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日本古生物學會
Palaeontological Society of Japan

目 次 CONTENTS

報 告 Transactions

記 事 Proceedings

日本古生物學會報告
(Transactions of the Palaeontological Society of Japan)

33. *New Occurrence of Rotaliatina in the Pliocene of Java*

By

Hisakatsu YABE and **Kiyosi ASANO**

(Read Jan. 30th; received Feb. 2nd; 1937)

Rotaliatina is a genus of Foraminifera errected by Dr. J. A. CUSHMAN[1,2] in 1925 on material from the Upper Eocene Alazan shale of Carrizo on the Rio Tamuin, San Louis Potosi, State of Mexico. Its genotype is *R. mexicana* CUSHMAN. Perhaps *Rotalina buliminoides* REUSS described by REUSS[3] in 1851 from the Late Tertiary (Septarien Ton) of Hermsdorf near Berlin could be regarded as congeneric with the Mexican species, being very similar to it in the trochoid spiral of test and simple suture ; the original description and figures are copied below for comparison :—

"Testa elevata, pupiformi, superne dilatata, basi acuta, laevigata ; spire elevata ; aufractibus 3 manifestis ; loculis 7 angustis, convexiusculis ; facie superiore subumbilicata ; aperture tenui, elongata. Altit. 0.35-0.45 mm."

We now have a new species of this genus from the Pliocene of western Java. It bears the following morphological characters:

Rotaliatina globosa sp. nov.

Figs. 3 a, b.

Test sphaeroidal, composed of two or more coils; chambers distinct, all visible on dorsal side, only those of the last coil exposed on ventral side ; suture distinct, marked externally either by interrupted raised line or

1) J. A. CUSHMAN : New Foraminifera from the Upper Eocene of Mexico, Contri. CUSHMAN Lab. Foram. Res., Vol. 1, No. 1, p. 4, 1925.

2) J. A. CUSHMAN : Foraminifera, their Classification and Economic Use, 2nd Ed., 1933.

3) REUSS : Ueber die fossilen Foraminiferen und Entomostraceen der Septarienthone der Umgegend von Berlin, Zeit. Deut. Geol. Gesel., Vol. 3, p. 77, 1851.

in double rows, but simple or grooved in last coil; wall smooth; aperture an arched slit at inner margin of inferior face of last chamber. Longer diameter ca. 2 mm.

Localities:—Bodjong and Tjilegong, Bantam, Java. Holotype (Inst. Geol. and Pal., Tôhoku Imp. Univ., Reg. No. 21397) from Bodjong. Pliocene.

Remarks:—This is one of the most distinctive forms in the Foraminifera fauna from the Tertiary of Bantam, Java; the raised and granulated sutures are of peculiar type and will at once distinguish it from the allied species.

In his recently published report on the Upper Eocene Foraminifera of the southeastern United States, CUSHMAN[4] described

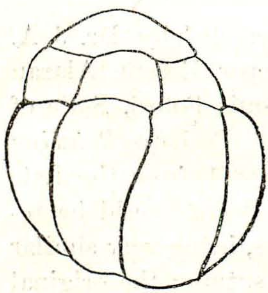
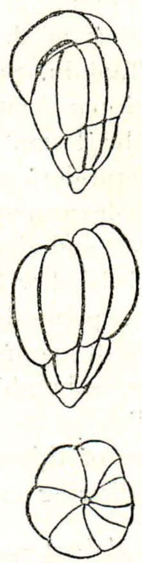


Fig. 1a



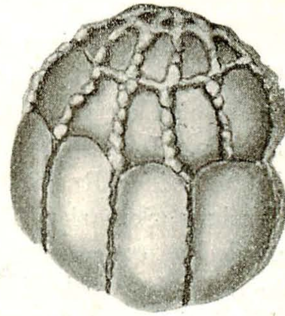
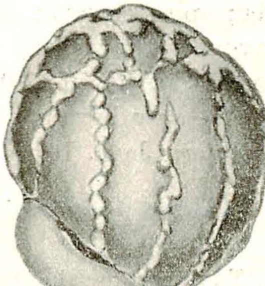


Fig. 3a



Figs. 2a-c

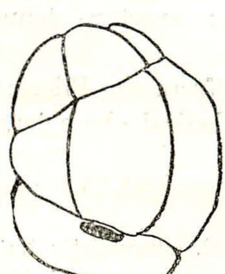


Fig. 1b

Fig. 3b

Figs. 1a, b. *Rotaliatina mexicana* CUSHMAN (Copy of CUSHMAN'S original)
Figs. 2a-c. "*Rotalina bulimoides* REUSS" (Copy of REUSS'S, original)
Figs. 3a-b. *Rotaliatina globosa* n. sp. x 30.

4) J. A. CUSHMAN: Upper Eocene Foraminifera of the Southeastern United States, Prof. Paper U. S. Geol. Surv., No. 181, 1935.

203 species and varieties from the Upper Eocene Jackson Formation and found that the shallow-water forms of this formation are more related to the living shallow-water forms of the Indo-Pacific region than to those of the West Indies, while, on the contrary, the deep-water forms are most closely allied to the recent species of the Gulf of Mexico and the West Indies.

Rotaliatina mexicana CUSHMAN has been confined to the Upper Eocene of Mexico, and it is therefore interesting that its allied species, *R. globosa* n. sp. is common in the Pliocene of Java, in as much as the above noted relationship may exist as pointed out by CUSHMAN between the Foraminifera faunas of the Early Tertiary of North America and those of the recent Indo-Pacific.

Finally we wish to offer our warmest thanks to Messrs. Y. CHITANI and S. WATASE of the Imperial Geological Survey, Tokyo, for kindly submitting this material to our study.

Rotaliatina の新産地（摘要）

矢部長克・淺野　清

Rotaliatina 屬の地質的分布は，從來 Mexico 州 Carrizo の上部始新期のみと限られて居たが，今回 Java の上部鮮新期と考へられてゐる砂岩中より，本屬の一新種（*Rotaliatina globosa* n. sp. を發見したことにより，地質的分布に變革を要することになつた。玆に興味あることは，アメリカの始新期有孔蟲の或者が，現在の Indo-pacific の有孔蟲類と甚だ密接な關係にあることが，CUSHMAN 氏の研究に依り明かにされた所であるが，本新種の發見に依り，一層其感を深くする。尙ほ，REUSS 氏の *Rotalina bulimoides* REUSS, 1851 は *Rotaliatina* に屬するものと考へられ，斯くすれば，本屬の地質的分布は Upp. Eocene (Carrizo, Mexico)—Miocene (Hermsdorf, near Berlin)—Pliocene (Bodjong, Bantam Java) となる。

最後に，資料を提供された地質調査所の千谷，渡瀨の兩氏並に，ジャバ石油組合の方々に厚く感謝の意を表す。

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34. 日本產 *Cassidulina* 屬有孔蟲の分布に就いて

（豫　報）

淺　野　清
中　村　正　義

（昭和 11 年 11 月 21 日講演，12 年 2 月 12 日受理）

新潟，秋田の兩縣下に發達する油田地方に，*Cassidulina* 屬有孔蟲が，多數產出することに就いては，1924 年，矢部教授，半澤助教授の御研究に依つて知られ，三浦半島に於いても，同年，兩先生の報告があり，又最近筆者の一人（淺野）が，既に記錄した。其後東北帝國大學理學部地質學古生物學教室に蒐集された標本に據れば，*Cassidulina* 屬有孔蟲は，現生種，化石種共に，日本全國に亙つて，多數產出することが知られるに至つた。之等の有孔蟲類は，筆者等の觀察に基けば，其大部分のものが，所謂日本要素とも稱すべきものであるが，日本海側（裏日本）のものは，California の San Pedro のものと密接な關係がある。

Cassidulina 屬は，1826 年 D'ORBIGNY に依つて，*Cassidulina laevigata* D'ORB. を模式種 (monotypic) として樹立されたものであるが，同種は船の ballast から得られたものであり，type-locality は判明しない。其後多數の人々の研究があり，本屬の種は，著しく增加するに及んで，可成り複雜な genera の一つとなつた。1925 年 CUSHMAN は，"Notes on the Genus *Cassidulina*" の題下で，本屬に含れる種全部の type-figure 並に type-locality を，文獻と簡單な註を付して發表し，本屬の研究には，著しく便宜なものとなつた。

從來日本產の種に就いては，上揭 CUSHMAN の研究以前の文獻に據つて，調査されたものであり，可成り廣範圍な種名（變異的に觀て）が採用されてゐたが，今回筆者等は，小澤博士採集，California の San Pedro 產有孔蟲資料を得，合せて上揭 CUSHMAN の研究を參照しつゝ，日本產 *Cassidulina* 屬有孔

蟲の再考を行つた次第である。其概要,並に新種の記載は後日に讓るとして,茲には，日本產の種類と，その分布とに就いて述べることにする。

筆者等の取扱つた *Cassidulina* の產地は別表に示した如く，北海道から臺灣に至る 54 箇所である。其等の多くは，鮮新世のものであるが，唯一箇所更新世の箇所が含まれてゐる。現生種は，蒼鷹丸採集のもの並びに，新野理學士採集のものを使用したが，化石種と大差なく，分布も極めて近似的關係にあるので，本豫報に於いては，主として化石種に就いて述べることにした。

識別された日本產 *Ccssidulina* 屬有孔蟲は，次の 12 種である。(*‥‥日本近海現生種)

**Cassidulina japonica* n. sp.
C. y:bei n. sp.
**C. sublimbata* n. sp.
C. setanaensis n. sp.
**C. subglobosa* Brady
**C. subglobosa parva* n. subsp.
**C. subglobosa depressa* n. subsp.
**C. sagamiensis* n. sp.
C. kadusaensis n. sp.
**C. orientale* Cushman
**C. pacifica* Cushman
**C. laevigata* d'Orbigny (?)

