ON A COLLECTION OF NON-MARINE MOLLUSCA FROM CURAÇAO

BY

TERA VAN BENTHEM JUTTING,
Zoological Museum, Amsterdam.

(With 4 text-figures).

About ten years ago Dr. J. H. VERNHOUT, at that time curator at the National Museum of Natural History at Leiden, gave a commentary on the present state of our knowledge about the "Land- & Freshwater-Molluscs of the Dutch West-Indian Islands" (Notes Leyden Museum, Vol. XXXVI, pag. 177—189, 1914).

After summarising carefully the different species of every island in particular, he composed a survey in table-form representing their geographical distribution on other Antilles and on the continent.

The paper by M. M. SCHEPMAN (Encyclopedie van Nederlandsch West-Indië, Mollusca, pag. 480—481, 1914—1917) repeats in general these results.


To these papers I shall have to refer repeatedly.

In the following lines a brief account is given of the collections recently made by Dr. C. J. VAN DER HORST of Amsterdam and by Mr. G. J. H. MOLENGRAAFF, engineer of the Geological Survey of Curacao. I added also the non-marine molluscs from this same island contained in the collection of the Zoological Museum of Amsterdam.

Drymaeus elongatus (Bolten).

Hato 1923, numerous spec.
Entrance to Spanish Water, 2 spec.
Curaçao, 2 spec.

Cerion uva (Linne).

Near Caracasbay 1920, 185 spec.
Curaçao, 2 spec.
Entrance to Spanish Water, numerous spec.
Hato, 11 spec.
Curaçao, 28 spec.

discussion of the variation of Cerion uva and the correlation between average height and number of
turns. After the examination of more than 2700 specimens the author feels inclined to ascribe the
different features only to the influence of ecological conditions: "The size of the shells (i.e. the diameter)
appears to be directly dependent on the richness of the habitat. . . . The number of whorls (and the
altitude) appears to be inversely proportional to the amount of exposure to the dry trade-winds" etc.

Consequently the names diabljensis created for "the most dwarfed shells" and hatoensis given
to the biggest individuals with the heaviest sculpture, only denote the extreme limits of variation
connected by series of intermediate stages.

In his "Rapport betreffende een voorloopig onderzoek naar den toestand van de Visscherij
en de Industrie van Zeeproducten in de Kolonie Curaçao" (’s Gravenhage, 1907) Dr. J. BOEKE mentions
on page 143 how Cerion uva was formerly exported in large quantities to Germany as turkey-food,
and therefore the natives call these shells: "kokoliesjė di kalakoa". At the present time this trade
has considerably decreased in importance.

Brachypodella raveni (Crosse).

41, pl. I, fig. 4.

no. 152, 1924, pag. 90—92, pl. XVI, fig. 65, pl. XVII, fig. 67, 68 and 73.

Tafelberg, 23 I. 85, 6 spec.
Near well Bak Ariba, Hato, 19 IX 23, 1 spec.
Plantation Plantersrust, 24 IX 23, numerous spec.

This last set consists of several immature shells still possessing their initial whorls which are
generally lost at more advanced age. Plantation Plantersrust, situated north of Schottegat, and Tafel-
berg near Santa Barbara being only at a short distance from each other, it is easily to be understood
that I have not succeeded to distinguish BAKER's subspecies raveni and sanctae barbarae among the
shells at my disposal. Those of Plantersrust and of Tafelberg practically agree and may be ranked
among sanctae barbarae. I wish to exclude from this discussion the only specimen collected at Hato
as it is badly worn and in a poor condition.

Microceramus bonairensis subsp. caraçaoana H. B. Baker.

1923, pag. 6—7, pl. I, fig. 4 and 5; ibid. no. 152, 1924, pag. 96—97, pl. XVII, fig. 75—76.

Hato, 2 spec.
Plantation Plantersrust, 24 IX 23, 37 spec.
Near well Cajoeda, 1923, 1 spec.

The specimens of Curaçao being a trifle larger than the only shell of Bonaire described by
SMITH in 1898 have therefore been distinguished by BAKER as the subspecies caraçaoana. Mr. Molen-
graaff collected a large series, many specimens of which again surpass Baker's indications of size,
reaching even 11 mm. height in a few shells.

According to the composition of the radula this species, originally described by SMITH as a
Pineria, should be ranked among Microceramus, as PILSBRY already suggested (The Nautilus, Vol. XVII,
1903, pag. 48), but this could not be decided at that time as no living animals were known.

Leptinaria gloynii (Gibbons).

figs. 59 and 62.

Plantation Plantersrust, 20 IX 23, numerous spec.

The highest shell of the material from Plantersrust and four others which nearly approach it
in their dimensions, measure:

<table>
<thead>
<tr>
<th>altitude (in mm.)</th>
<th>number of whorls</th>
<th>altitude (in mm.)</th>
<th>number of whorls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>
Opeas gracile (Hutton).

