



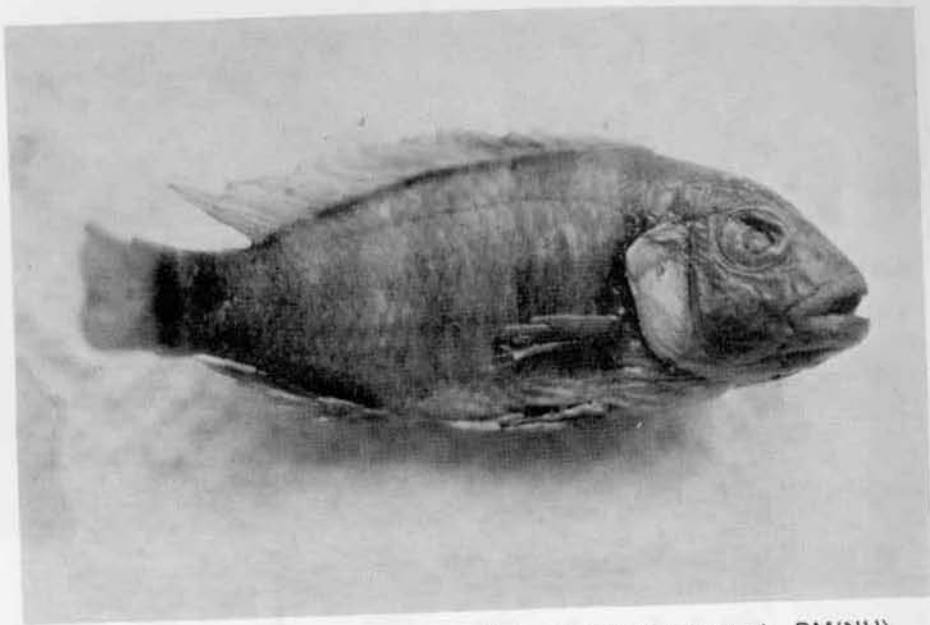
Pseudotropheus lanisticola Burgess. Holotype showing characteristic color pattern.

STUDIES ON THE FAMILY CICHLIDAE:

6. A New Shell-dwelling Cichlid from Lake Malawi and Its Inquiline Catfish

by Warren E. Burgess
Photos by the author

During my stay with Peter and Henny Davies at Cape Maclear on Lake Malawi, I expressed a desire to collect what appeared to be *Pseudotropheus livingstonii*, a species reported to live in empty snail shells. While scuba diving I had seen an area just off the Davies residence where *Lanistes* shells with fishes inside were to be found. The water, surprisingly, was not particularly deep, being less than 20 feet in most cases. As I approached the shells the fish were outside but quite close. When I came very close the fish eventually went into the shells, all but hidden from view. I picked up some shells but found that most of the fish abandoned them and swam away rather than remain in the shelter of the shell.



The holotype of *Pseudotropheus livingstonii* (Boulenger). BM(NH) #63.11.12.22.

Peter Davies arranged for me to trawl for these fishes one afternoon off Cape Maclear with James Pindani. The net (see accompanying photos) was dragged behind the boat for 15 to 20 minutes at a time at depths between 20 and 50 feet. Of the eight to ten trawl hauls made, some produced nothing, one or two brought up a few species of *Haplochromis* (including one large *H. atritaeniatus*), and still others caught a number of *Lanistes* shells which—in at least two of the trawls—housed quite a few of these small fish. The fish remained in the shell (even when shaken vigorously) until they were forced out by breaking the shell, leaving no hiding place. Bringing the fish up from these depths also caused them some distress, and it took them several minutes to recover. In 2½ hours, 56 such *Pseudotropheus* and one *P. elegans* were captured.

Having seen the type specimens of *Pseudotropheus livingstonii* at the British Museum (Natural History) in London and comparing it with the new specimens, I discovered that they were two different species. (Both of these species are in the aquarium trade and both are called *P. livingstonii* although recognized as "different".) The small cichlid inhabiting the *Lanistes* shell was not *P. livingstonii* but a new species.

