A CHECK-LIST OF NEW ZEALAND ASCIDIANS,
WITH PRELIMINARY NOTES ON THEIR DISTRIBUTION.

by J.P. Croxall*

SUMMARY

A check-list of New Zealand ascidians is presented. One hundred and thirty species arranged in 48 families are recognised. References are given to descriptions of each species and a preliminary account of their New Zealand distribution is attempted.

INTRODUCTION

In the course of work on aspects of the biology of various species of intertidal ascidians, I have become very aware of the need for a concise list, with references to descriptions, of New Zealand ascidians. These animals are ecologically an important component of the intertidal and subtidal environment but we still know very little about the distribution of even the more common species. Part of the reason for this is that, in spite of the notable series of papers by Brewin (1948 et seq.), species in many groups are still rather difficult to identify, and furthermore, species descriptions are scattered throughout the literature. Also, the pioneer works on New Zealand ascidians by Michaelsen (1922, 1924) and Sluiter (1900) are very difficult to consult in this country.

At much the same time as Brewin (1948-1960) was working on New Zealand ascidians, Kott (1952-1963) published a series of papers on Australian species and Millar (1960) described a number of new species for New Zealand waters. The work of the latter two authors also necessitated a number of changes in the nomenclature used by Brewin. The recent review of Indo-Pacific Didemnidae by Eldredge (1966) indicates the need to make one or two further changes.

This paper is intended to present an up-to-date list of New Zealand ascidians, together with such information on their distribution as is given in the aforementioned works. A number of unpublished distribution records of the author are also included but it should be emphasised again that there are great gaps in our knowledge of species distribution.

As far as possible reference is given to a description of each species in the recent literature. A few species have not been found again since the original collection. These species are noted by Brewin and by consulting the appropriate paper in her series the location of the original description can be ascertained.

This list was designed as a working guide and no detailed nomenclatural synononies are provided. There are, however, two sections following the list which are essentially explanatory. The category of excluded species refers to

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species which have been claimed to occur in New Zealand but which are not now believed to do so. The records are either regarded as unsubstantiated, or the exclusion of a species results from a taxonomic re-arrangement whereby closely related species are believed to represent New Zealand material.

The nomenclatural notes fulfil a number of purposes. Chiefly they explain the occasional use of a name different from that used by either Brewin or Kott. In addition, they draw attention to the groups in which considerable taxonomic uncertainty still exists and explain my reasons for using certain names in the check-list. Unless there is good agreement to the contrary I have preferred to retain all valid names in a number of difficult and poorly understood genera.

The basic classification followed is that of Huus (1937-40) in Kukenthal & Krumbach, Handbuch der Zoologie, with the modifications adopted by Millar (1960).

Key to Localities:

1 : North Auckland
2 : Leigh
3 : Great Barrier (East Coast)
4 : Hauraki Gulf
5 : East Cape
6 : Cook Strait
7 : Christchurch
8 : Otago Coast
9 : Portobello
10 : Stewart Island
11 : Chatham Islands and Chatham Rise
12 : Auckland Islands
13 : Campbell Island
2 etc : Unpublished distribution record of author
5a : New Plymouth (Michaelsen 1922 & 1924)
1a : vicinity of North Cape (Millar 1960 stations 929, 934, 935, 936)
6a : vicinity of Kapiti Island (Millar 1960 station 941)

Key to Symbols:

B1, B2, etc. : description of species in appropriate paper by Brewin.
(B11) etc. : reference to species in appropriate paper by Brewin – species not described by Brewin
K1, K2, etc. : reference to species (in key, sometimes in text also) in paper by Kott.
M : description of species, from New Zealand material, in Millar (1960)
“M” : description of species, but not from New Zealand material, in Millar (1960)
E : description of species in Eldredge (1966)

Superscript numbers indicate a reference to the nomenclatural notes.
**CHECK-LIST**