Hato, 1922, 3 spec.
Plantation Plantersrust, 20. IX. 23, numerous spec.

Though frequently recorded from several West-Indian islands in the vicinity of Curaçao, these are the first sets from our main Antillean colony itself.

Papa (Pupoides) marginata (Say).

Succinea barbadensis, 1828, pag. 532, pl. XXI, fig. 4—6.


Pupoides marginatus PILSBRY, Man. Conch., Vol. XXVI, 1921, pag. 111—113, pl. XII, fig. 1—7.

Plantation Plantersrust, 20. IX. 23, numerous spec.
Near well Bak Ariba, Hato, 19. IX. 23, 5 spec.


Hato, 4 spec.

According to PILSBRY (l.c. pag. 113) "this shell has usually been known as Papa graulia Say, but that species was based upon a stray example of Ena obscura (Müll.) of Europe." So marginatus Say has to be considered as the correct specific name.

Succinea barbadensis Guiding (fig. 1a and b).


" " REEVE, Conch. Iconica, Vol. XVII, 1872, Succinea, pl. VII, fig. 46.

Plantation Plantersrust, 20. IX. 23, numerous spec.

Hato, 1922, numerous spec.

As REEVE pointed out already this shell has a superficial resemblance to European Succinea patris. The turns of the latter form a less concise screw so that its whorls are wider apart which excludes the presence of "shoulders" at the successive sutures. Hence the whole character of the shell of patris has a more slender and oblique appearance and yet the size of the spire is lower in relation to that of the aperture than in barbadensis.

Ten of the larger specimens of our second set present the following measures in mm.:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (total)</td>
<td>17</td>
<td>16</td>
<td>16</td>
<td>15.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Height (aperture)</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>10.5</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Max. width (aperture)</td>
<td>7</td>
<td>8</td>
<td>6.5</td>
<td>7</td>
<td>7</td>
<td>6.5</td>
<td>6</td>
<td>5.5</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Number of whorls</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
<td>3½</td>
</tr>
</tbody>
</table>

Until now this species has only been recorded from Barbados, St. Vincent and St. Thomas.

Succinea gyrata Gibbons (fig. 2a and b).

Succinea gyrata GIBBONS, Journ. of Conch., Vol. II, 1870, pag. 136, pl. 1, fig. 2.

" " VERNHOUT, Notes Leyden Museum, Vol. XXVI, 1914, pag. 179.
" " BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, n° 152, 1924, pag. 75—76, pl. XIV, fig. 48, 49 (radula and jaw).

Curaçao, Hato, 13. I. 85, 7 spec.

Plantation Plantersrust, 20. IX. 23, 5 spec.

This species presents many more characteristic features than the preceding one by the peculiarly twisted, elongated spire so high in relation to the aperture as is only rarely observed in this genus. The specimens in the Amsterdam Museum do not reach beyond the dimensions as given by Baker in the above cited paper.
Melampus cofea (Gmelin).

Entrance to Spanish Water, 1 spec.

Melampus flavus (Gmelin).

Entrance to Spanish Water, 5 spec.
Caracasbay, 2 spec.

Melampus pusilla (Gmelin).

Caracasbay, 1 spec.

Physa cubensis Pfeiffer. (fig. 3a and b).


Hato, 28. IV, 20, 5 spec.
Boca de Leeuw, Hato, 1923, 23 spec.

It is with a slight hesitation that I venture to place the present shells in this species, because the specimens from both sets are immature, the maximal height of the former being 7 mm. (at 4 1/4 whorls), whereas those from Boca de Leeuw do not reach beyond 6 mm. (at 3 1/2 whorls). The typically flattened last turn is hardly obvious in the younger individuals of about 3 whorls, but becomes more conspicuous in older animals with more than 3 whorls.

This species has not been recorded beyond the isle of Cuba which is another example to emphasize Mr. Vernouw's opinion (loc. pag. 185—187) that the principal affinities of the molluscan-fauna of Curacao should not be expected to be found in the non-marine molluscs of the mainland — Guyana and Venezuela — although the mainland is situated even in sight of our island, but on the contrary extend along the arch of Windward Islands to the Greater Antilles and Central-America. According to his last paper Mr. Baker appears to be of the same opinion.

It must be remembered that this argument has evidently been confirmed in a similar way by other groups of animals (cfr. SCHARFF, The Origin of the West-Indian Fauna, Bijdr. t. d. Dierk., Afl. XXII, 1922, pag. 65—72).

Planorbis circumlineatus Shuttleworth. (fig. 4a, b and c).


REEVE, Conch. Icon., Vol. XX, Planorbis, 1878, pl. VI, n° 48.

CLESSIN, in Mart.-Chemn. N. Syst. Conch. Cab., Vol. XVII, Abt. 1, pag. 211, 1886, pl. 37, fig. 6.