次に之等の種の簡單なる註釋をすれば,

C. japonica‥‥從來 *C. crassa* d'Orb. とされてゐたものと考へられるが, d'Orb. の種とは apeıture に依つて區別される。本種は日本海側の油田地方 (化石種), 及び日本海 200〜600 米の深度の箇所に現生種として發見される。三浦，房總兩半島，掛川地方，四國南岸，臺灣等の太平洋側の地域には全然產出しないことは，注意すべきことである。California, San Pedro の鮮新世から多產する *C. Californica* Cush. & Hugh. は

本種に最も近いが稍圓みを帶び，suture は *japonica* 程に depress されてゐない。

C. yabei····本種は，前掲の種と共に，日本海側特有のものであり，太平洋側には產出しない。*C. laevigata* d'Orb. に近いが，suture が straight であること，umbilicus の發達著しいことに依り區別される。現生種としては發見されて居ない。

C. sublimbata····前 2 種と共に，日本海側の要素である。California 產出の *C. limbata* Cush. & Hugh. に近いが，suture が餘り limbate してゐないこと，periphery の sinuation が弱いことで區別される。日本海にのみ現生する。

C. setanaensis····*C. japonica* とは，aperture 及び suture に依つて區別される。北海道瀨棚郡東瀨棚村丸山附近に限つて多數に產出する。

C. subglobosa parva····*C. subglobosa* とは，suture に於いて區別される。太平洋側に多い。

C. subglobosa depressa····aperture は *C. subglobosa* と全く同一であるが，test は次に述べる *C. sagamiensis* の如くに depress してゐる。太平洋側の要素である。

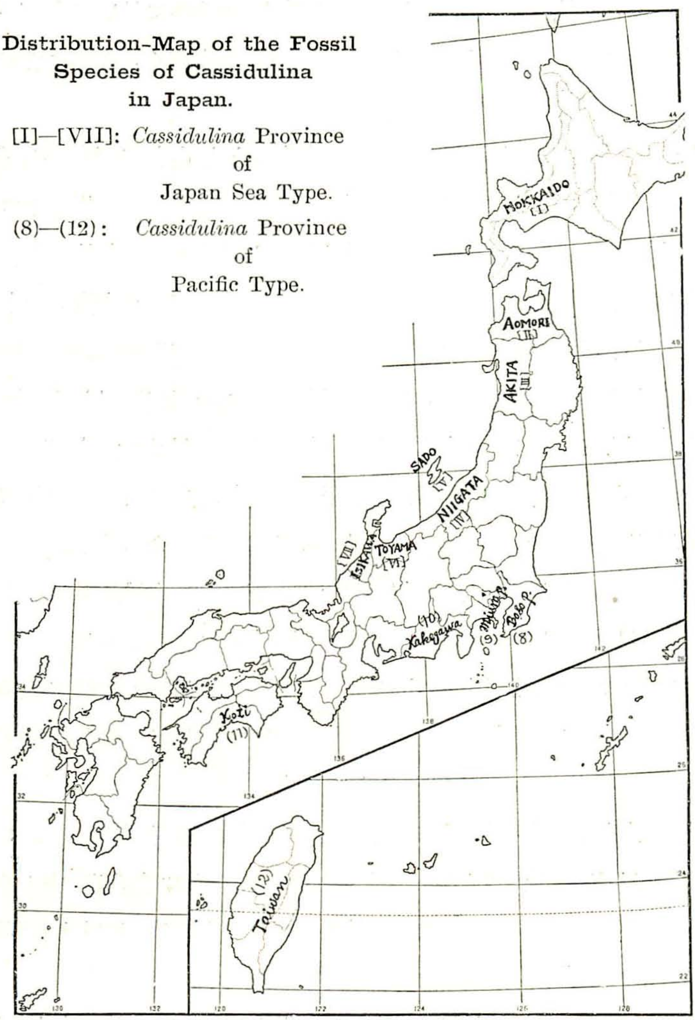
C. sagamiensis····日本海側に多い *C. japonica* に近いが，apertural face が細長く延びて，aperture は suture に沿うて長い。本種は普通 *japonica* の約半分位の大さであり，日本海側に發見されないが太平洋側には分布廣く，臺灣にまで及んで居る。

C. kadusaensis····千葉縣夷隅郡總元村三又にのみ產する化石種であるが，同地方では，本種の個體數は多いが，他の有孔蟲の種は少い。chamber の形態に特徴があり，他の種との區別は容易である。

C. laevigata d'Orbigny (?)····suture の curve してゐること，umbilicus が發達してゐないことは，d'Orbigny の *laevigata* に近いが，apertural view が稍違ふ。

其外，*C. subglobosa* Brady, *C. orientale* Cushman, *C. pacifica* Cushman

は既に太平洋側から報告されてゐる種であるが, 日本海側には殆ど産出しない。*C. orientale* は可成り變異するやうであるが, typical なものは, 三浦半島に多い。



Distribution-Map of the Fossil Species of Cassidulina in Japan.

[I]—[VII]: *Cassidulina* Province of Japan Sea Type.

(8)—(12): *Cassidulina* Province of Pacific Type.

之等の 12 種の分布を觀るに, *C. japonica; C. yabei; C. sublimbata; C. setanaensis* の 4 種は, 石川縣以北の日本海側のみの區城に發見され, 太平洋側には全く産出しない。それらの中 2 種 (*C. yabei* と *C. setanaensis*) は, 現

生種として發見されないが，他の 2 種は，若狹灣以北，特に佐渡島，秋田の沿岸にかけて多い。稍深海性のものと考へられる（200〜600 米）。太平洋側には現生しない。

之に反して，其他の 8 種は，太平洋側に產し,現生種に於いても,少くとも,能登半島以北には發見されない。太平洋側では，分布廣く，臺灣にまで及んでゐる。

Cassidulina 屬有孔蟲が，斯の如く，日本海側と太平洋側に於いて，化石,現生共に區別が著しいことは，非常に興味ある事實である。唯石川縣下のものだけが，日本海側の要素と太平洋側の要素と混在してゐるが，其他の箇所に於いては，單に標本のみ提示されることに依つても，其れが，日本海側のものであるか，或は太平洋側のものであるかは，判定することが出來る。

筆者等は之等の事實に基いて，日本の鮮新世並に,現生 *Cassidulina* 屬有孔蟲の產地を 2 大別し，假に,日本海側を，日本海型 *Cassidulina* 區（*Cassidulina*-Province of Japan Sea Type）とし,太平洋側のものを,太平洋型 *Cassidulina* 區（*Cassidulina*-Province of Pacific Type）と命名しておき度い。

玆に注意すべきことは,化石有孔蟲類の材料としては,大體近似した horizon のものを使用したことであり，殊に日本海側のものに於いて著しい。斯くすれば，日本に於いては，或過去（Pliocene）より，*Cassidulina* に關する限り，現在に於けると同樣に，明瞭な二つの“區”を設けることが出來るのである。卽ち，*Cassidulina* から見た古動物區として興味あるのみならず，日本產 *Cassidulina* 屬有孔蟲の系統を考察する上に於いて，誠に重要な事實である。

此の *Cassidulina* を例證とした日本の古動物區が,他の有孔蟲の屬に於いて,又他の海棲動物群に於いて，如何なる結果を生じてくるか，興味ある問題として，後日の研究に讓る。