**Order: Enterogona Perrier**

**Suborder Aplousobranchiate Lahille**

**Family: Polyclinidae Verrill**

**Subfamily Polyclininae Adams**

<table>
<thead>
<tr>
<th>Aplidium Savigny</th>
<th>Location</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>adamsi</strong> Brewin</td>
<td>9, 10</td>
<td>B1; K4</td>
</tr>
<tr>
<td><strong>benhami</strong> Brewin</td>
<td>6, 9-10</td>
<td>B1; K4</td>
</tr>
<tr>
<td><strong>circumvolutum</strong> (Sluiter)</td>
<td>1, 2, 4, 11</td>
<td>(B9a, 10) K4 “M”</td>
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<tr>
<td><strong>cottrelli</strong> (Brewin)</td>
<td>1, 2, 4</td>
<td>B10; K4</td>
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<tr>
<td><strong>constrictum</strong> (Sluiter)</td>
<td>11</td>
<td>(B9a)</td>
</tr>
<tr>
<td><strong>foliaceum</strong> (Sluiter)</td>
<td>6, 10, 11</td>
<td>B9a; K4</td>
</tr>
<tr>
<td><strong>knoxi</strong> (Brewin)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>maritimum</strong> (Brewin)</td>
<td>10</td>
<td>B11</td>
</tr>
<tr>
<td><strong>merinoensis</strong> (Brewin)</td>
<td>11</td>
<td>B9a; K4</td>
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<tr>
<td><strong>hydranth</strong> (Brewin)</td>
<td>1, 2</td>
<td>B6; K4</td>
</tr>
<tr>
<td><strong>novaezelandiae</strong> Brewin</td>
<td>5</td>
<td>B8; K4</td>
</tr>
<tr>
<td><strong>oamaruensis</strong> (Brewin)</td>
<td>8, 10</td>
<td>B3; K4</td>
</tr>
<tr>
<td><strong>phortax</strong> (Mich.)</td>
<td>1-4, 6, 9-11</td>
<td>B1; K4</td>
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<tr>
<td><strong>powelli</strong> (Brewin)</td>
<td>4</td>
<td>B12</td>
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<tr>
<td><strong>quadrisulcatum</strong> Millar</td>
<td>1a</td>
<td>M</td>
</tr>
<tr>
<td><strong>scabellum</strong> (Michaelsen)</td>
<td>1, 2, 4, 11</td>
<td>B9; K4</td>
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<tr>
<td><strong>seeligeri</strong> Millar</td>
<td>1a, 6a</td>
<td>M</td>
</tr>
<tr>
<td><strong>siphonum</strong> (Brewin)</td>
<td>11</td>
<td>B9a; K4</td>
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<tr>
<td><strong>stelliferum</strong> (Sluiter)</td>
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<td>(B13); K4</td>
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<td><strong>thomasi</strong> Brewin</td>
<td>1, 2, 3-4, 6</td>
<td>B2</td>
</tr>
<tr>
<td><strong>thomsoni</strong> Brewin</td>
<td>1, 2, 3-7, 9-10</td>
<td>B1; K4</td>
</tr>
</tbody>
</table>

**Synoicum Phipps**

| **arenaceum** (Michaelsen) | 1, 10 | (B10, 11); K4 |
| **fungosum** (Herdman) | 11 | (B9a) |
| **haurakiensis** (Brewin) | 1, 2, 4 | B6; K4 |
| **herdmani** Brewin | 11 | B9a; K4 |
| **hypurgon** Michaelsen | 4 | B6; K4 |
| **kuramui** Brewin | 2, 3 | B5; K4; M |
| **stewartense** (Michaelsen) | 10 | (B11); K4 |

**Aplidiopsis Lahille**

| discoveryi Millar | 6a | K4; M |

**Polyclinum Savigny**

| **cerebrale** Michaelsen | 5a, 10 | B11; K4 |
| **michaelseni** Brewin | 11 | B9a; K4 |
| **novaezelandiae** Brewin | 10 | B11 |
| **sluiteri** Brewin | 11 | B9a; K4 |

**Protopolycinum Millar**

| pedunculatum Millar | 1a | M |

**Dumus Brewin**

| **areniferus** Brewin | 8, 10 | B7 |

**Subfamily Euherdmaninae Seeliger**

| Placentula Redikorzev | 1, 2-4 | B5; K2 |
| Pseudodistoma Michaelsen | \( \star \) | aureum (Brewin) | 1 | B10; K4 |
cereum Michaelsen 2-3, 4.
opacum (Brewin) 1, 2, 3.

Ritterella Harant sigillinooides (Brewin) 10.
vestita Millar 1a.

Family: Didemnidae Giard

Didemnum Savigny
\( \times \) candidum Savigny 1-2, 4-11.
chilense Arnbak 1, 3.
\( \times \) grande (Herdman)\(^3\) 1-2, 4, 5a, 10.
lambitum (Sluiter) 11.
lithostrotum Brewin 10, 11.
psammatoles (Sluiter) 1, 2, 4, 7, 9-10.
studert Hartmer 10-12.
tuberatum (Nott) 4, 6, 10, 12.

Polysyncraton Nott
chondrilla (Michaelsen) 1, 4, 10.
mortenseni (Michaelsen) 10, 11.
paradoxum Nott 1, 2, 4.

