9. *Brief Notes on the Eodiscids* I, Their Classification with a Description of a New Species and a New Variety.

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(Comm. by H. Yabe, M.LA., Jan. 12, 1943.)

Matthew was the first to classify eodiscids. While he had classified them into four sections in 1896, Raymond established the Eodiscidae in 1913 to include *Eodiscus, Goniodiscus* and *Weymouthia*. Later Pagetia Walcott, Delgadoia Vogdes (= Delgadodiscus Kobayashi) and Hebediscus Whitehouse were added to them and I myself established the Pagetidae to comprise Pagetia and Dipharus. For Raymond’s *Goniodiscus* Howell proposed *Calodiscus* in 1932, because it was a homonym of Müller and Troschel’s *Goniodiscus*, 1842, and subsequently in 1937 Resser pointed out that *Dawsonia* Hartt, 1868, which had long been overlooked, must be used in place of *Calodiscus*, but in my opinion these two are both valid names because *Calodiscus* and *Dawsonia* are different in the number of thoracic segments that they have as well as in other respects.

Recently I** re-examined the whole group of eodiscids, and found that Cobboldites, Paradiscus, Metadiscus, Spinodiscus, Brevidiscus, Deltadiscus, Alemtejoia, Eopagetia and Mesopagetia should be added to them. Not counting the eight species1) of which little is known, as well as another eight species2) which were referred to the eodiscidian genera incorrectly, there are forty-five species and three varieties which are classified here into fifteen genera and three subgenera in five

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* Miscellaneous Notes on the Cambro-Ordovician Geology and Palaeontology, Nos. 11-12.
** This paper is the result of studies which I am undertaking with a research grant from the Department of Education. I wish here to express my thanks to the officials of the department for financial support and to Prof. H. Yabe for his continuous encouragement and for presenting the two companion papers to the academy.

   *Microdiscus* sp. undt. Toll, 1899.
   *Microdiscus orientalis* Walcott, 1905.
   *Microdiscus* sp. nov. by Miquel, 1912, (undescribed).
   *Microdiscus emerci* Czarnocki, 1927, (undescribed).
   *Microdiscus* sp. by Reed, 1934, (undescribed).
3) *Dolichometopus* tatei Woodward, 1884 ........................................ "Lorenzella".
   *Microdiscus* subsagittatus Tate, 1892 ........................................ "Lorenzella tatei".
   *Microdiscus* kochi Toll, 1899 .............................................. Ciceroagnostus.
   *Microdiscus lenaicus* Toll, 1899 .............................................. Ciceroagnostus.
   *Ptychoparia* czekanowski Toll, 1899 ........................................... "Levisia?".
   *Ptychoparia* meglikizi Toll, 1899 ........................................... *Strenuella?*
   *Strenuella (?) attleborensis vigilans* Matthew, 1899 ....................... *Strenuella?*
   *Ptychoparia (?) annio* Cobb, 1910 ......................................... *Strenuella."
families including six subfamilies as below. (Type species of each genus is marked by an asterisk).

Agnostida Kobayashi, 1935.

Microtrilobites, miomeric and isopyogous.

Dawsoniidea Kobayashi (nov.) (= Eodiscidea Richter, 1932, pars.)

Agnostida having two or three segments in thorax and regularly furrowed axial lobe of pygidium; eyes and proparian facial sutures occasionally present; basal side-lobes of glabella always absent).

I. Eodiscidae Raymond, 1913.

Hypoparian Dawsoniidea with distinct axial lobe and trisegmented thorax.

1 a. Calodiscinae Kobayashi, nov.

Eodiscidae having smooth cephalic border.


Eodiscidae with long unfurrowed glabella and furrowed pygidium; nuchal spine absent; borders smooth.

_Agnosuts lobatus_ Hall*, 1847
_Microdiscus parkeri_ Walcott, 1886.

2. Cobboldites Kobayashi, nov.

Similar to Calodiscus, but pleural and ring furrows obscured on the pygidium.

_Microdiscus comleyensis_ Cobbold*, 1910
_Eodiscus simplex_ Cobbold, 1931,
_Cobboldites gracilis_ Kobayashi, nov. (= _Microdiscus cfr. helena_ by Burr in Grabau, 1900, pl. 33, fig. 3).

11 b. Eodiscinae Kobayashi, nov.

Eodiscidae having short glabella, tuberculated cephalic border and unfurrowed pleural lobes of pygidium.

