Notes on Streptostele (Raffraya) horei E. A. Smith, 1890

by
L. A. W. C. VENMANS
with an appendix on its anatomy by
HUGH WATSON

The genus *Streptostele* H. Dohrn, 1866, inhabits continental Africa, Prince's Island, Fernando Po, Mayotte Island and the Seychelles, and is subdivided [1]) into the subgenera *Streptostele* s.s., *Varicostele* Pilsbry, 1919, and *Stereostele* Pilsbry, 1919. *Varicostele* is only known from the Belgian Congo; *Stereostele* only from the Seychelles. These two subgenera contain no species with shells having a vertical rib-striation.

The subgenus *Streptostele* s.s. is subdivided into four sections: *Graptostele* Pilsbry, 1919, the only section in which the shells have the embryonic whorls spirally engraved and the rest of the whorls

[1]) I follow in this paper the classification of THIELE (1931, p. 732) in preference to the older one of PILSBRY (1919, p. 180—185), who subdivided the genus into the subgenera *Streptostele* s.s., *Raffraya, Tomostele, Stereostele* and *Graptostele,* and who considered *Varicostele* to be a separate genus.

smooth; *Tomostele* Ancey, 1885; *Streptostele* s.s., and *Raffraya* Bourguignat, 1883 (= *Ischnostele* C. Boettger, 1915).

The representatives of these last named three sections, which are only known from Central Africa, except those of *Tomostele,* which are found only on some of the islands in the Gulf of Guinea, all possess shells of which the embryonic whorls are smooth, and the following whorls show a distinct sculpture of vertical ribs. The species belonging to the section *Tomostele* have a *Subulina*-like columella distinctly truncated at the base, whereas the columella of those belonging to the sections *Streptostele* s.s. and *Raffraya* is not at all truncate, but rounded and curving into the basal margin.

The species belonging to the section *Streptostele* s.s. have the aperture without teeth, those of the section *Raffraya* have the outer lip obtusely toothed just above the middle, the basal and columellar margins of the peristome broadly reflected, and a small angular nodule on the parietal lip.

Of the section *Raffraya* Bourguignat only four species are yet known: *Streptostele (Raffraya) herma* Connolly from Rhodesia, *Streptostele (Raffraya) leroii* (C. Boettger) from the Sudan, *Streptostele (Raffraya) milne-edwardsi* (Bourguignat) — the type of the section — from Abyssinia, and *Streptostele (Raffraya) horei* E. A. Smith from the Belgian Congo.

The last named species is characterized by the well-reflected peristome with a thickening or blunt tooth above the middle of the outer lip, defining a distinct somewhat retracted sinulus, and by the small transverse tubercular angular tooth; and to this species belong 43 specimens which I found in a box of humus collected in January 1953 by the Reverend Father CHR. VAN DER HOF at Yanonge, Belgian Congo.

The species was first described — but not figured — by E. A. SMITH in 1890 from a single specimen presented by Mr. E. COODE HORE to the British Museum and collected in Tanganyika, without further indication as to the exact locality.

The original description is as follows:

„Testa parva, elongata, anguste rimata, cerea; anfractus 7½, apicales laeves, caeteri convexiusculi; sutura profunda leviter obliqua sejuncti, costellis confertis, erectis, superne ad suturam denticulatis instructi, inter costellis nitidi; apertura mediocris, longitudinis totius ¼ subaequans; peristoma incrassatum, album, anguste reflexum, margine externo prope suturam intus sinuato, columellari dilatato, rimam semiobtegente; columella indistincte contorta; paries anfractus ultimi prope extremitatem labri tuberculis duobus parvis munitus.

„Longit. 6½ mm, diam. 2, apertura 1½ longa et lata.

„The species is well distinguished by the fine longitudinal riblets, which at the upper extremities give a finely denticulate appearance to the deep

suture. The single specimen under examination exhibits two denticles at the upper part of the aperture upon the wall of the body-whorl — one near the upper end of the upper lip, the other near it but further within the mouth. The labrum is conspicuously sinuated above near the suture and has a tubercular thickening within below the sinus."