Pseudotropheus lanisticola, new species

Holotype.—USNM 216266, male, 54.1 mm SL, collected by Warren E. Burgess, James Pindani, *et. al.* Trawled off Cape Maclear, Lake Malawi, Malawi in 20-50 feet of water on February 12, 1976.

Paratypes.—USNM 216267, 3 spec. (2 males, 1 female), 45.3-51.5 mm SL, same data as holotype. Four additional paratypes have been divided between the British Museum (Natural History) and the American Museum of Natural History, all with the same data as the holotype.

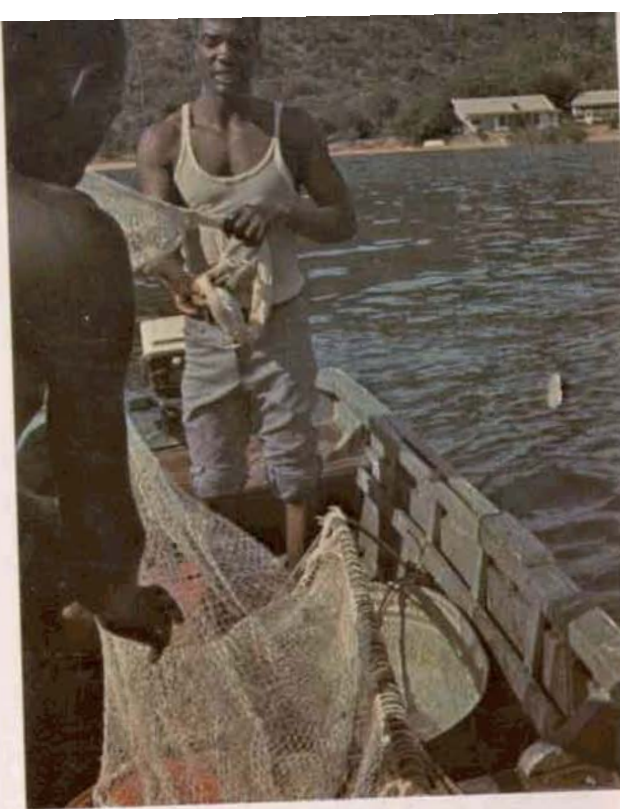
Type Locality.—Off Cape Maclear, Lake Malawi, Malawi.

Diagnosis.—*Pseudotropheus lanisticola* differs from all other species of *Pseudotropheus* by color pattern. It most closely resembles *P. livingstonii*, which is the only other known species which has the characteristic caudal fin pattern of orange-yellow lines, broken and interconnected in places, which run from the base of the caudal fin to its posterior edge. The broad bright yellow distal band of the anal fin (which stops short of the posterior end of the fin) is lacking in *P. livingstonii* and occurs in combination with the distinctive caudal pattern in no other described *Pseudotropheus*. The teeth in the outer row of each jaw of *P. lanisticola* are typically (subequal) bicuspid, whereas those of *P. livingstonii* are unequally (mitt-shaped) bicuspid.