3. Paradiscus Kobayashi, nov.

Eodiscidae with no spine on the posterior side of cephalon; transglabellar furrows occasionally present.

_Microdiscus speciosus_* Ford*, 1873
_Microdiscus helena_ Walcott, 1889
_Microdiscus robustus_ Kobayashi, nov. (= _Microdiscus speciosus_ by Lake, 1907, pl. 3, fig. 7).


Similar to Paradiscus but having spines on the posterior side of the cephalon: transglabellar furrows very weak or absent.

_Microdiscus pulchellus_ Hartt, 1384
_Microdiscus beli-marginitus_ Shaler and Foerste, 1888
_Microdiscus schucherti_ Matthew*, 1896
_Microdiscus bellimarginatus insularis_ Matthew, 1899.

11 c. Spinodiscinae Kobayashi, nov.

Eodiscidae having a nuchal spine and crenulated cephalic border.

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1) For further distinctions of this superfamily from the Agnostidea, see the next paper.
5. **Metadiscus** Kobayashi, nov.

Spinodiscinae with furrowed pleural lobes of pygidium.
- *Microdiscus sculptus* Hicks*, 1871
- *Microdiscus haimantensis* Reed, 1910
- *Eodiscus fusifrons* Saito, 1934
- *Calodiscus foveolatus* Howell, 1935
- *Calodiscus oelandicus* Westergård, 1936
- *Metadiscus bunkeiensis* Kobayashi, nov.
- *Metadiscus bunkeiensis sulcatus* Kobayashi, nov.

6. **Spinodiscus** Kobayashi, nov.

Similar to *Metadiscus* but having unfurrowed pleural lobes of pygidium.
- *Microdiscus punctatus* Salter*, 1864 (=*Microdiscus eucentrus* Linnarsson, 1883)
- *Microdiscus scanicus* Linnarsson, 1883 (a variety of *punctatus*)
- *Microdiscus convexus* Walcott, 1887
- *Spinodiscus matthewi* Kobayashi, nov. (=*Microdiscus pulchellus* by Matthew, 1896, pl. 17, figs. 8 a).

1d. Brevidiscinae Kobayashi, nov.

Intermediate between the Dawsoniidae and Agnostidea, but tentatively placed here.

7. **Brevidiscus** Kobayashi, nov.

Similar to *Calodiscus* but having a shorter glabella: lunate preglabellar depression and transglabellar furrows occasionally present.
- *Brevidiscus lunulatus* Kobayashi*, 1896 (=*Microdiscus lobatus* by Walcott, 1886, pl. 15, fig. 1 a)
- *Brevidiscus (?) agnostoides* Kobayashi, nov. (=*Microdiscus lobatus* by Walcott, 1886, pl. 16, fig. 1)
- *Brevidiscus (?) troyensis* Kobayashi, nov. (=*Microdiscus lobatus* by Walcott, 1886, pl. 16, fig. 1 a).

II. Dawsoniidae Resser, 1937, em.

Hypoparian Dawsoniidae with crenulated cephalic border and bisegmented thorax.

8. **Dawsonia** Hartt, 1868 (non Nicholson, 1873 and Fritsch, 1879).

Dawsoniidae having longiconic glabella and furrowed pygidium.
- *Dawsonia dawsoni* Hartt*, 1888 (=*Microdiscus dawsoni* Billings)
- *Dawsonia spinifera* Kobayashi, nov. (=*Microdiscus dawsoni* by Matthew, 1896, pl. 17, fig. 5 a–c)
- *Dawsonia canadensis* Kobayashi, nov. (=Pygidium of *Microdiscus praecursor* Matthew, 1896, text-fig.).

9. **Deltadiscus** Kobayashi, nov.

Dawsoniidae with breviconic glabella and median preglabella furrow.
- *Deltacandus praecursor* (Matthew*) (Eodiscus punctatus praecursor Matthew, 1886, cephalon only).

III. Dipharidae Kobayashi, nov.

Proparian Dawsoniidae with eyes and depressed lunate cephalic border and trisegmented thorax.

10. **Hebediscus** Whitehouse, 1936.

Dipharidae with eyes and eye-ridges.
- *Ptychaparia attleborensis* Shaler and Foerste*, 1888
Dipharidae with transglabellar furrow and stalked eyes.