最後に筆者等の研究に對して，多大の御援助を與へられ，且つ本文の御校閲を辱うした矢部敎授に深甚な謝意を表して，筆を擱く。

産地	附記圖號に於ける	時代	Cassidulina japonica	C. yabei	C. sublimbata	C. setanaensis	C. subglobosa	C. subglobosa parva	C. subglobosa depressa	C. sagamiensis	C. kadusaensis	C. orientale	C. laevigata (?)	C. pacifica
1. 北海道磯谷郡南尻別村貝殼	[I]	Plioc.	+		+									
2. 北海道壽都郡黒松内村貝殼澗	〃	〃	+											
3. 北海道瀬棚郡利別村美利加	〃	〃			+									
4. 北海道瀬棚郡利別村大曲	〃	〃	+	+										
5. 北海道瀬棚郡利別村花石	〃	〃	+	+	+									
6. 北海道瀬棚郡利別村釣橋	〃	〃	+	+										
7. 北海道瀬棚郡利別村丸山	〃	〃	+	+	+	+								
8. 北海道瀬棚郡利根村南金原	〃	〃	+	+	+									
9. 青森縣東津輕郡奥内村内眞部川	[II]	〃	+		+									
10. 秋田縣河邊郡岩見三内村田屋	[III]	〃	+											
11. 秋田縣由利郡院内	〃	〃	+											
12. 新潟縣佐渡·澤根	[V]	〃	+	+	+									
13. 新潟縣三島郡·久田	[IV]	〃	+	+	+									
14. 新潟縣刈羽郡内鄕村後谷	〃	〃	+	+	+									
15. 新潟縣刈羽郡下高町仲通	〃	〃	+	+	+									
16. 新潟縣刈羽郡北條村夏川谷	〃	〃	+		+									
17. 新潟縣刈羽郡田尻村今熊	〃	〃	+	+	+									
18. 富山縣氷見郡十二町村十二町島崎	[VI]	〃	+	+	+									
19. 富山縣西礪波郡石堤村石堤	〃	〃	+		+									
20. 富山縣西礪波郡子撫村田川	〃	〃	+	+	+									
21. 富山縣西礪波郡子撫村法樂寺	〃	〃	+											
22. 富山縣西礪波郡子撫村安樂寺	〃	〃	+	+	+									
23. 石川縣鹿島郡七尾町岩屋	[VII]	〃	+									+		
24. 石川縣河北郡中條村飛坂	〃	〃					+							
25. 石川縣河北郡小坂村長屋	〃	〃	+											

26. 石川縣河北郡淺川村小二又	[VII]	Plioc.	+											
27. 石川縣河北郡淺川村舘	〃	〃											+	
28. 石川縣石川郡崎浦村大桑	〃	〃											+	
29. 千葉縣市原郡市東村瀬又新田瀬又堰	(8)	Pleistoc.					+		+			+	+	
30. 千葉縣君津郡小糸村	〃	Plioc.					+					+		
31. 千葉縣君津郡大貫町	〃	〃					+			+				
32. 千葉縣君津郡佐貫町	〃	〃					+							
33. 千葉縣夷隅郡總元村三又	〃	〃					+				+			+
34. 千葉縣君津郡湊町笹毛	〃	〃					+		+	+		+	+	
35. 千葉縣安房郡國分寺村廣瀬市場	〃	〃					+			+				+
36. 千葉縣安房郡豐房村	〃	〃					+							
37. 神奈川縣久良岐郡金澤町富岡	(9)	〃					+	+		+				+
38. 神奈川縣久良岐郡金澤町氷取見	〃	〃					+							
39. 神奈川縣久良岐郡金澤町谷津	〃	〃					+	+		+		+	+	+
40. 神奈川縣久良岐郡金澤町寺前	〃	〃					+			+		+	+	
41. 神奈川縣久良岐郡金澤町野島	〃	〃					+	+		+		+	+	+
42. 神奈川縣鎌倉郡玉繩村植木	〃	〃						+				+	+	+
43. 神奈川縣鎌倉郡玉繩村坂下	〃	〃					+		+	+		+	+	+
44. 神奈川縣鎌倉郡村岡村	〃	〃					+	+	+			+		
45. 神奈川縣鎌倉郡本郷村押切	〃	〃					+			+		+	+	
46. 神奈川縣鎌倉郡鎌倉町朝比奈切通	〃	〃					+	+		+		+		+
47. 神奈川縣三浦郡初聲村下宮田	〃	〃										+		
48. 神奈川縣三浦郡南下浦村上宮田	〃	〃					+		+	+		+		
49. 靜岡縣小笠郡山口村滿水	(10)	〃					+							
50. 靜岡縣小笠郡仁藤村仁藤	〃	〃					+							
51. 靜岡縣小笠郡西郷村下西郷	〃	〃					+							
52. 靜岡縣小笠郡南郷村結縁寺	〃	〃											+	
53. 高知縣安藝郡大野	(11)	〃							+					
54. 臺灣高雄州橋子頭	(12)	〃					+		+	+				+
日本海現生			+		+		?						?	
太平洋現生							+	+	+	+		+	+	+

On the Distribution of the Japanese Species of *Cassidulina*

(Résumé)

By

Kiyosi ASANO and Masayosi NAKAMURA

A study of various collections of foraminifera now stored in the collection of the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, Japan, has rendered possible the review of the Japanese species of *Cassidulina*, both fossil and recent.

There are 12 species belonging to the genus *Cassidulina* in Japan; among them 4 species, namely, *C. japonica* n. sp., *C. yabei* n. sp., *C. setanaensis* n. sp., and *C. sublimbata* n. sp. are distributed only in northern Japan, both as recent and fossil, and are not known from the Pacific side of Japan. On the contrary, the other 8 species, namely, *C. subglobosa* BRADY, *C. subglobosa parva* n. subsp., *C. subglobosa depressa* n. subsp., *C. sagamiensis* n. sp., *C. kadusaensis* n. sp., *C. orientale* CUSHMAN, *C. pacifica* CUSHMAN and *C. laevigata* D'ORBIGNY (?), occur only in the recent or fossil materials from the Pacific side and not in those from the Japan Sea side.

The distribution of these interesting forms are the subject of this article and descriptions of the new species or subspecies will appear in another article.

The writers here propose the following two different provinces of the marine Neogene from the view point of distribution of *Cassidulina*.

1) *Cassidulina* province of the Japan Sea type:—
   This includes the Neogene formations in the prefectures of Aomori, Akita Niigata, Toyama, Isikawa and Hokkaidô.
2) *Cassidulina* province of the Pacific type:
   This includes the Neogene formations of Bôsô and Miura Peninsulas, the Kakegawa District and Aki-gun in Kôti prefecture.

The former province seems to be closely related to the Neogene Oil-field of Japan and it is noteworthy that the allied species are commonly found in the Plio-Pleistocene of California.

35. An Occurrence of a New Permian Phyllocarid in South Chosen.

By

Teiichi KOBAYASHI

(Read Jan. 30th.; received Feb., 14th.; 1937)

The material dealt with in this paper was collected by SHIRAKI from a black slate of the Jido series exposed on the southern slope of Mt. Taikwa, Kwasan-ri, Eishun-men, Tanyo-gun, Chiusei-hoku-do, Chosen[1] and submitted me for its description for which generosity thanks of the writer are due to Mr. Takuji SHIRAKI, then a staff of the Fuel Investigation Office at Keijo.

The black slate which yields the phyllocarid is located just above the coal measure D. According to HATAE[2] the limestones of the Jiro series below this coal measure contain the Uralian *Palaeofusulina-Schwagerina* fauna while in the limestone of the Koten series which is overlain by the Jido is found the Moscovian *Fusulina-Fusulinella* fauna. On the other hand KAWASAKI[3] through his palaeobotanical study agreed with Yabe[4] in regard to the lower Permian age of the rich Jido flora mostly obtained from the coal measure D.

On the slabs of black slate at hand are found thirteen carapaces of phyllocarids besides a pinnule of *Pecopteris* sp. which are, however, not well preserved. Neverthless this occurrence is worth while to record, because it is the discovery of phyllocarid or Archaeostraca in the Upper Palaeozoic formation in Eastern Asia, although a few phyllocarids, such as *Sinocaris*[5] and *Tuzoia*,[6] have already

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1) 忠淸北道丹陽郡永春面華山里太華山南坂
2) N. HATAE (1935), The Foraminiferal Fauna in the Limestones of the Heian System in the Vicinity of Neietzu, Kogen-do, (Jour, Geol. Soc. Japan, Vol. 42,) pp. 362-363.
3) S. KAWASAKI (1934) The Flora of the Heian System, Pt. 2, (Bull. Geol. Surv. Chosen Vol. 6, No. 4), p. 260.
4) H. YABE (1919), Report on the Anthracite Formation in Heian-do, Chosen, (Korea) (Bull. Geol. Surv. Chosen Vol. 1, pt. 1)
5) H. MANSUY (1912), Silurien de Si-Yang-Tang et de Nano-Tsou, (Mém, du Ser. géol. de l'Indochine Vol. 1, Fasc. 2.)
6) Ch. E. RESSER and R. ENDO (1912) in RESSER's New Lower and Middle Cambrian Crustacea, (Proc. U. S. Nat. Mus. Vol. 76, Art. 9), p. 9, pl. 3, figs 2-3.

been known to occur in the Lower Palaeozoic formations of Yunnan and Manchuokuo. Furthermore, the fossil is a new form.

The phyllocarid is widely distributed in the Palaeozoic formations of Europe, America and Australia from Cambrian to Carboniferous, but its Permian occurrence is still meager.[1] None is known from the Mesozoic and Tertiary. However, it recurs in the recent marine water. That is the Nebalidae which is regarded by most authors as the descendant of this kind of animal.

