding, 1798

Lavigeria nassa
Woodward, 1859

Lavigeria grandis
E. A. Smith, 1881

Paramelania damoni
E. A. Smith, 1881

Anceya giraudi
Bourguignat 1885

Anceya terebriformis
(Smith 1890)

Martelia tanganyikensis
Dautzenberg 1908

Syrnolopsis minuta Bourguinat 1885
Found at Pambete, Ufipa and Kogoma. Up to 5,8 mm.

Mysorelloides mutisulcata (Bourguignat 1898)
Found along all shores to depths of 60m. Up to 10,5 mm.

Hirthia littorina Ancey 1898
Found along southeast shore in Ufipa district. Up to 12 mm.

Hirthia globosa Ancey 1898
Found along southeast shore in Ufipa district. Up to 10 mm.

Spekia zonata (Woodward 1859)
Found along rocky shoreline grazing algae. Up to 14 mm.

Tanganyicia rufofilosa (Smith 1880)
Found along rocky shoreline. Up to 17 mm.

Stanleya neritinoides (Smith 1880)
Found along shoreline. Up to 8,9 mm.

Reymondia horei (Smith 1880)
Found along shoreline to depths of 10m. Up to 16 mm.

Brodouxia giraudi Bouguignat 1885
Found along rocky shallows of the lake. Up to 9,5 mm.

Bridouxia ponsonbyi (Smith 1889)
Found along shores of the lake . Up to 7 mm.

Stormsia minima (Smith 1908)
Found along rocky shallows in sheltered bays of the lake. . Up to 3,3 mm.

Paramelenia damoni (Smith 1881)
Found throughout the lake to depths of 65m, nodulose form lives on rocky shores. Up to 37 mm.

Paramelania iridescens (Moore 1898)
Found in muddy substrata to depths of 250m. Up to 40 mm.

Limnotrochus thompsoni Smith 1880
Found throughout the lake to depths of 70m. Up to 19 mm.

Tiphobia horei Smith 1880
Found in muddy substrata near river mouths to depths of 125m. Up to 36 mm.

Bathanalia howesi Moore 1898
Found along southern shore near Mleroes to depths of 250m. Up to 25 mm.

Bathanalia straeleni Leloup 1953
Found throughout the lake to depths of 80m. Up to 12 mm.

Chytra kirki (Smith 1880)
Found in muddy substrata to depths of 180m. Up to 15 mm.

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Syrnolopsis lacustris
Smith 1880

Syrnolopsis gracilis
Pilsbry and Bequaert 1927

Syrnolopsis minuta
Bourguinat 1885

Mysorelloides mutisulcata
(Bourguignat 1898)

Hirthia littorina
Ancey 1898

Hirthia globosa
Ancey 1898

Spekia zonata
(Woodward 1859)

Tanganyicia rufofilosa
(Smith 1880)

Stanleya neritinoides
(Smith 1880)

Reymondia horei
(Smith 1880)

Brodouxia giraudi
Bouguignat 1885

Bridouxia ponsonbyi
(Smith 1889)

Stormsia minima
(Smith 1908)

Paramelenia damoni
(Smith 1881)

Paramelania iridescens
(Moore 1898)

Limnotrochus thompsoni
Smith 1880

Tiphobia horei
Smith 1880

Bathanalia howesi
Moore 1898

Chytra kirki
(Smith 1880)

The Blind Snail

by Barbara A. Fouche

Family: **Janthinidae**
Janthina, Violet coloured in Latin
Common Names:"Purple seasnail", "violet snail", "foam shell" and "storm snail".

Janthinidae are certainly one of the most interesting of the varied ocean fauna. They are a small family of about eight species, of which six occur in South African waters.

Janthina janthina (Linnaeus, 1758)
Janthina excigua Lamarck, 1816
Janthina umbilicata d'Orbigny, 1840
Janthina pallida W. Thompson, 1840
Janthina globosa Swainson, 1822
syn. *J. prolongata* Blainville, 1822
Recluzia jehennei Petit de la Saussaye, 1853

They are strictly pelagic, and being quite unable to swim, drift passively with the ocean currents, hanging upside-down from a raft of mucous-coated bubbles. Vast shoals may occur, sometimes composed of several species; one such shoal is said to have measured nearly 200 nautical miles in extent.

If detached from their floats they will sink to the bottom and die, as they have no power to rise to the surface. Moribund individuals let go their foothold on the raft, and die on the ocean floor. The raft is often found afloat without its mollusc. Storms wrench many apart, fish nip off portions of the float, but the foot may add more at the end next to the body. Juveniles may temporarily free themselves to cling to the small siphonophore jellyfish (*Vellela*). Even the veliger larvae are reported to hatch with a rudimentary float, which consists of a long mucous strand attached to the foot, and ending in a small swelling containing air bubbles.

The adult raft consists of bubbles which are individually formed by the snail protruding the front end of its foot through the surface film and cupping it, thereby enclosing an air bubble, which is then coated with mucous from the ventral pedal gland; this bubble is then pushed against the float and allowed to harden; the termination of the float is attached to the posterior end of the sole, and in

most species passes through a notch in the outer lip of the shell.

In an experiment carried out in the United States of America many years ago, active individuals from which the floats were cut loose, reproduced them in the aquarium when they were suspended by hooks in a position just below the surface of the water. A small blue crab has been found living symbiotically on the float, asking nothing of its host but lodging and free transportation.

The shell of the *Janthina* sometimes bears hydroids and blue gooseneck barnacles. The barnacles are occasionally eaten by the *Janthina*.

Members of the family are blind, evidently finding their prey by contact. They feed largely on the little pelagic jellyfish (*Vellela*) – By-the-Wind-Sailor; They secrete quantities of purple dye from the hypobranchial gland (gland on roof of mantle cavity), which may serve as an anaesthetic that prevents the dying prey from shedding its tentacles. They also devour other coelenterates, small crustacea, and, occasionally, one another. Protandric hermaphrodites, they change from male to female with age. Fertilization is internal, groups of sperm being transported to the ovary of the female, where fertilization takes place, by large, feathery carrier-sperms. Except in the case of the ovoviviparous *Janthina janthina*, pearl-shaped capsules are attached to the underside of the float, by means of fairly long stalks; the "head" of the capsule bears small surface spines. A single float may carry from 250 to 400 egg-capsules of various ages. The embryos, which according to species may number from 75 to 7500 per capsule, are nourished by an albuminous fluid. Similarly, in *Janthina janthina*, the developing young, which are brooded within the ovary itself, are nourished by a mucous secretion; the young are eventually expelled violently from the left side of the mantle cavity as late veliger larvae.

The characteristic dark base and pale spire are cryptic adaptations to living upside down on the surface, in that the former will render it inconspicuous against the depth when viewed from above, while the pale spire will camouflage it from below by blending into the sun-brightened surface.

The chief enemies of *Janthina* are seabirds that skim and scan the surface for food, and turtles.

Janthina, bluebottles (*Physalia*), the blue nudibranch (*Glaucus*), blue gooseneck barnacles, and the tiny blue crab are often washed ashore together after periods of heavy onshore winds. Since this "blue community" is always associated with bluebottles, and is hence dangerous to swimmers, the Australians have taken to announcing their arrival at beaches by warning bathers that "THE BLUES ARE IN".

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