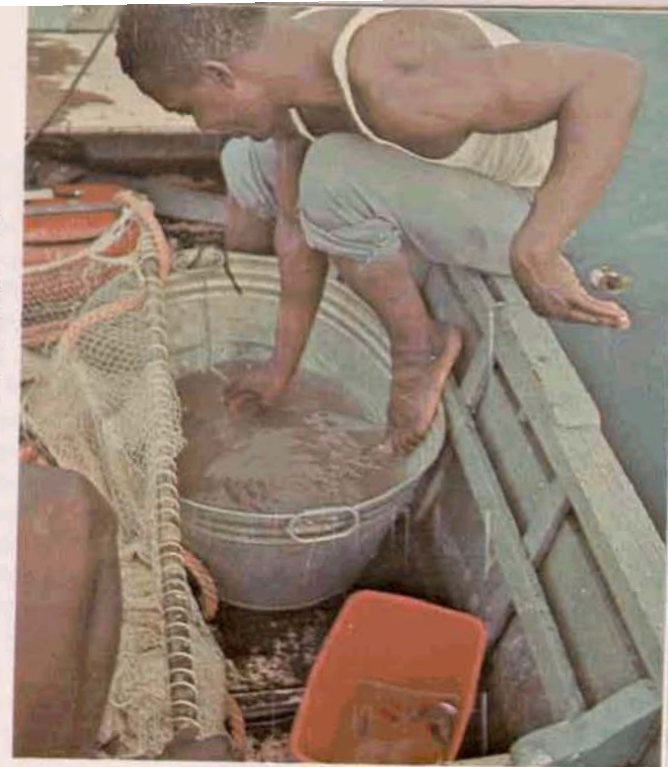
Description.—Proportional measurements (data for holotype in italic type): Depth 2.6, 2.4-2.7 (37.0-41.6%) in SL; head 3.0, 2.9-3.1 (32.3-34.5%) in SL; eye 2.9, 2.9-3.3 (30.3-34.5%) in head length; snout length 3.4, 3.0-3.4 (29.4-33.3%) in head length; interorbital width 3.7, 3.7-4.2 (23.8-27.0%) in head length; upper jaw length 3.2, 2.8-3.3 (30.3-35.7%) in head length; lower jaw length 3.8, 3.0-3.8 (26.3-33.3%) in head length; length of preorbital bone 6.7, 5.5-7.9 (12.7-18.2%) in head length; depth of caudal peduncle 6.7, 6.5-7.0 (14.3-15.4%) in SL; predorsal length 2.9, 2.8-3.0 (33.3-35.7%) in SL; pectoral fin length 3.1, 3.1-3.6 (27.8-32.3%) in SL; pelvic fin spine length 6.4, 5.6-6.8 (14.7-17.9%) in SL; and pelvic fin length 2.5, 2.2-3.5 (28.6-45.5%) in SL.

Fins: Dorsal fin XVII-XVIII, 8-9; anal fin III (one with IV), 7-8; pectoral fin 14 (all elements counted except short splinter at upper edge); caudal fin truncate.

James Pindani prepares the net for the next trawl. Cape Maclear is in the background.



With the content of the trawl in the basin, James checks the shells for fishes. The inhabited shells are cracked open on the metal trawl frame and the fishes are placed in the plastic pail nearby. The belly-up fish is suffering from a temporary case of swim-bladder discomfort but will recover.



Another fish collected in the same way as the *P. lanisticola* was this *P. elegans* juvenile.



The trawl is dropped over the side of the boat and enough line is let out to ensure that the trawl will be dragged on the bottom.



Scales: Lateral line scales 22-25 + 6-10 (plus 1-3 pored scales that may extend onto the caudal fin); scales in a longitudinal line from the upper edge of the opercle to the base of the caudal fin 29-30; 7-9 + 1 + 9-11 scales in a transverse series from base of first dorsal fin spine to base of first anal fin spine; caudal fin scaled only at base, dorsal and anal fins not scaled.

Gill rakers: 12-14 (usually 12) total on first gill arch.

Teeth: Teeth of jaws in curved rows; outer row distinctly bicuspid, the cusps subequal, that closer to the symphysis larger; in upper outer row, teeth becoming smaller posteriorly and ending in about 6 (5-7) unicuspid teeth which increase in size again until the last; the two (occasionally one) inner rows of teeth in each jaw tricuspid; about 27-33 teeth in outer row of upper jaw (unicuspid teeth included) and about 14-18 bicuspid teeth in the outer row of the lower jaw. Teeth of lower pharyngeals not crowded, posterior row enlarged and composed of about 34 teeth.

Internal anatomy: The specimens were examined to determine sex and the lower pharyngeals from three of the specimens were removed for examination. The peritoneum is black.

Coloration: *Pseudotropheus lanisticola* is in life grayish tan to flesh colored, lighter below, with about five or six dusky bars extending from the dorsal surface to about mid-body or slightly beyond. Three of these originate under the dorsal fin, the fourth just anterior to the dorsal fin, the fifth on the caudal peduncle just posterior to the dorsal fin, and the sixth at the base of the caudal fin. Spinous dorsal fin yellowish with bright yellow tips, the soft portion and the caudal fin with yellow stripes (sometimes irregular, interrupted, or anastomosing) having white stripes between them on a hyaline background. Anal fin base and posterior portion hyaline, the rest bright yellow. Yellow egg-spots present in posterior portion of fin. Pelvic fins blackish with inner rays pale; pectorals hyaline. Some electric blue markings on head and a black opercular spot present. In preservative yellow of anal fin fades but remaining pattern of the fish is otherwise discernible.