The fossil and recent phyllocarids have generally the marine habit. Lately RUEDEMANN[2] emphasized the common inclusion of *Caryocaris* in the pure graptolite shale which he compared with the deposit of the sargasso sea of to-day. However, the phyllocarid is sometimes found also in the coal measure. *Cryptozoe* in Illinois is such an example. *Coreocaris* represents another instance, because, according to Siraki's observation, the black slate of the Jido series is by no means of the marine origin.

Coreocaris eishunensis, new genus and species.
Figs. 1—3.

Carapace thin, composed of two valves which are anchylosed on the dorsal side; each valve triangularly subovate, surrounded by an entire margin and narrowed toward the front; dorsal margin nearly straight; surface marked by a few concentric irregular folds near the margin.

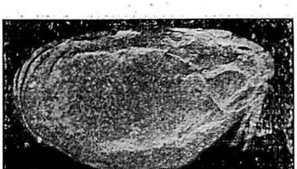
Fig. 1. Holotype

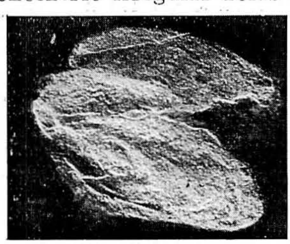
Fig. 2. Paratype

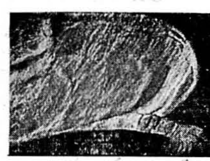
Fig. 3. Paratype

The specimen in fig. 2 is 9.3 mm long and 2.5 mm broad and shows two valves united along the dorsal margin. In the anterior of

1) A. W. VOGDES (1893), A Classed and Annoted Bibliography of the Palaeozoic Crustacea, 1698-1892, to which is added a Catalogue of North American Species, pp. 262-264.

G. GÜRICH (1929), *Silesiocaris* von Leipe und die Phyllocariden überhaupt. (Mitteil. aus dem Min. -geol. Staatinst. Hft. 11.)

2) R. RUEDEMANN (1934), Palaeozoic Plankton of North America, (Geol. Soc. Am. Mem. 2), pp. 36-37.

another specimen or the holotype (fig.1) are observed irregular depressions which are probably the scars of the attachment of the body. A small prolonged spot located at a point close to the anterodorsal margin mignt be an impression of ocula, because this position and outline are approximate to those of *Emmelozoe*.[1] Two appendages, long anterior and short posterior, seen behind the anterior extremity are presumably the antenule and antenna respectively.

In the third specimen (fig. 3) is preserved the abdominal part of the body which is projected behind the carapace. It is composed of four subsquare segments in addition to the telson. This telson may be composed of two spines, on one of which the serration is to be seen on the lower side.

With regard to the bivalved nature this may be referrable to the Ceratiocaridae or Ceratiocarina, but the telson, so far as I can see, consists of two spines, instead of three as usual in the family.

Among the upper Palaeozoic genera of the family *Colpocaris* MEEK, *Acanthocaris* PEACH, *Cryptozoe* PACKARD, *Macrocaris* MILLER and *Stringocaris* VOGDES (i.e. *Solenocaris* MEEK), the first genus[2] has an antero-dorsal sinuation and arcuate dorsal margin; the second[3] is said to have an anterior snout. The present form is distinguished from *Cryptozoe*[4] by its anterior outline and straight dorsal margin. *Macrocaris*[5] has a carapace pointed in front and hind and ornamented by anastomosing striae. Further, its abdomen is relatively large and composed of more than twelve segments. Hence it is also beyond comparison with the Korean form. The outline of carapace is much more elongated in *Stringocaris*[6] as well as in *Caryocaris* than in this form.

Nothozoe[7] from the Ordovician of Bohemia is rather similar to this in the outline, but still less triangular than the Korean form. Thus, none of these genera have this species in its fold, and therefore a new genus is instituted for this Korean form.

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1) T. R. JONES and H. WOODWARD (1887), Monograph of the British Palaeozoic Phyllocarida (Palaeontogr. Soc.) p. 69.

2) S. A. MILLER (1889), North American Geology and Palaeontology, p. 539.

3) ZITTE-EASTMAN's Text-Book of Palaeontology, 1913, p. 751.

4) A. S. PACKARD, jr. (1886), Discovery of the thoracic feet in a Carboniferous Phyllocaridan (Proc. Am. Phil. Soc. Vol. 23), p. 381. pl.

5) MILLER (1889), Op. cit. p. 709, fig. 1236.

6) MILLER (1889), Op. cit. p. 567, fig. 1058.

7) J. BARRANDE (1872), Système Silurien du Centre de la Bohême I, Suppl. p. 536, pl. 23, figs. 15-21, pl. 27, figs. 1-4.

南鮮産二疊紀木葉蝦類新屬に就いて（摘 要）

小 林 貞 一

素木卓二學士採集の忠淸北道丹陽郡永春面華山里太華山南坂の寺洞統より産出せし木葉蝦類を研究するに新屬新種にして，共の特性類似諸屬との比較識別を記す

36. 自昭和6年至同11年葛生骨洞群發掘概報

鹿 間 時 夫

（昭和 12 年 2 月 2 日受理，1 月 30 日講演）

1. 緒　　言

昭和 5 年栃木縣安蘇郡葛生(クズフ)町地方に於て，石灰岩裂罅洞窟中に我國稀有の哺乳動物化石床が發見され，6 年以降筆者は其の發掘研究に從ひ，層位的概報は既に本誌上に發表した。[1] 第 2 報は近く發表の豫定である。過去 6 年間に於ける調査の結果，裂罅洞窟堆積物卽ち葛生層中次の 9 の主なる化石層を認める事が出來た。猶，葛生骨洞群とは之等の化石層を含む裂罅洞窟群の事である。

下部葛生層

1. *Sus* Bed ················葛生町大叫
2. *Stegodon* Bed ··········　〃

上部葛生層

3. *Geoclemys* Bed ··········赤見村出流原
4. amphibia Bed ··········　〃
5. *Palaeoloxodon* Bed ······葛生町大叫
6. *Microtus-Meles* Bed······葛生町大久保
7. carnivora Bed ·········赤見村出流原
8. ? *Parastegodon* Bed······　〃
9. *Moschus* Bed ············寺尾村門澤

以上の中，1·2·5·8 は筆者の研究不能に近い化石層であつたので，止むを得ず

1) 鹿間時夫 (1933): 葛生層に就いて，地質學雜誌，第 40 卷，第 482 號。

殘の 5 化石層の調査に終つた。[1] 之等各化石層の層位的關係は別報にて述べる積りである。本報は幸ひ筆者が直接發掘し得る境遇にあつた過去 6 年間の發掘を以て一先づ第一期として區切りをつけ度い爲に，手元に集積した化石骨を整理した結果である。かゝる計數的方法も，化石床の性質就中成因的方面に資する一助ともならうと信ずる者である。

筆者は組織的發掘を行ふ事が出來なかつたが田中乙太郎氏が，現場に於いて連日篩を以て綿密に採集された葛生町大久保宮田採掘崖第 1・第 2 洞窟を以てタイプとし，其他二三の比較的多産地にて且筆者の可成り採集し得た化石床を加へ，之等について產出化石骨の個數を調べ，其の頭數を計算した。其の結果，上部葛生層の *Palaeoloxodon* Bed, *Parastegodon* Bed を除く 5 化石層より計 4033 個の齒・牙・角・骨・甲（破片を含む）を得，凡そ 424 頭乃至 426 頭，以上の哺乳數・鳥類・爬蟲類・兩棲類よりなる事を推定し得た。小破片や母岩中に包裡され測定不能の標本や位置不明の斷片骨等は除外した。其等は第 1 表・第 2 表に示す如くである。手元にあるものは哺乳類 36 種・鳥類 5 種・爬蟲類 3 種・兩棲類（蛙）3 種で，計 37 屬（亞屬を含め）以上 47 種に達する。標本は大部分東北帝國大學地質學古生物學教室に保管してもらふ積りである。

之等各種の分類的研究は目下進行中であり，表中の種名も暫定的なものが多い。將來成因的考察に關し，鳥獸の確なる分類的決定が，習性を教示するに重大な役割を占めるは云ふまでもないが，本報に於ける統計的考察には暫定的種名も宥される可きものと思ふ。

猶，發掘の大部分は昭和 6·7 兩年に終り，後は不連續な小發掘であつた事を附加する。

種々御懇篤な御指導を戴いた矢部教授・發掘に際し絶大なる努力と義俠を以て始終一貫筆者を援助された田中乙太郎氏・良く發掘研究の精神を理解され心よく骨洞と標本を提供された宮田採掘場主宮田德次郎氏・研究の援助を戴いた岸田久吉氏・等に衷心より感謝致します。