*Dipharus insperatus* Clark*, 1923
*Dipharus peculiaris* Kobayashi, nov. (= *Pagetia attleborensis* by Cobbold, 1931, pl. 38, fig. 6).

IV. Pagetiidae Kabayashi, 1935.
Proparian Dawsoniidea with bisegmented thorax.

12. *Pagetia* Walcott, 1916, is the only known genus of the family which is divided into the following three subgenera.


*Pagetia* with thoracic segments of the same outline and ribbed pleural lobes of pygidium: median preglabellar furrow absent.

*Microdiscus significans* Etheridge*, 1902
*Eodiscus spiniger* Saito, 1934
*Eopagetia resseri* Kobayashi, nov. (= *Pagetia clytia* by Resser, 1937, pl. 2, fig. 8).

12 b. *Mesopagetia* Kobayashi, nov.

*Pagetia* with thoracic segments of the same outline: pleural furrows of pygidium: median preglabellar furrow occasionally present.

*Pagetia clytia* Walcott*, 1916
*Microdiscus griesbachi* Reed, 1910
*Pagetia fossula* Resser, 1938
*Pagetia maladensis* Resser, 1939.

12 c. *Pagetia* Walcott, s. str.

*Pagetia* with median preglabellar furrow and smooth pleural lobes of pygidium: posterior thoracic segment broader than the anterior one and its pleural end pointed antero-laterally.

*Pagetia bootes* Walcott, 1916.

V. *Weymouthiidae* Kabayashi, nov.
Smooth Dawsoniidea with trisegmented thorax; eyes and facial sutures occasionally present.


Hypoparian Weymouthiidae with tuberculated cephalic border.

*Agnostus (?) nobilis* Ford*, 1872

V b. *Delgadoiinae* Kobayashi, nov.

Weymouthiidae with eyes and non-tuberculated cephalic border.


Delgadoiinae with a caudal spine; eyes and proparian facial sutures occasionally present.

*Microdiscus caudatus* Delgado*, 1904
*Microdiscus subcaudatus* Delgado, 1904
*Microdiscus venseslaci* Delgado, 1904.

15. *Alemejota* Kobayashi, nov.

Delgadoiinae with no rows of tubercles on the cephalic border, nor caudal spine; eyes occasionally present.
Microdiscus souzai Delgado, 1904
Microdiscus woodwardi Delgado, 1904

Description of *Metadiscus bunkeiensis* sp. nov. and its variety, *sulcata*, var. nov.

*Pagetia (Eopagetia)* sp. nov, Kobayashi and Aoti, Proc. 18 (1942), 305, (listed).

Several detached shields of *Metadiscus bunkeiensis* nov. are contained in the Bunkel collection. Because of the poor state of preservation I thought at first that they had eyes and facial sutures but later found on a better preserved specimen that the parts thought to be the sutures and eyes must be broken margins. Two cephalon at hand are almost identical with that of *M. haimantensis*\(^1\) except for the smooth test of the carapace and presence of faint crenulation on the border seen in one of the two cephalon (fig. 1). On these accounts this species agrees with *M. fusifrons*\(^2\) but its occipital spine is very short.

Fig. 1, 3 & 5. *Metadiscus bunkeiensis* Kobayashi, (nov.)
Fig. 2 & 4. *Metadiscus bunkeiensis* var. *sulcata* Kobayashi, (nov.)

The third cephalon (fig. 2), though similar to the preceding, differs in having a pair of lateral furrows and an occipital one, all distinct. Therefore the name, *sulcata*, is proposed here for this cephalon. Though the posterior end of its glabella is broken, its occipital ring is probably not so much projected behind as that of the typical form.

The pygidia from Bunkei can also be classified into two kinds. One (fig. 4), like that of *haimantensis*, has a tubercle on each ring of


the axial lobe which is lacking in four others. The tuberculated one, however has one or two more rings on the axis than does *haimantensis* and its test is smooth; the non-tuberculate ones (figs. 3 & 5) resembles that of *fusifrons* but the axis is a little broader. Pleural furrows can only be seen in the pygidia at hand only when light is thrown sideways on the specimen.

Because these specimens are fragmentary, it is impossible to determine which pygidium goes with which cephalon, but for the time being the non-tuberculated pygidium is referred to the typical form, the tuberculated one to the varietal form.

*Occurrence:*—*Ptychoparia* zone in the Majo formation in the South of Kanairi, Bunkei area, South Chosen.