Nine years later PUTZEYS (1899) described and depicted (Figs. 5 and 6) a shell found at Nyangwe (Manyema), Belgian Congo, on the soil in coffee plantations, as *Ennea albida,* which was afterwards considered to be identical with SMITH's species. PUTZEYS' description runs as follows:

„Testa cylindrico-conica, seu elongato-ovata, solidiuscula, albida, subdiaphana, arcuatim costulata, apice obtuso; spira cylindrica, versus apicem attenuata; anfractibus 8 convexiusculis, 2 primis sublaevibus, caeteris plus minusve confertim subverticaliter plicato-costulatis; ultimo basi attenuato, ad aperturam leviter ascendente; sutura impressa, extremitate costularum crenulata. Apertura pyriformis, verticalis, antice attenuata, saepissime edentula, passim in pariete obtuse uniplicato; peristoma continuo, subexpanso, anguste reflexo, margine labiali supra sinuato, medio incrassato et flexuoso; columella edentula, obtuse compressa; margine columellari dilatato et reflexo, cum margine labiali callo productissimo juncto.

„Longitud. testae 8 mill.; diam. testae 2 3/10 mill.; longitud. aperturae 2 mill."

In 1901 DUPUIS and PUTZEYS (1901) again mention *Ennea albida* in their paper on some new and already known species of mollusks from the Belgian Congo, and say that the shell originally appears to be yellowish to reddish orange-coloured, but, when the animal has died, after some time grows white. The authors do not mention the exact locality, but say, that the species was found abundantly on the soil in coffee plantations during the wet season in March 1889, and was collected also in quantity on a day of drought in the interstices of the bark of a mango tree.

In 1904 ANCEY synonymized *Ennea albida* Putzeys with *Streptostele (Raffraya) horei* E. A. Smith, of which he compared the type specimen in the British Museum in October 1901. In a manuscript note on a copy of their paper of 1901 DUPUIS and PUTZEYS appear to have reached the same conclusion — teste PILSBRY (1919) — so that the name *Ennea albida* should not be used, assuming that this view is right.

Nevertheless GERMAIN (1907) and DAUTZENBERG and GERMAIN (1916) still employed the name *Ennea albida* Putzeys. As they did not mention in their literature the paper of ANCEY (1904), they evidently did not know of it, and therefore did not give their opinion as to the identity of PUTZEYS' species with *Streptostele horei* Smith. GERMAIN (1907) described three straw-coloured shells of the species found at Brazzaville by Mr. ROUBAUD. DAUTZENBERG and GERMAIN (1916) mentioned the species from Nyangwe, where Dr. BEQUAERT

found 7 specimens, and from Kakombo, where he collected 3 specimens.

In 1919 PILSBRY mentioned 2 specimens found by HERBERT LANG and JAMES P. CHAPIN at Stanleyville, and agreed with ANCEY's opinion as to the identity of *Ennea albida* and *Streptostele horei.*

My own observations of the specimens from Yanonge, which happen to be more numerous than those that have been found in other localities, show that in size these shells agree better with the typical *Streptostele horei* from near Lake Tanganyika than with the larger form from Nyangwe, Stanleyville and elsewhere, named by PUTZEYS *Ennea albida.*

The only difference yet known between the two forms seems to be their measurements. The specimen of *Streptostele horei* described by SMITH (1890) has a height of 6.5 mm, a diameter of 2 mm, whereas the height as well as the width of the aperture is 1.5 mm. According to PUTZEYS (1899) the measurements of *Ennea albida* are: height: 8 mm; diameter: 2.3 mm; height of aperture: 2 mm; whorls: 8. Of *Streptostele horei* the height of the shell is mentioned by the authors before PILSBRY (1919) as 6 mm, whereas his own two specimens from Stanleyville have a height of 8 mm, and 8½ whorls. GERMAIN (1907) gave of *Ennea albida:* height 7—8 mm; major diameter: 2 mm; height of aperture: 1.75—2 mm; diameter of aperture: 1.50 mm; whorls: 8.