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1) 前報に於ける *Stegodon-Rhinoceros* Zone は *Stegodon* Bed に，*Muntiacus* Zone は *Moschus* Bed に改める。

2. 骨格の計數と表の說明

a. 第 1 表は齒牙•角•骨•甲等の個數を示す。選んだ骨洞は 7 個, 其の內 *Geoclemys* Bed と amphibia Bed とは, 同様の殘留粘土中にあり產狀も似て居るので, 區別しなかつた。

目的は, 頭類を推定する爲と各種鳥獸の骨格完全度を知る爲である。卽ち, 各個體が埋沒時に完全であつたか, 破損分離して居たかを知るにある。完全なる場合は洞窟裂罅內に棲息して屍を殘す場合•墜落して死ぬ場合•餌食として持ち込まれ其のまゝ遺棄される場合•一時的に避難して斃死する場合(自然的墓場等)•洞窟附近にて死に比較的速に流入埋沒する場合等があり, 不完全なる場合は餌食として持ち込まれた殘碎•嚙つたり其他の目的にて不完全なる斷片として持ち込まれる場合•洞窟裂罅外にて斃死し, 流入運搬の途, 分解離散する場合•二次的化石として流入する場合等があるであらう。勿論組織的發掘でないから, 骨洞の化石を全部採り算へたのでもなし, 又風雨に曝された裂罅では, かゝる事は根本的に不可能にも近いし, 一方微細な爲計數より漏れたのもあり脊椎骨•助骨•牙其他で現在の所種の決定不可能に近く切り離したのもあるから, 骨格完全度を知るには, 決して充分のものとは思はれない。例へば表中, 20•21•29•33•41 等は將來他の何れかの種に編入さる可きものである。之等は從つて頭數を揭げてないか, 揭げる場合は總數の項で (( )) を以て示した。然し一骨洞內の化石骨の個數を嚴密に算へる事は, 巨木の葉の數を克明に算へると大同小異であり本報の目的とする所ではない。要は限られた骨洞內の骨格分布の大勢を知るにある。

堆積物の一部分を其の儘實驗室に運び計數しても公平な眞髓に觸れる事は出來ない。骨の分布が化石層內で一樣でないからである。

b. 第 1 表中, ( ) は頭數を示す。個數の中, 左右區別つくものは { を以て示し上に右側を示す。母岩中に包裡されたもので, 計數困難のものは * を以て示す。50. *Natrix* は蛇の脊椎骨で頭數推定不可能である。

c. 第 2 表は第 1 表より推定した頭數を示す。本表は種數と量の關係•卽ち

鳥獸の分布を知るを目的とする。

頭數は各部分の骨・歯・角等より推定した値の中，最大なるものを選んだ。左右下顎骨 2 個の場合，1 頭にするか 2 頭にするかは形狀・大さ・保存程度・歯の磨滅程度（年齢）等を斟酌した。同一個體でも左右の多少の差は認め得るから，大差ない場合は 1 頭とした。例へば第 1 表 17. *Microtus* は宮田採掘崖第 1 洞窟にて，右下顎 40 個・左下顎 42 個で頭數は 42 乃至 82 であるが，40 對の下顎が悉く各々同一個體に屬しない事はプロバブルでないから極小値 42 頭を掲げた。尠くとも半分，同一個體に屬しないとすれば 42 乃至 62 頭であるが，之は見込みであつて，實際の數は其の間に位するかも知れぬ。從つて第 2 表の頭數は實際より尠く見積つてある。事物の性質上到底嚴密に算へ得ぬ事は云ふまでもない。

第 1 表　化石骨個數表

BED	*Moschus* Bed	*Microtus-Meles* Bed			carnivora Bed	*Geoclemys* Bed & amphibia Bed	TOTAL
LOCALITY / FOSSILS	門澤 Kadozawa	宮田第二洞窟 Miyata, 2nd Cave	宮田第一洞窟 Miyata, 1st Cave	築地 Tuidi	出流原 Iduruhara	出流原 Iduruhara	
PRIMATES							
1. *Macaca fuscata* (Blyth)	(1?)		(6)				(7)
Fragments of skull and rami.	2	—	16	—	—	—	18
Detached teeth.	1	—	10	—	—	—	11
PROBOSCIDEA							
2. *Elephantidae*, gen. & sp. indet.			(1?)				(1?)
Tusk.	—	—	1	—	—	—	1
Humerus (piece).	—	—	1	—	—	—	1
Femur (piece).	—	—	1	—	—	—	1
UNGULATA							
3. *Cervus* (*Sika*) *ezoensis* Heude			(1?)				(1?)
Antler.	—	—	2	—	—	—	2

4. *Cervus* (*Cervus*) *elaphus* L.			(1)				(1)
Antler.	—	—	1	—	—	—	1
5. *Cervus* (*Megaceros*) sp.				(1)			(1)
Antler.	—	—	—	1	—	—	1
6. *Cervus* (*Depéretia*) sp.					(1)		(1)
Antler.	—	—	—	—	1	—	1
7. *Cervus* (*Depéretia*) *praenipponicus* SHIKAMA	(9+)		(3)	(3+)	(3?)		(18+)
Antler with fragments.	11	—	9	—	2	—	22
Skull and rami.	8	—	7	2	1	—	18
Detached teeth.	56	—	—	3	1	—	60
Vertebrates.	8	—	4	9	1	—	22
Costa.	5	—	8	1	—	—	14
Scapula.	2	—	2	2	3	—	9
Humerus.	7	—	2	—	2	—	11
Ulna and radius.	6	—	—	1	—	—	7
Carpus.	1	—	—	1	1	—	3
Metacarpus.	6	—	1	—	—	—	7
Innominate bone.	1	—	2	—	—	—	3
Femur.	4	—	—	4	—	—	8
Tibia and fibula.	6	—	3	1	—	—	10
Astragalus.	—	—	—	1	—	—	1
Calcaneum.	7	—	—	—	1	—	8
Tarsus.	—	—	—	1	1	—	2
Metatarsus.	12	—	2	2	—	—	16
Digits.	8	—	—	3	9	—	20
8. *Cervus* cf. *praenipponicus* SHIK.	—	(5)	(9-11)			(2?)	(16-18)
Antler with fragments.	—	—	27	—	—	—	27
Skull and rami.	—	2	25	—	—	2	29
Detached teeth.	—	13	44	—	—	7	64
Vertebrates.	—	2	125	—	—	14	141
Costa.	—	1	87	—	—	—	88
Scapula.	—	1	19	—	—	—	20
Humerus.	—	—	17	—	—	1	18
Ulna and radius.	—	—	28	—	—	2	30
Carpus.	—	—	10	—	—	—	10
Metacarpus.	—	—	18	—	—	4	22
Innominate bone.	—	—	14	—	—	—	14
Femur.	—	—	22	—	—	—	22
Tibia and fibula.	—	—	30	—	—	—	30
Astragalus.	—	1	12	—	—	—	13
Calcaneum.	—	—	10	—	—	—	10
Tarsus.	—	—	2	—	—	—	2
Metatarsus.	—	—	29	—	—	12	41
Digits.	—	—	48	—	—	6	54
9. *Cervus* sp.	(3)		(1)				(4)
Metacarpus.	—	—		—	—	—	1

Femur.	1	—	—	—	—	—	1
Tibia.	4	—	—	—	—	—	4
10. *Moschus moschiferus* L.	(2)						(2)
Ramus.	1	—	—	—	—	—	1
Detached teeth.	10	—	—	—	—	—	10
Metacarpus.	1	—	—	—	—	—	1
Metatarsus.	2	—	—	—	—	—	2
11. *Cervicornia*				(1)			(1)
Ramus.	—	—	—	1	—	—	1
12. *Cavicornia* α			(1)				(1)
Ramus.	—	—	1	—	—	—	1
13. *Cavicornia* β	(1)			(1)			(2)
Radius.	1	—	—	—	—	—	1
Carpus.	5	—	—	—	—	—	5
Metacarpus.	1	—	—	—	—	—	1
Digits.	2	—	—	1	—	—	3
RODENTIA							
14. *Lepus brachyurus* TEM.		(2)	(5)	(1)			(8)
Skull and rami.	—	2	8	—	—	—	10
Detached teeth.	—	—	9	1	—	—	10
Vertebrates.	—	5	12	—	—	—	17
Scapula.	—	—	2	—	—	—	2
Humerus.	—	—	10	—	—	—	10
Ulna and radius.	—	—	1	1	—	—	2
Innominate bone.	—	2	4	—	—	—	6
Femur.	—	3	8	—	—	—	11
Tibia and fibula.	—	5	9	—	—	—	14
15. *Petaurista leucogenys* THOMAS			(1)				(1)
Ramus.	—	—	1	—	—	—	1
16. *Sciurus* sp.				(2)			(2)
Detached teeth.	—	—	—	2	—	—	2
17. *Microtus montebelli* (MILNE-EDWARD)	(2?)	(49)	(42)	(6)	(4)	(2)	(105)*
Skull.	1	11	10	—	2	*	24*
Rami.	—	96 {49, 47}	82 {40, 42}	10 {6, 4}	5 {3, 2}	2 {1, 1}	195*
Detached teeth.	4	37	22	1	2	—	66*
16. *Apodemus speciosus* TEM.	(1)	(9)	(17)	(2)	(2)	(1)	(32)
Skull.	—	1	—	—	—	—	1
Rami.	1	15	28 {17, 11}	2 {1, 1}	2 {1, 1}	1	49
Detached teeth.	—	—	1	—	—	—	1
19. *Muridae*, gen. & sp. indet.		(1)					(1)
Detached teeth.	—	1	—	—	—	—	1
20. *Muridae* (*Microtus* or *Apodemus*)							
Detached teeth (inciser).	4	96	154	20	11	*	285*
Humerus.	—	83 {37, 46}	3	5	—	*	91*
Ulna and radius.	—	25	6	2	—	*	33*
Innominate bone.	—	53	7	—	1	*	61*