Planorbis pallidus BAKER, Occ. Papers Museum of Zoology University of Michigan, n° 152, 1924, pag. 71—74.

Well Mamaja, Hato, 16 spec.
Well Wandeloo, Hato, 14 spec.
In rivulet from Tanki Rincon, on Soux, numerous spec.
Tanki Rincon, on Soux, 9.IX.23, 2 spec.
Hato, 28.IV.20, 4 spec.
Tanki Monpoo, Hato, 12 spec.
Well Cajoeda, Hato, 1923, 15 spec.
Well Knoekoe hatoon, Hato, 7 spec.
Tanki Santa Barbara, 19.V.20, numerous spec.
Boca de Leeuw, Hato, 1923, numerous spec.
Plantation Blauw, 1924, 26 spec.

The Planorbis first mentioned from Curacao were three young specimens which — according to SMITH (Proc. Malac. Soc. London, III, 1898, pag. 113) — „do not offer any special characters, and at present must remain undetermined” . According to the rather extensive amount of localities where recent investigators obtained quite an important series of shells, Planorbis seems even to abound in
the island. The genus is generally distributed in most of the other Caribbean islands where fresh water is found, so that a considerable number of different species has been recorded from this region. This caused a deplorable confusion of problematic species and I venture to doubt the specific value of many forms. In the case of our Planorbis circumlineatus I have a slight suspicion that the at any rate closely related species Pl. decipiens Ads. might be a young circumlineatus, the only real difference — according to Clessin’s diagnoses of both species (in Mart.-Chemn. N. Syst. Conch. Cab., Vol. XVII, Abt. 1, pag. 210 and 211) being its size, a thin white callosity uniting the margins of the aperture in decipiens and its last whorl faintly descending towards the mouth.

Judging from his very poor reference to literature and his imperfect diagnosis it seems very probable that Clessin was ignorant of the original description of circumlineatus, else he would have noticed that Shuttleworth mentions on page 96 the incontestable fact of “marginibus callo tenui conjunctus,” moreover, among the Planorbis from Curacao there occur, at random, specimens of different sizes with and without descending last whorl even at remote localities, so that I consider the characteristics mentioned to be of individual variation, as in most Planorbidae the courses of the turns may often be subject to important irregularity.

I have a similar suspicion of Pl. lanterianus Orb. but its diagnosis is so very superficial and incomplete — a reproach unfortunately appropriate to several of Clessin’s descriptions — that I would rather abstain from a definite conclusion in this case.

Baker (Occ. Pap. Mus. Zool. Univ. Michigan, n° 152, 1924, pag. 71–74) is inclined to use the name pallidus C. B. Adams, considering circumlineatus a synonym. In that case Shuttleworth’s name has to be dropped before the older diagnosis of Adams.

Unfortunately I am not able to recognize the Curacao Planorbis by the insufficient description (Proc. Nat. Hist. Soc. Boston, Vol. II, 1846, pag. 102) which is even quite wrong in one detail; “anfractibus vix tribus”, though Baker tries to explain this passage by suggesting that the author “must have counted the whorls as visible from the apical side” where the separate turns are difficult to observe.

Afterwards Sowerby (in Reeve, Conch. Icon. Vol. XX, Planorbis 1878, pl. VI, n° 48) and Clessin (N. Syst. Conch. Cab. Vol. XVII, Abt. 1, pag. 211, 1886) gave more extensive descriptions of Pl. pallidus none of which were probably based on an examination of the type specimen (if it is still preserved!).

Obviously Baker does not know the original shell either, else he would certainly have mentioned it. Summarising there is sufficient reason to avoid the name pallidus as long as we are so unsatisfactorily informed and I propose to accept for the Curacao species the description which Shuttleworth published (Mitt. naturf. Ges. Bern, 1854, pag. 96—97), and which but for the somewhat small indications of measurements fits considerably better.

Most of the specimens collected by Messrs Van der Horst and Molengraaff hardly reach 8 mm. diameter. Only some larger individuals, bleached and dead, collected in the rivulet flowing from Tanki Rincon during the wet monsoon, present the following dimensions in mm.:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>maximal</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>minimal</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>height</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>number of whorls</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Planorbis circumlineatus occurs further on Humacao, Porto Rico, St.-Thomas and Haiti. This geographical distribution reminds us vividly of analogous conditions with Physa cubensis and it will be sufficient to refer to the remarks on the preceding species.

Amnicola parvula (Guilding).


Tanki Santa Barbara, 19.V.20, 12 spec.
Hato, 28.IV.20, 7 spec.
Welt Cajoeda, Hato, 1923, numerous spec.
Welt Bak Ariba, 19.IX.23, numerous spec.
Boca de Leeuw, Hato, 1923, 7 spec.
Tanki Rincon, on Souax, 9.IX.23, 9 spec.