Leptoclinides Bjerkand\(^3\)
auranticus Brewin 11.
diemenis Michaelsen 1, 1a, 4.
marmoreus Brewin 11.
novaezelandiae Brewin 10.
sluiteri Brewin 3.
sperus Michaelsen 5a.

Trididemnum Della Valle
cerebriforme Hartmer 10.
sluiteri Brewin 10.

Diplosoma MacDonald\(^5\)
macdonaldi Herdman 1, 2, 4-7, 9-10.
notti (Brewin) 4.

Family: Clavelinidae Forbes & Hanley

Subfamily Clavelininae Seeliger

Podoclavella Herdman
kottae Millar 1a.

Clavelina Savigny
\( \times \) claviformis (Herdman)\(^6\) 1, 1a.

Subfamily Polycitorinae Michaelsen

Sycozoa Lesson
anomala Millar 1a.
\( \times \) sigillinoides Lesson\(^7\) 1, 5, 11.

Distaplia Della Valle
knoxi Brewin 6.
marplesi Brewin 8.
tayleri Brewin 2, 4, 7.

Hypsistroza Brewin
\( \times \) jasmeriana (Michaelsen) 1, 2, 4, 5, 7, 9-10.

Polycitorella Michaelsen
mariae Michaelsen 1.

Eudistoma Caullery\(^8\)
circumvallatum (Sluiter) 2, 3-6, 8, 9-10.

Cystodytes van Drasche
Atapazoa Brewin

Family: Ascidiidae Adams
Ascidia Linnaeus
aspera (Muell.) lagena Michaelsen

Family: Agnesiidae Huntsman
Agnesia Michaelsen
glaciata Michaelsen

Family: Corelliidae Lahille
Corella Alder & Hancock
eumyota Traustedt

Family: Perophoridae Giard
Perophora Weigmann
annectens Ritter boltenina Michaelsen

Family: Cionidae Lahille
Ciona Fleming
intestinalis (Linnaeus)

Suborder Phlebobranchiata Lahille

Order: Pleurogona Perrier

Family: Stylididae Sluiter
Botryllus Gaertner
schlosseri (Pall.) separatus Sluiter stewartensis Brewin

Botrylloides Edwards
leachi Savigny

Polyzoa Lesson
opuntia Lesson reticulata (Herdman)

Okamia Brewin
thileni (Michaelsen)

Arnbackia Brewin
novaezelandiae Brewin

Berrillia Brewin
bolteniodes Brewin

Alloecarpa Michaelsen
affinis Bovien minuta Brewin

Amphicarpa Michaelsen
michaelensi Brewin schauinslandi Michaelsen

Theodorella Michaelsen
arenosa Michaelsen stewartensis Michaelsen torus Michaelsen

Metandrocarpa Michaelsen

1a, 2, 4, 6, 8, 10-11 B2; K2; M
1a M
7, 9-10 B1; K1
10 B11; K1
1a M
1a, 1-12 B1; K1
2 B6; K1
10 (B11)
1-2, 4, 6, 7 B4; K1
1, 2, 4, 6, 7, 9-10 B1; K1
1a M
10 B11
1, 2, 4-7, 9-12 B1; K1
1-2, 4-5, 10 B6; K1
12 B14; “M” (B14): “M”
13
1-2, 4-5, 5a B2
1, 3 B5
8 B7
13 (B14)
2, 10-11 B6
11 B9a
11 (B9a)
10 B11
10 B11
1, 5a (B10)
**protostigmata** Michaelsen