Femur.	—	119	26	4	3	*	152*
Tibia and fibula.	—	100	22	3	1	*	126*
21. Rodentia or Insectivora							
Vertebrates.	—	12	—	—	—	—	12
Costa.	—	23	—	—	—	—	23
CARNIVORA							
22. *Canis* cf. *lupus* L.			(2)				(2)
Skull and ramus.	—	—	2	—	—	—	2
23. *Nyctereutus* sp.	(1)		(1)		(4?)		(6?)
Skull and rami.	—	—	—	—	5	—	5
Detached teeth.	2	—	—	—	—	—	2
Vertebrates.	—	—	1	—	5	—	6
Scapula.	—	—	—	—	2	—	2
Humerus.	—	—	—	—	3	—	3
Ulna and radius.	—	—	—	—	2	—	2
Femur.	—	—	—	—	1	—	1
Tibia and fibula.	—	—	—	—	3	—	3
Digits.	—	—	—	—	2	—	2
24. *Ursus tanakai* SHIKAMA MS			(1)				(1)
Ramus.	—	—	1	—	—	—	1
25. *Meles* cf. *anakuma* TEM.	(2)	(6)	(19?)	(1)	(8?)	(3?)	(39?)
Skull and rami.	2	27	91	2	11	4	137
Detached teeth.	4	59	70	2	—	8	143
Vertebrates.	—	2	44	3	2	5	56
Costa.	—	4	—	1	2	12	19
Scapula.	—	—	—	—	1	—	1
Humerus.	—	1	29	1	2	1	34
Ulna and radius.	—	—	12	—	3	1	16
Innominate bone.	—	—	13	—	1	2	16
Femur.	—	—	21	1	2	1	25
Tibia and fibula.	—	—	12	1	1	4	18
Digits.	—	—	—	—	—	6	6
26. *Meles* sp. nov.			(1)				(1)
Skull and ramus.	—	—	2	—	—	—	2
27. *Mustela* (*Mustela*) *erminea nippon* (CABRERA)		(2)	(2)				(4)
Skull and rami.	—	4	2	—	—	—	6
28. *Mustela* (*Lutreola*) *itatsi* TEM.		(2)	(5)				(7)
Skull and rami.	—	3	12	—	—	—	15
Detached tooth.	—	—	1	—	—	—	1
29. *Mustelidae*, aff. *Meles*							
Costa.	—	—	44	—	—	—	44
Humerus.	—	—	5	—	—	—	5
Ulna and radius.	—	—	39	—	—	—	39
Femur.	—	—	8	—	—	—	8
Tibia and fibula.	—	—	28	—	—	—	28
Digits.	—	—	71	—	—	—	71

30. *Felis* cf. *microtis* MILNE-EDWARDS		(1)					(1)
Ramus.	—	1	—	—	—	—	1
31. *Felis* sp. α	(2)						(2)
Detached teeth.	19	—	—	—	—	—	19
Ulna.	1	—	—	—	—	—	1
Digits.	1	—	—	—	—	—	1
32. *Felis* sp. β				(1)	(1)		(2)
Detached teeth.	—	—	—	1	2	—	3
33. *Felis* sp.			(2)				((2))
Femur.	—	—	1	—	—	—	1
Digits.	—	—	16	—	—	—	16
CHIROPTERA							
34. *Nyctalus aviator* THOMAS		(1)					(1)
Ramus.	—	1	—	—	—	—	1
35. *Murina hilgendorfi* (PETERS)		(1)					(1)
Ramus.	—	1	—	—	—	—	1
36. *Pipistrella abramus* (TEM.)?		(1)					(1)
Skull.	—	1	—	—	—	—	1
37. *Chiroptera*, gen. & sp. indet.		(1)					(1)
Ramus.	—	1	—	—	—	—	1
INSECTIVORA							
38. *Crocidura dsinezumi* (TEM.)			(1)		(1)		(2)
Rami.	—	—	1	—	1	—	2
39. *Sorex shinto* THOMAS		(3+)	(5)				(8+)
Rami.	—	3+	6	—	—	—	9+
40. *Chimarrogale crassidentata* KISHIDA		(1)	(1)	(1)		(2)	(5)
Skull.	—	—	—	1	—	1	2
Rami.	—	1	1	—	—	1	3
41. *Soricidae* (*Sorex* or *Chimarrogale*)		(7)	(1)	(1)			((9))
Humerus.	—	10 {3/7}	1	—	—	—	11
Ulna and radius.	—	1	—	1	—	—	2
Femur.	—	2	—	—	—	—	2
Tibia and fibula.	—	6	—	—	—	—	6
42. *Mogera wogura* (TEM.)	(1)	(18)	(13)	(6)	(4)	(5)	(47)*
Skull.	—	3	6	1	—	1	11
Rami.	1	34 {18/16}	19 {6/13}	5 {3/2}	3 {3/0}	5 {3*/2}	67*
Detached teeth.	—	1	3	—	—	*	4*
Scapula.	—	8	4	1	—	*	13*
Humerus.	—	20 {11/9}	1	7 {1/6}	6 {4/2}	6 {4*/2}	40*
Ulna and radius.	—	30	5	8*	4	1*	48*
Innominate bone and sacrum.	—	10	4	—	—	*	14*
Femur.	—	11	1	1	—	*	13*
Tibia and fibula.	—	13	4	—	—	*	17*
Digits.	—	—	—	*	—	*	*

AVES							
43. *Phasianus* sp.		(7+)	(27+)	(1)	(5)	(4+)	(44+)*
Skull.	—	1	5	—	—	1*	7*
Ramus.	—	—	1	—	—	—	1
Vertebrates.	—	3	5	—	2	*	10*
Scapula.	—	2	29 {17/12}	1	2	4	38
Humerus,	—	—	61 {26/35}	—	9	8 {7/1}	78
Ulna and radius.	—	—	27	1	—	2	30
Metacarpus.	—	1	20 {9/11}	—	6	2 {1/1}	29
Sacrum.	—	6	6	—	1	3	16
Femur.	—	—	26 {14/12}	—	2	2	30
Tibia and fibula.	—	—	43 {23/20}	1	3	8 {4/4}	55
Tarso-Metatarsus.	—	12	26 {13/13}	1	2	4 {3/1}	45
Furcula.	—	—	2	—	—	—	2
Sternum.	—	—	14	—	3	1	18
44. Aves, gen. & sp. indet. α		(1)					(1)
Ramus.	—	1	—	—	—	—	1
45. Aves, gen. & sp. indet. β		(1)					(1)
Sacrum.	—	1	—	—	—	—	1
46. Aves, gen. & sp. indet. γ		(1)					(1)
Tarso-Metatarsus.	—	1	—	—	—	—	1
47. Aves, gen. & sp. indet. δ			(1)				(1)
Tarso-Metatarsus.	—	—	1	—	—	—	1
REPTILIA							
48. *Cyclemys miyatai* SHIKAMA MS			(1)				(1)
Shell.	—	—	1	—	—	—	1
Skull.	—	—	1	—	—	—	1
Humerus.	—	—	1	—	—	—	1
49. *Geoclemys yabei* SHIKAMA MS				(1)	(6)		(7)
Carapace.	—	—	—	—	2		2
Plastron.	—	—	—	—	2		2
Pieces of shell.	—	—	—	2	56+		58+
Vertebrate.	—	—	—	—	1		1
Coracoid ?	—	—	—	—	1		1
Humerus.	—	—	—	—	5		5
Ulna and radius.	—	—	—	—	2		2
Ilium.	—	—	—	—	2		2
Pubis.	—	—	—	—	2		2
Tibia.	—	—	—	—	1		1
50. *Natrix tigrina* (BOIE) ?		?		?	?	?	?
Vertebrates.	—	38	—	18	4+	*	60+*
AMPHIBIA							
51. Anura, gen. & sp. indet. α		(6)	(3)	(2)	(1?)	(11+)	(23+)*
Skull with fragments.	—	13	1	—	*	9*	23*
Vertebrates.	—	7	—	1	*	20*	28*
Coccyx.	—	6	—	—	*	8*	14*

Pectoral arch (piece).	—	2	3	—	*	13*	18*
Humerus.	—	6	1	—	1*	22 {10 12	30*
Ulno-Radius ?	—	6	5	—	*	16*	27*
Pelvic arch (piece).	—	5	2	2	1*	10 {7 3	20*
Femur ?	—	8	2	3	*	45*	58*
Tibio-Fibula ?	—	12	5	1	*	53*	71*
Metatarsus and digits.	—	22	1	—	*	17*	40*
52. Anura, gen. & sp. indet. β		(4)					(4)
Tibio-Fibula.	—	7	—	—	—	—	7
53. Anura, gen. & sp. indet. γ		(1)		(1)		(1)	(3)
Pectoral arch (piece).	—	—	—	—	—	1	1
Humerus.	—	1	—	—	—	1	2
Ulno-Radius.	—	1	—	—	—	—	1
Pelvic arch (piece).	—	—	—	1	—	3	4
Metatarsus and digits.	—	5	—	—	—	—	5
TOTAL	219	1134	1939	154*	74 (150* + 363*)		4033*
					150*	363*	

( ) Estimated individual numbers of animals.