So far as I can trace from literature the species is till now only known from the neighbourhood of Lake Tanganyika (the type locality: SMITH, 1890); from Nyangwe, Manyema (the type locality of *Ennea albida* Putzeys), West of Lake Tanganyika, on the soil of coffee plantations and in crevices of the bark of mangos (PUTZEYS, 1899, and DAUTZENBERG and GERMAIN, 1916); from Kakombo, between Kikondja and Ankoro, Katanga, South of Nyangwe; from near Brazzaville in the western part of the Belgian Congo, underneath the bark of trees, on the sandbanks of the island of M'Bamou, in the middle of Stanley-Pool (GERMAIN, 1907); from Stanleyville in the northern part (PILSBRY, 1919, Pl. XXI, figs. 6 and 6a); and — according to Prof. BEQUAERT in a letter to me — from Elisabethville (Fig. 1).

As GERMAIN (1907) suggested, in all probability the species is living throughout the whole basin of the River Congo.

The new locality, Yanonge (Saint Léopold), is situated also in that river-basin, at 0°39′ N., 24°40′ E., about 65 km. west of Stanleyville, on the left bank of the River Congo, in the country of the Lokele, whose settlements line the banks of the lower Lomani River and those of the Congo River between the mouth of the Lomani River and Stanley Falls (MAES et BOONE, 1935).

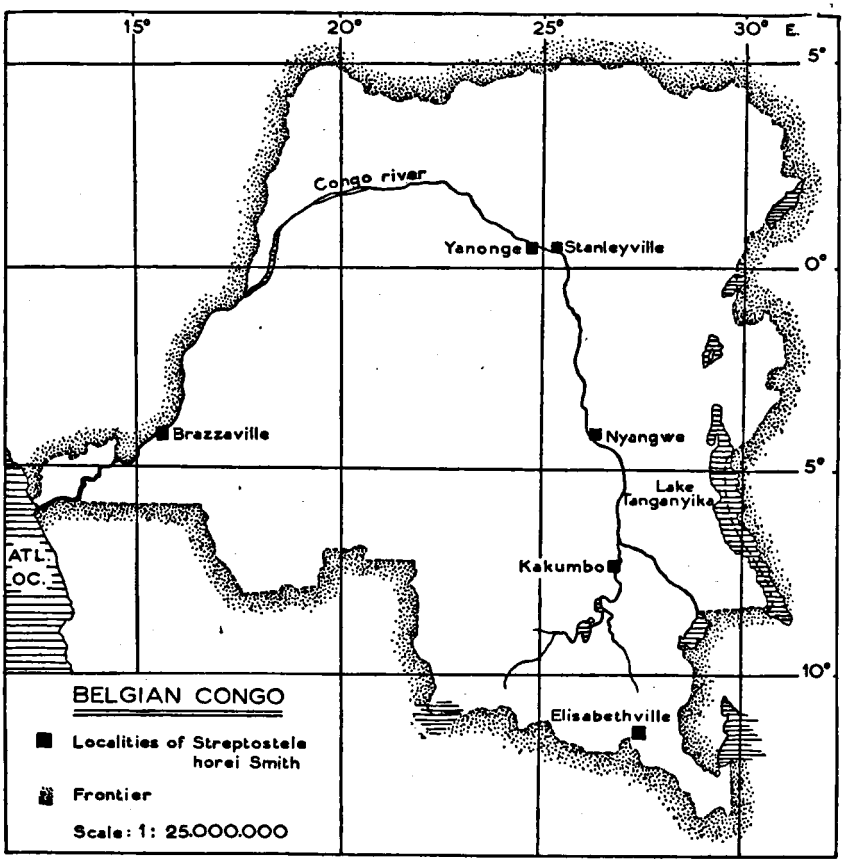

Fig. 1. Distribution of *Streptostele (Raffraya) horei* E. A. Smith.