4-5

**Subfamily Styelinae Herdman**

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<th>Species</th>
<th>Subfamily</th>
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<td>Nemidocarpa Huntsman</td>
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<td>B1</td>
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<tr>
<td>biocornata (Sluiter)</td>
<td>1, 2, 4-11</td>
<td>B1</td>
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<td>madagascariensis Hartm. var</td>
<td>1, 8</td>
<td>B7</td>
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<tr>
<td>regalis Michaelsen</td>
<td>1-3, 5-7, 10-11</td>
<td>B4</td>
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<td>nisiotis (Sluiter)</td>
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<td>B4</td>
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<td>novaezelandiae (Michaelsen)</td>
<td>8, 10-11</td>
<td>B7; B3</td>
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<td>Otogoensis Brewin</td>
<td>1-4, 6-7, 9-12</td>
<td>B1; K1</td>
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<td>Stewartensis Michaelsen</td>
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<td>Asterocarpa Berwin</td>
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<td>B1; K1</td>
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<td>Cereae (Sluiter)</td>
<td>1-2, 4-8, 10-11</td>
<td>B2; K1</td>
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<td>Coerulea (Quoy &amp; Gaim.)</td>
<td>2, 4, 10</td>
<td>B2</td>
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<tr>
<td>Styela Fleming</td>
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<td>B9a</td>
</tr>
<tr>
<td>Plicata (Lessner)</td>
<td>1-2, 4, 10</td>
<td>B2</td>
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<tr>
<td>Polycarpa Heller</td>
<td>11</td>
<td>B11</td>
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<tr>
<td>Pegasis Michaelsen</td>
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<td>Family: Pyuridae Hartmeyer</td>
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<td>B12</td>
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<td>Pyura Molina</td>
<td>1-2, 4-8, 10-11</td>
<td>B2; K1</td>
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<td>Cancellata Brewin</td>
<td>2, 4, 10</td>
<td>B2; K1</td>
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<tr>
<td>Carnea Brewin</td>
<td>11</td>
<td>B9a</td>
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<td>Lutea (Sluiter)</td>
<td>6-7, 9-11</td>
<td>B1; K1</td>
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<td>Pachydermatina (Herdman)</td>
<td>8, 10</td>
<td>B3</td>
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<tr>
<td>Picta Brewin</td>
<td>1, 5a, 6-7, 9-11</td>
<td>B1; K1</td>
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<td>Pulla (Sluiter)</td>
<td>1, 2, 4, 6</td>
<td>B2; K1</td>
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<tr>
<td>Rugata Brewin</td>
<td>1, 2, 4, 6</td>
<td>B2; K1</td>
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<td>Spinossissima Michaelsen</td>
<td>5</td>
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<td>Subuculata (Sluiter)</td>
<td>1-7, 10</td>
<td>B2; K1</td>
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<td>Suteri (Michaelsen)</td>
<td>5, 7-11</td>
<td>B1; K1</td>
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<tr>
<td>Trita (Sluiter)</td>
<td>1, 2, 4, 5a, 10-13</td>
<td>B14; K1</td>
</tr>
<tr>
<td>Microcosmus Heller</td>
<td>1-2, 4</td>
<td>B2; K1</td>
</tr>
<tr>
<td>Claudicans Savigny</td>
<td>11</td>
<td>B9a; K1</td>
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<tr>
<td>Hirsutus Sluiter</td>
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<td>B2; K1</td>
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<tr>
<td>Family: Molgulidae Lacaze-Duthiers</td>
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<td>B12</td>
</tr>
<tr>
<td>Molgula Forbes &amp; Hanley</td>
<td>10</td>
<td>B11</td>
</tr>
<tr>
<td>Herdmani Brewin</td>
<td>1-2, 4-6, 10, 5a</td>
<td>B6</td>
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<td>Mortensi (Michaelsen)</td>
<td>6, 8, 10-11</td>
<td>B3</td>
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<td>Sluteri (Michaelsen)</td>
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<td>B11</td>
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<td>Paramolgula Traustedt</td>
<td>6, 10, 11</td>
<td>B11</td>
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<tr>
<td>Filholi (Piz.)</td>
<td>1a</td>
<td>M</td>
</tr>
<tr>
<td>Eugyra Alder &amp; Hancock</td>
<td>7</td>
<td>B4</td>
</tr>
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<td>Brewinae Millar</td>
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<td>Novaezelandiae Brewin</td>
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<td>B4</td>
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<tr>
<td>Ctenicella</td>
<td>12</td>
<td>B14</td>
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<tr>
<td>Amokurae Bovien</td>
<td>12</td>
<td>B14</td>
</tr>
<tr>
<td>Novaezelandiae (Michaelsen)</td>
<td>7</td>
<td>B4</td>
</tr>
</tbody>
</table>

**EXCLUDED SPECIES**

Aplidium variable (Herdman)

Chatham Islands (Sluiter 1900). An antarctic-subantarctic species otherwise found no
nearer than Kerguelen Island. Michaelsen (1942) and Millar (1960) regard Sluiter's record as highly unlikely.

*Leptoclinides reticulatus* (Sluiter)

*Leptoclinides rufus* (Sluiter)

See nomenclatural note 4

*Diplosoma fragile* (Van Name)

See nomenclatural note 5

*Botrylloides nigrum* (Herdman)

Kott (1952) records the distribution of this species as extending to New Zealand. I have seen no record of material of this species being collected here, although it would not be surprising if it does occur.

**NOMENCLATURAL NOTES**

1. Kott (1963) suggests that *Synoicum arenaceum* (Michaelsen), *S. herdmani* Brewin and *S. kuranui* Brewin are synonymous. Millar (1960) retains *S. arenaceum* and *S. kuranui* as separate species and perhaps all three should be so regarded until more material is available.