(( )) Ditto of indeterminable animals.

— Absent. { Right and left sides of specimens in above and below lines.

* Specimens of incalculation embedded in matrix.

第 2 表 化 石 頭 數 表

BED / LOCALITY / FOSSILS	*Moschus* Bed	*Microtus-Meles* Bed			carnivora Bed	*Geoclemys* Bed & amphibia Bed	TOTAL
	門澤 Kadozawa	宮田第二洞窟 Miyata, 2nd Cave	宮田第一洞窟 Miyata, 1st Cave	築地 Tuidi	出流原 Iduruhara	出流原 Iduruhara	
1. *Macaca fuscata* (BLYTH)	1?	—	6	—	—	—	7?
2. *Elephantidae*, gen. & sp. indet.	—	—	1?	—	—	—	1?
3. *Cervus* (*Sika*) *ezoensis* HEUDE	—	—	1?	—	—	—	1?
4. *C.* (*Cervus*) *elaphus* L.	—	—	1	—	—	—	1
5. *C.* (*Megaceros*) sp.	—	—	—	1	—	—	1
6. *C.* (*Depéretia*) sp.	—	—	—	—	1	—	1
7. *C.* (*Depéretia*) *praenipponicus* SHIKAMA	9+	—	3	3+	3?	—	18+
C. cf. *praenipponicus* SHIK.	—	5	9–11	—	—	2?	16–18
8. *C.* sp.	3	—	1	—	—	—	4
9. *Moschus moschiferus* L.	2	—	—	—	—	—	2

10. *Cervicornia*	—	—	—	1	—	—	1
11. *Cavicornia α*	—	—	1	—	—	—	1
12. *Cavicornia β*	1	—	—	1	—	—	2
13. *Lepus brachyurus* TEM.	—	2	5	1	—	—	8
14. *Petaurista leucognys* THOMAS	—	—	1	—	—	—	1
15. *Sciurus* sp.	—	—	—	2	—	—	2
16. *Microtus montebelli* (MILNE-EDWARDS)	2?	49	42	6	4	2	105*
17. *Apodemus speciosus* THOMAS	1	9	17	2	2	1	32
18. *Muridae*, gen. & sp. indet.	—	1	—	—	—	—	1
19. *Canis* cf *lupus* L.	—	—	2	—	—	—	2
20. *Nyctereutus* sp.	1	—	1	—	4?	—	6?
21. *Ursus tanakai* SHIKAMA MS	—	—	1	—	—	—	1
22. *Meles* cf. *anakuma* TEM.	2	6	19?	1	8?	3?	39?
23. *Meles* sp. nov.	—	—	1	—	—	—	1
24. *Mustela* (*Mustela*) *erminea* (Cab.)	—	2	2	—	—	—	4
25. *M.* (*Lutreola*) *itatsi* TEM.	—	2	5	—	—	—	7
26. *Felis* cf. *microtis* MILNE-EDWARDS	—	1	—	—	—	—	1
27. *Felis* sp. *α*	2	—	—	—	—	—	2
28. *Felis* sp. *β*	—	—	—	1	1	—	2
Felis sp.	—	—	2	—	—	—	2
29. *Nyctalus aviator* THOMAS	—	1	—	—	—	—	1
30. *Murina hilgendorfi* (PETERS)	—	1	—	—	—	—	1
31. *Pipistrella abramus* (TEM.)?	—	1	—	—	—	—	1
32. Chiroptera, gen. & sp. indet.	—	1	—	—	—	—	1
33. *Crocidura dsinezumi* (TEM.)	—	—	1	—	1	—	2
34. *Sorex shinto* THOMAS	—	3+	5	—	—	—	8+
35. *Chimarrogale crassidentata* KISHIDA	—	1	1	1	—	2	5
36. *Mogera wogura* (TEM.)	1	18	13	6	4	5	47*
37. *Phasianus* sp.	—	7+	27+	1	5	4+	44+
38. Aves, gen. & sp. indet. *α*	—	1	—	—	—	—	1
39. Aves, gen. & sp. indet. *β*	—	1	—	—	—	—	1
40. Aves, gen. & sp. indet. *γ*	—	1	—	—	—	—	1
41. Aves, gen. & sp. indet. *δ*	—	—	1	—	—	—	1
42. *Cyclemys miyatai* SHIKAMA MS	—	—	1	—	—	—	1
43. *Geoclemys yabei* SHIKAMA MS	—	—	—	1	6		7
44. *Natrix tigrina* (BOIE)?	—	?	—	?	?	?	?
45. Anura, gen. & sp. indet. *α*	—	6	3	2	1?	11+	23+*
46. Anura, gen. & sp. indet. *β*	—	4	—	—	—	—	4
47. Anura, gen. & sp. indet. *γ*	—	1	—	1	—	1	3
			173+		6		424+
TOTAL			—				—
	25+	124+	175+	31+	34	31	426+

— 缺除　　* 母岩中に包裡され計數不能の標本よりなるもの。

3. 推定事項

a. 概　說

第2表によつて明なる如く，化石の水平分布と頭數とに著しい粗密がある。筆者によつて47種の化石を次の如き要素に分つ。

卓越要素 ……20頭以上にて水平分布大なるもの。

從屬要素 A…… 5頭以上にて水平分布相當に大なるもの。
從屬要素 B…… 5頭以下にて水平分布小なるもの。

卓越要素はニツポンムカシ鹿・ハタネズミ・アカネズミ・アナグマ(ムジナ)・モグラ・雉・蛙で，從屬要素Aはウサギ・タヌキ・イタチ・トガリネズミ・カワネズミ・クサガメ及び蛇である（第3表)。即ち上部葛生層の大部分の化石群は鹿と

第3表　主要化石表

卓越要素	*Cervus* (*Depéretia*) *praenipponicus* SHIKAMA *Microtus montebelli* (MILNE-EDWARDS) *Apodemus speciosus* THOMAS *Meles* cf. *anakuma* TEMMINCK *Mogera wogura* (TEMMINCK) *Phasianus* sp. Anura, gen. & sp. indet. α
從屬要素A	*Lepus brachyurus* TEMMINCK *Nyctereutus* sp. *Mustela* (*Lutreola*) *itatsi* TEMMINCK *Sorex shinto* THOMAS *Chimarrogale crassidentata* KISHIDA *Geoclemys yabei* SHIKAMA MS *Natrix tigrina* (BOIE)?

小形鳥獸・龜・蛇・蛙等よりなる低山性森林地帶(即ち現在の葛生町附近の地理的狀況に該當する）の動物群である。主要メムバーが穿地性又は其に近い性質の獸類である事は重要な意味を有する。第3表の各種は殆んど大部分，骨格が完全に近く揃つて居るに反し，從屬要素Bは斷片的な骨格が多く下顎1個しか知られぬものも多い。既述の色んな場合を考察すれば自ら動物群の骨洞に於ける由來が判明するであらう。

此の種の化石群の例を海外に求めば北米合衆國 Arkansas 州の Conard Fissure である[1]。一骨洞より哺乳類 49 種・鳥類 7 種・爬蟲類 4 種・蛙類 4 種が得られたので葛生より一段と豐富であるが，多くは穿地性のと嚙齒類・食蟲類等の小形哺乳類で穴居したとされる。其他當時裂罅の附近に棲んだと思はれる熊・猫等の食肉類と其の餌となつたらしい鹿・野猪及び裂罅の一部に穴居したらしい鼬鼠・梟等と其の餌となつたらしい小形哺乳類・蛙・爬蟲類等よりなる。葛生に於ては一部は確に穴居であつたであらう。Conard Fissure の如き各鳥獸の食物連鎖は將來の研究に讓らねばならぬ。

第 4 表 化石個數と頭數との關係表

	門 澤	宮 田 第 2 洞窟	宮 田 第 1 洞窟	築 地	出流原 食肉類層	出流原 龜蛙層
化石個數	219	1134	1939	154	150	363
頭數	25	124	173-175	31	34	31
個數/頭數	8.8	9.1	11.2-11.1	4.8	4.4	11.7

第 4 表より推察すれば大小各部分の骨の個數は頭數の約 12 倍以下である。發掘の精度が增す程此の値は大となる傾向にある。最も綿密に掘つた宮田第 1 洞窟にては値も大であり，發掘不充分であつた築地は小である。出流原 carnivora Bed で値が小なのは發掘の粗漏によるのでなく卓越要素たるハタネズミ・アカネズミ・モグラ・雉等の個數が尠いからである。又 amphibia Bed, *Geoclemys* Bed の値が大なのは蛙の化石個數が例外的に多いからである。

b. *Moschus* Bed.