Of the 43 specimens which I found in about one litre of vegetable earth, 4 were in fragments, 9 were juveniles, and 30 were adult. Most of them were still living on their arrival in the Netherlands. Two specimens I presented to Prof. Dr. WERNER BLUME at Göttingen (who was so kind as to confirm my determination) [1]); two specimens I am presenting to Prof. Dr. JOS. BEQUAERT, who has kindly compared them with the specimens he collected himself in the Belgian Congo, for the Museum of Comparative Zoology at Cambridge, Massachusetts; 39 specimens are deposited under Nr. 6322 in my own collection, and Fig. 3 shows one of these.

[1]) The 2 specimens now in the collection of Prof. BLUME have not been inserted in the tables, because I did not take their measurements before parting with them.

The description of the specimens from Yanonge (Fig. 3) is as follows:

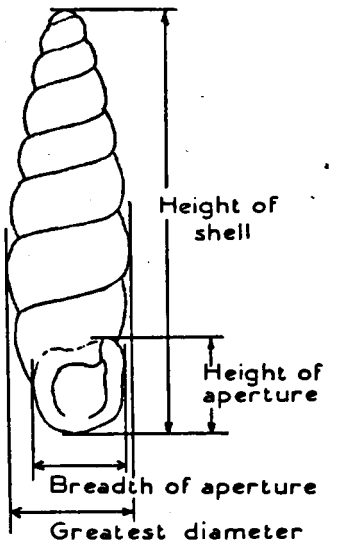

Fig. 2. Method of measurement.

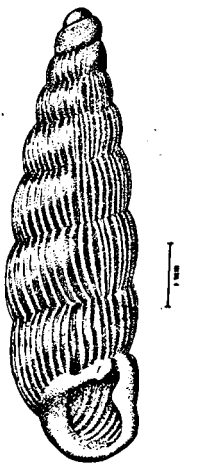

Fig. 3. *Streptostele horei* Smith from Yanonge, Belgian Congo.

Shell rather solid, imperforate, slender, turrited, greyish white, subtranslucent, rather dull. Embryonic 2½ whorls smooth; subsequent whorls moderately convex, having a sculpture of strong, smooth, nearly vertical ribs not quite half as wide as the intervals between them, which are also smooth. On the front of the penultimate whorl there are about 8—9 ribs in one millimeter. Suture rather strongly crenulated by the upper ends of the ribs; it ascends a little as it approaches its termination below. Aperture pyriform, rounded at the base. Peristome white, well-reflected, with a thickened tooth slightly above the middle of the palatal lip, defining a distinct, somewhat retracted sinulus; outer edge somewhat emarginate in the middle; columellar lip expanded, passing with a sort of gully at the upper end into the rather strong, white parietal callus. At the upper end of the parietal callus there is a weak, transverse, S-shaped angular lamella curving inward.

Height of shell: 5.58—7.13 mm, major diameter: 1.64—2.15 mm, external height of aperture: 1.43—2.03 mm, external breadth of aperture: 1.22—1.64 mm, number of whorls: 7½—8½.

The tubercular angular tooth of all specimens is mostly very weak, and never as much pronounced as is shown in the figures of

PILSBRY (1919). Nevertheless all specimens which show the angular tooth appear to be adult. [1])

The published descriptions of the colour of the shell vary. SMITH (1890) said: *cerea.* The exact signification of this term is not clear. Literally it means „wax-coloured", but the colour of wax varies from pure white to pale yellow. PUTZEYS (1899) in his description said: *albida,* i.e. whitish, but in his and DUPUIS' paper (1901) is said that the shell is yellowish to reddish orange, but grows white after the animal has died.

The specimens from Yanonge are all whitish, and had the same colour when they arrived here and were still alive.