2. Five generic names have been in recent use in this subfamily. Their definitions have been emended by various authors and species re-allocated accordingly. Kott (1963) presents the most recent evaluation and her treatment is followed here. The two sets of names used by Brewin are as follows:

<table>
<thead>
<tr>
<th>Sigillinaria Oka</th>
<th>Homeodistoma Redikorzev</th>
</tr>
</thead>
<tbody>
<tr>
<td>arenosa Brewin</td>
<td>arenosa (Brewin) (=Placenta)</td>
</tr>
<tr>
<td>novaeezelandiae Brewin</td>
<td>novaeezelandiae (Brewin) (=Pseudodistoma / cereum)</td>
</tr>
<tr>
<td>aurea Brewin</td>
<td>aureum (Brewin)</td>
</tr>
<tr>
<td>opaca Brewin</td>
<td>opacum (Brewin)</td>
</tr>
<tr>
<td></td>
<td>Pseudodistoma Michaelsen emend. Brewin 1958</td>
</tr>
<tr>
<td></td>
<td>Pseudodistoma (cereum) Michaelsen</td>
</tr>
<tr>
<td></td>
<td>sigillinoideos Brewin (=Ritterella)</td>
</tr>
</tbody>
</table>

Currently accepted names are given in brackets afterwards. Kott (1963) synonymises *Homeodistoma novaeezelandiae* with *Pseudodistoma cereum*.

3. *Didemnum albidum* sensu Michaelsen (1942) and Brewin (1951) non Verrill = *Didemnum grande* (Herdman).


(b) Eldredge (1966) maintains *Lissoclinum* Verrill as a subgenus of *Diplosoma*. The full citation of the New Zealand species becomes:

*Diplosoma (Diplosoma) macdonaldi* Herdman

*Diplosoma (Lissoclinum) notti* (Brewin)

Kott (1962) regards *D. (L) notti* as a synonym of *D. (L) fragile* (Van Name). Eldredge (1966) prefers to regard them as distinct species at present.

5. Specific limits are most uncertain in the genus *Leptoclinides* Bjerkan.

Tokioka (1952) thought that *L. diemensis* Michaelsen was probably synonymous with *L. rufus* (Sluiter).

Millar (1960) noted the characters (some not very satisfactory ones) distinguishing *L. sparsus* Michaelsen, *L. diemensis* Michaelsen, *L. sluiteri* Brewin, *L. marmoreus* Brewin and *L. auranticus* Brewin. He recommended maintaining these as separate
species for the time being.

Kott (1962), however, synonymised *L. diemensis*, *L. sluiteri* and *L. auranticus* with *L. rufus* quoting Tokioka (1952) and Millar (1960) in agreement with her action! *Leptoclinides novaeezelandiae* Brewin was synonymised with *L. lissus* Hastings, a species Tokioka (1952) regarded as probably identical to *L. rufus*. *Leptoclinides sparsus* was also synonymised, under the name *L. reticulatus* (Sluiter). *Leptoclinides marmoreus* was retained as distinct.

Eldredge (1966) noted the confusion and recommended retaining all species pending the collection of more material and a generic revision. He is followed here.

6. *Clavelina sigillaria* Michaelsen = *Clavelina claviformis* (Herdman)
7. *Sycozoa umbellata* (Michaelsen) is regarded by Millar (1960) as a synonym of *Sycozoa sigillinoides* Lesson.
8. *Polycitor (Eudistoma) circumvallatum* (Sluiter) = *Eudistoma circumvallatum*
9. *Botryllus magnicoecus* (Hartmeyer,) described for New Zealand by Brewin in 1951, is placed by Kott (1952) in the genus *Botryllloides* Edwards as the species possessas a brood pouch. It should be noted that this condition is not specifically described by Brewin. Brewin's description of *Botryllus Stewartensis* does not clearly indicate the situation of the ovary and the type material should be re-examined to ascertain which genus the species belongs to.

10. Brewin described *Pyura chathamesis* from the Chatham Islands (Brewin 1956). Previously, (Brewin 1952), she had noted the description of *P. lutea* from the same locality by Sluiter (1900). There appears to be no significant difference between the two species and Sluiter's name must be used.

11. The description of *Pyura subuculata* (Sluiter) in Brewin (1946) refers, as is noted in Brewin (1948), to *P. suteri* (Michaelsen).

REFERENCES

Only references cited in the present paper are given here. More comprehensive bibliographies are listed in the papers by Kott and in Brewin (1946).


Ascidians from the Chatham Islands and the Chatham Rise. Trans. R. Soc. N.Z. 84(1), 121-37.