No sexual dimorphism in color pattern was observed.

Comparisons: *Pseudotropheus lanisticola* has a distinct color pattern with the outer portion of the anal fin bright yellow and the caudal and soft dorsal striped. It is also one of the smallest species of *Pseudotropheus*, the largest specimens not

exceeding 60mm in standard length. All specimens were easily sexed including a 36.4mm SL female which contained developing eggs. The other small species of *Pseudotropheus*, *P. minutus*, is so different it need not be discussed here further. The only species of *Pseudotropheus* which approaches *P. lanisticola* in color pattern is *P. livingstonii* (Boulenger) which is a larger fish (large adults exceed 80mm SL) with a shallower body (2.7-3.0 in SL versus 2.4-2.7 for *P. lanisticola*) and caudal peduncle (7.4-8.0 versus 6.5-7.0) and differently shaped teeth (subequally bicuspid in *P. lanisticola* but mitt-shaped—with one very large cusp and one very small cusp—in *P. livingstonii*). There are also more teeth in the jaws (upper 37-48, lower 19-22 in *livingstonii*, upper 27-33, lower 14-18 in *lanisticola*). *P. livingstonii* is a yellowish fish (paler below) with dark grayish stripes and a similar pattern in the caudal fin (especially when young), but it lacks the yellow of the anal fin of *P. lanisticola*. In alcohol *P. livingstonii* is whitish with grayish brown bars and dusky fins.

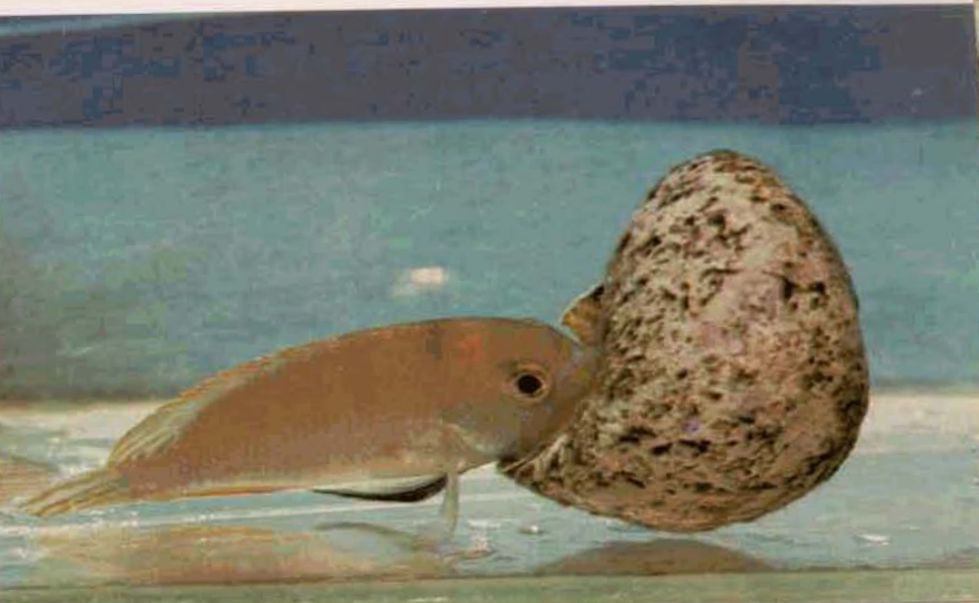
Distribution: *Pseudotropheus lanisticola* is endemic to Lake Malawi. The type locality is Cape Maclear in the southern end of the lake, but according to Jackson (in Jackson and Ribbink, 1975) specimens associated with *Lanistes* shells were taken by trawl in deeper waters of ten fathoms or so "on sandy bottoms of the lake." No specific locality was given.

Etymology: This species was named in reference to its habit of living in the empty shells of the mollusc *Lanistes* (*lanisti* from the genus *Lanistes*; *colo*, Latin, to inhabit).