The shells have been measured with the aid of a drawing-prism placed on one of the oculars of a binocular microscope. In table I the total height of the shells, the major diameter, and the external height and breadth of the aperture are given in millimeters. The index figures are found by dividing 100 times the measurement in question by the figure of the total height of the shell. At the base of table I the means and the standard deviation of the various measurements are indicated. Figure 2 shows the method of measurement.

The only published data concerning the animal are found in the paper of DUPUIS and PUTZEYS (1901), where the authors say that it is transparent, and of a greyish yellow colour, except that the eye-bearing tentacles and a dorsal line behind them vary from orange-yellow to clear red, and that the ocular tip of the tentacles is black.

The living animals of the Yanonge lot are whitish and semitransparent, except that the eye-bearing tentacles and a dorsal line are orange-coloured.

The snails are very lively, and move rather quickly, reacting quite swiftly to light effects. At the least touch they withdraw their tentacles, and even when moving forward the tentacles are rapidly retracted at intervals, either both at the same time, or separately.

Of the biology of the species very little is known. Dr. BEQUAERT collected adult specimens 29—XI—1910 at Nyangwe (DAUTZENBERG and GERMAIN, 1916); ROUBAUD found adult specimens 20—IV—1907 at Brazzaville (GERMAIN, 1907); the Rev. Father v. d. HOF obtained the specimens from Yanonge in the middle of January 1953. Among the last named nine were juveniles, i.e. 20.93 %. In dissecting the animals I found that the species is viviparous.

[1]) The angular tooth seems to be very variable. This agrees with what Prof. BEQUAERT writes to me. He says: Your specimens agree with specimens of the species which we have from Elisabethville in the Katanga ... the development of the angular tubercle and the parietal lamella, which continues it, varies greatly, as shown in the fairly large series from Elisabethville.

Nr.	Height of shell	Major Diam.	Index (% of shell's height)	Height of Aperture	Index (% of shell's height)	Breadth of Aperture	Index (% of shell's height)	Number of Whorls
1	7.13	2.00	28	1.70	24	1.64	23	8
2	6.90	2.06	30	1.73	25	1.61	23	8¼
3	6.90	1.85	27	1.70	25	1.46	21	8
4	6.84	1.97	29	1.67	24	1.52	22	8½
5	6.81	2.15	32	1.70	25	1.64	24	8½
6	6.72	2.06	31	1.70	25	1.64	24	8
7	6.69	1.88	28	1.67	25	1.46	22	8
8	6.69	1.91	29	1.55	23	1.49	22	8
9	6.54	1.88	29	1.58	24	1.43	22	8
10	6.48	1.91	29	1.64	25	1.49	23	7¾
11	6.45	1.82	28	1.52	24	1.55	24	8
12	6.45	1.94	30	1.61	25	1.43	22	8
13	6.36	1.82	29	1.52	24	1.46	23	8¼
14	6.33	1.88	29	1.67	26	1.55	25	8¼
15	6.33	1.88	30	1.52	24	1.52	24	8
16	6.24	1.73	28	1.52	24	1.37	22	7¾
17	6.09	1.79	29	1.61	26	1.40	23	7½
18	6.09	1.82	30	1.52	25	1.43	24	8
19	6.03	1.76	29	1.43	24	1.37	23	8½
20	6.00	1.91	32	1.52	25	1.46	24	7½
21	6.00	1.91	32	1.58	26	1.46	24	7½
22	5.94	1.85	31	1.52	26	1.43	24	7½
23	5.85	1.82	31	1.49	26	1.40	24	7¾
24	5.82	1.82	31	1.43	25	1.40	24	7¾
25	5.76	1.76	31	1.52	26	1.37	24	7½
26	5.73	1.64	29	1.43	25	1.31	23	7½
27	5.58	1.73	31	1.43	26	1.28	23	7½
Means	6.32	1.87	29.70	1.57	24.89	1.43	23.19	7.92
Standard Deviation	0.41	0.11	1.36	0.09	0.83	0.08	0.94	—

Table I. Measurements of 27 specimens of *Streptostele horei* SMITH from Yanonge, Belgian Congo.

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