Tudora rapis H. B. Baker.

Hato, 11 spec.

Though BAKER recently divided Tudora rapis into two subspecies rapis s. str. and newportensis, I do not venture to apply one of these names to the relatively small number of animals in our collection.

Tudora muskasi H. B. Baker.


Curacao, 1 spec.

It is my opinion that BAKER is right when he suggests (Occ. Pap. Mus. Zool. Univ. Michigan, n° 152, 1924, pag. 53) that Tudora costata Menke, described by PEIFFER (Zeitschr. Malak. Vol. III, 1846, pag. 47) does not suit to the shell recorded by VERNHOUT (Notes Leyden Museum, Vol. XXXVI, 1914, pag. 190) under this name. I had the opportunity to examine the latter specimen which belongs to the Leiden Museum and which is a trifte larger than the one hitherto similarly identified in the Amsterdam collection.

It is not only the characteristics mentioned by BAKER which suffice to distinguish the two Curacao-shells collected by Mr. VAN KOOLWIJK about forty years ago from the real T. costata. There is still another fact which rouses our suspicion. PEIFFER namely added to the diagnosis: „Nahe verwandt mit C. megacheilum.” This opinion granted, the true costata thus being at home in the relationship of T. megacheile, consequently belongs to the section Tudora which among other things is characterised by the lattice-work sculpture contrary to the representatives of section Tudorala with nearly smooth or irregular faintly grated exterior (Occ. Pap. Mus. Zool. Univ. Michigan, n° 152, 1924, pag. 44 and 55).

The specimens we are discussing here in fact both hardly show any spiral or longitudinal cords but the few especially accentuated ribs which form part of the typical features of muskasi.

Just as in the other species of Tudora I do not employ the trinominal nomenclature for want of sufficient number of individuals.

Tudora megacheile (Potiez & Michaud).


Tafelberg, 23.I.85, 7 spec.
Hato, 13.I.85, 10 spec.
Plantation Plantersrust, 24.IX.23, 7 spec.
Near Caracasbay, 20.V.20, 7 spec.
Entrance of Spanish Water, 2 spec.
Curacao, 17 spec.
Hato, 1923, 22 spec.
Curacao, 4 spec.

In this species I do not follow either the differentiation into subspecies proposed by BAKER.
Indeed their characteristics, chiefly based on minute differences in habitus, can only be successfully recognised in more extensive series of shells than those which formed the subject of the present study.

*Tudora megacheile* forma *desculpta* H. B. Baker.


Curacao, 1 spec.

Hato, 1923, 2 spec.

_Tudora fossor_ H. B. Baker.


Hato, 11 spec.

Same remark as for *Tudora megacheile*.

_Cistulops raveni* (Crosse).

_Cistula raveni* Crosse, Journ. de Conch., Vol. XX, 1872, pag. 159—160 and Vol. XXI, 1873, pag. 43—44, pl. I, fig. 8.


Curacao, 21 spec.

Tafelberg, 2 spec.

Tafelberg, 6 spec.

H. B. Baker gives a figure (Occ. Pap. Mus. Zool. Univ. Michigan, 1923, pl. I, fig. 6) of the apical whors of this species at high magnitude. In 1924 (The Nautilus Vol. XXXVII, pag. 1—6) he proposed to change the generic name into *Cistulops* with _C. raveni_ as its only representative. In a second paper of the same year he separated the species in two subspecies _raveni_ s. str. and _arubana_ H. B. Baker of which the former inhabits the isle of Curacao. The author gives detailed descriptions of both subspecies and figures radula and operculum.

Before concluding I wish to present my sincere thanks to Prof. Dr. Max Weber, former Director of the Zoological Museum of Amsterdam, as well as to the present one Dr. L. F. de Beaufort for entrusting me the collections alluded to before and for their keen interest and valuable advice during the progress of the work.

By the kind mediation of Prof. Dr. E. D. van Oort, Director of the National Museum of Natural History, I was enabled to study for comparison some species of _Tudora_ from the Leiden Museum.

Finally I am very much indebted to Dr. C. J. van der Horst for his information and suggestions.
PRINCIPAL SOURCES OF REFERENCE.


1873. —— Description de Mollusques nouveaux provenant de Caraïbes et Sainte Lucie (Antilles), Journ. de Conch. Vol. XXI, pag. 40-54, pl. I, fig. 5-3.


1879. —— Notes on some of the Landshells of Caraïbes, Journ. of Conch. Vol. II, pag. 135-137, fig. 1 and 2.


1878. C. M. POULSEN, Catalogue of West-India Shells in the collection of Dr. C. M. Poulsen.

1897. M. M. SCHRUMM, Mollusca, in Encyclopedie van Nederlandsch-West-Indië, pag. 477-482.