Discussion: This small cichlid is reported to inhabit empty shells of the genus *Lanistes* (Jackson in Jackson and Ribbink, 1975). I was able to confirm this while scuba diving off Cape Maclear. It appeared that only one fish inhabited a shell although Jackson stated that the shell was "just big enough for a pair of *Pseudotropheus livingstonii* mbuna to curl up within it, lying tightly close together." He also mentions that an occasional brooding female would be found in a shell.

Peter Davies had informed me that a small catfish shared the shell with *P. lanisticola*. As the fish were collected special care was taken to examine the empty shells for catfishes, and several were found. Apparently they share the shell with the cichlids, hiding well up in the upper part of the shell when the lower part is occupied by *P. lanisticola*. The relationship between these two fishes has not been studied and it is not known

Tropical Fish Hobbyist



An individual *P. lanisticola* about to enter an empty shell in the photo tank.



I rolled the shell over and the fish all but disappeared into the shell.



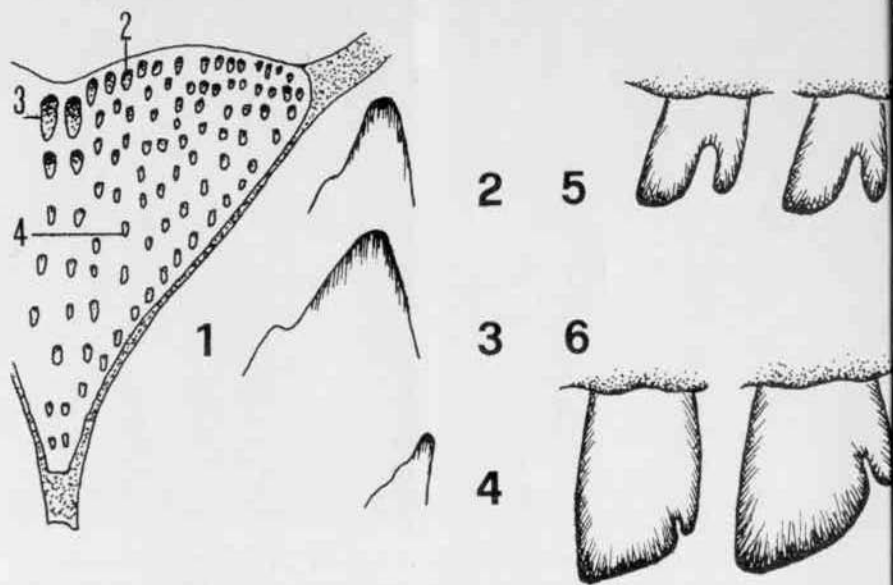
I had to break the shell open to remove the fish. While photographing the *P. lanisticola* I noticed the shell had a second inhabitant, this small catfish.

Leptoglanis sp., possibly *L. rotundiceps* (the spotted catlet), about 19 mm standard length.



It went in part way and rested; perhaps having the head safely hidden was enough for its security.





Dentition of *Pseudotropheus lanisticola* (1-5) and *P. livingstonii* (6):

1. Lower pharyngeals (right portion omitted);
2. Typical tooth from enlarged posterior row of lower pharyngeals;
3. One of paired, enlarged teeth in center of posterior row of lower pharyngeals;
4. Typical tooth from midlateral area of lower pharyngeals;
5. Typical bicuspid teeth from outer row of upper jaw to left of symphysis;
6. Typical teeth from similar area of *Pseudotropheus livingstonii*.

whether they are just making do with the small amount of shelter available in the otherwise bare sandy areas or whether they have evolved into a closer symbiotic relationship which benefits one or both of them.

The catfish has been identified as *Leptoglanis* sp., very close to or identical with *Leptoglanis rotundiceps* (Hilgendorf). Further study will be needed before an exact determination can be made.

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- Jackson, P.B.N. and A. Ribbink. 1975. *Mbuna*. T.F.H. Publications, Inc.; Neptune City, N.J.
- Trewavas, E. 1935. "A synopsis of the fishes of Lake Nyassa," *Ann. Mag. Nat. Hist.* (ser. 10), 16: 65-118.