ニツポンザル・ニツポンムカシジカ・ジヤコウジカ・ハタネズミ・アカネズミ・タヌキ・アナグマ・モグラ・虎科の猛獸等よりなる。最も頭數の多いのはニツポンムカシジカで鼠類や土龍は尠い。又鳥類・爬蟲類・蛙類を全然缺除する事も著しい點である。云はば鹿と虎科の猛獸の化石床で *Microtus-Meles* Bed とは可成り性質の異つたものである。

c. *Microtus-Meles* Bed.

1) Brown, B. (1909): The Conard Fissure, a Pleistocene bone Deposits in Northern Arkansas, Mem. Amer. Mus. Nat. Hist., Vol. IX.

最も豊富な化石層である。鳥類の多い事を特徴とする。ニツポンムカシジカ・鼠類・モグラ等も多い。哺乳類 33 種・鳥類 5 種・爬蟲類 2 種・蛙類 3 種である。

d. carnivora Bed.

ムカシジカ・ニツポンムカシジカ・ハタネズミ・アカネズミ・タヌキ・アナグマ・デネズミ・モグラ・虎科の獸・雉・龜・蛙等よりなる。最も頭數の多いのはアナグマである。頭數も大で骨格の充分なのはアナグマ・タヌキ・雉・龜で *Microtus-Meles* Bed に比し單調である。

e. *Geoclemys* Bed, amphibia Bed.

ムカシジカ・ハタネズミ・アカネズミ・アナグマ・カハネズミ・モグラ・雉・龜・蛙等よりなる。骨格充分で頭數の多いのはハタネズミ・アナグマ・モグラ・雉・龜・蛙で，*Geoclemys* Bed には龜・蛙があり amphibia Bed には殘のものがある。本 2 化石層の特徴は斷片的のもの尠く，龜・蛙等に至るまで骨格の見事に保存される點である。

f. 其　　他

上部葛生層化石群の一の特徴は若年の個體が多い事である。之はニツポンザル・ニツポンムカシジカ・野牛・イタチ・虎科の獸 (*Felis* sp. β) 等に著しい。之等のものの由來には考慮すべき點と思はれる。

猶，食肉獸・嚙齒類等の咬痕・嚙痕ある骨片とか，糞石の如きは見出し得なかつた。

4. 結　　尾

過去 6 年間に於ける上部葛生層 5 化石層の計數的調査の結果，哺乳類 36 種・鳥類 5 種・爬蟲類 3 種・兩棲類 3 種，計 37 屬 47 種 424 乃至 426 頭を得，4033 個の齒牙・角・骨・甲を得た。第 1 表・第 2 表に示す。之等化石群の内主要なる要素は第 3 表に示す。頭數と水平分布に粗密があり，密なるものは骨格充分であり又穿地性のものが多い。米國の Conard Fissure に似る。各化石層は互に多少の成因的差を有する。

Short Notes on the Excavation of the Ossiferous Fissures and Caves in Kuzuü during the Years 1931 to 1936

(Résumé)

By

Tokio SHIKAMA

The occurrence of a rich mammalian fauna in some of the limestone fissures and caves of Kuzuü in Aso-gun, Totigi-ken, came to the first time in 1930 to the notice of geologists ; since that time, the author repeated excavations of the ossuaries to the last year, with kind assistance of Mr. O. TANAKA, a resident in Kuzuü, to whom he is much obliged for facilitating the dangerous and difficult task of excavation and fossil collection. The laboratory work of fossils collected is still in progress under the guidance of Prof. H. YABE in the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, where all the materials obtained by excavation are deposited.

The fissure deposits of Kuzuü, the "Kuzuü formation" of the author, is divisible into three parts, lower, middle and upper. The lower Kuzuü formation consists of two fossil beds, the lower, *Sus* bed and the upper, *Stegodon* bed ; the upper Kuzuü has seven, *Geoclemys*-, amphibia-, *Palaeoloxodon*-, *Parastegodon*-, *Microtus-Meles*-, carnivora- and *Moschus* beds in ascending order ; and the middle Kuzuü is barren of fossils. In the present article only the *Geoclemys*-, amphibia-, *Microtus-Meles*-, carnivora- and *Moschus* beds of the upper Kuzuü are taken into consideration.

The fossil bones, teeth, antlers and shells procured by the author from Kuzuü during the past six years amount to 4033 in number ; they comprise 36 species of mammalia, 5 species of aves, 3 species of reptilia and 3 species of amphibia (anura), altogether representing more than 424 (or more) individuals in total. The actual number of samples and the estimated number of individuals (in parenthesis) of each species are given in Table 1 ; from this table one can get the general, though faint, idea of the numerical ratio of skeletal parts excavated of each species to the approximate individual numbers by estimation. In Table 2 are given only the estimated numbers of individuals of each species in order to show the relative population among the different species ; perhaps this statistical method may serve for palaeoecological analyses of the fossils beds or consideration of the mechanism of the fossil entombment. In strict sense, of course, it is almost impossible to estimate the total number of specimens preserved in one ossuary, especially by intermittent excavaations in small scale as in the author's enterprise ; yet his intention lies in knowing, if possible, the proportion in numerical value, though only in approximation, of the skeletal parts of different animals procured from each ossuary.

The specific elements of the fossil fauna under consideration are divided into the following three categories according to their frequency or population.

1. Dominant elements, in which the finds of the skeletal parts correspond to

20 individuals or more, and are found in all or at least in the majority of different ossuaries.

2. Subordinate elements of A type in which the finds of the skeletal parts correspond to less than 20 and more than 5 individuals and are found at least in the majority of the different ossuaries.
3. Subordinate elements of B type in which the finds of the skeletal parts correspond to less than 5 individuals and are found in only a limited number of the ossuaries.

The dominant elements and subordinate ones of A type are listed in Table 3; most of them are fossorial in habit, and their skeletal parts are rather completely recovered. On the contrary, the subordinate elements of B type are known only of very few and fragmental remains.

The Kuzuü ossiferous fissures, so far as the 5 fossil beds are concerned, are more or less like the Conard fissures in Arkansas, United States of America, in the constitution of fauna. In the case of Kuzuü, it can be at present said that the total number of the skeletal parts procured in each ossuary is less than twelve times the estimated number of animal individuals. The 5 fossil beds are rather different from one another in their faunal characters and the *Microtus-Meles* bed is most varied in faunal elements.

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37. *Restudy on the Dames' Types of the Cambrian Trilobites from Liaotung*

By

Teiichi KOBAYASHI

(Contribution from the Geological Institute, Imperial University of Tokyo.
Read Sept. 26th., 1936; received March 8th., 1937)

The pioneer of the Cambrian trilobite research in Eastern Asia is DAMES[1] who described 14 species through the study on the collections procured by Richthofen from three localities, Saimaki[2], Taling[3] and Wulopu[4] in Liaotung.

1) The Saimaki collection was obtained from two different horizons.

a) One is a greenish gray slabby limestone containing the trilobites as follows:—

Conocephalites frequens DAMES
Anomocare latelimbatum DAMES
Agnostus chinensis DAMES

b) The other is gray coloured fine grained or massive limestone yielding

Conocephalites quadriceps DAMES
Anomocare majus DAMES
Anomocare subcostatum DAMES and
(?) *Anomocare latelimbatum* DAMES.

2) Among the Taling collection procured from loose rocks in a wall the followings can be distinguished from the lithic aspects:—

a) A slabby gray limestone with *Conocephalites frequens* DAMES.

b) Greenish gray limestone with black spotts containing

1) W. DAMES (1883), Cambrische Trilobiten von Liaotung, in Richthofen's China Vol. IV, pp. 3-33, pls. I-II.

2) 賽馬集

3) 大岺

4) 臥龍舖

Anomocare minus DAMES and
Liostracus talingensis DAMES

c) Greenish blue massive limestone containing
Conocephalites subquadratus DAMES

d) Light gray limestone with impregnation of iron hydroxide containing
Conocephalites sp. indet. and
Anomocare nanum DAMES

e) Dark gray to black oolitic limestone with
Conocephalites typus DAMES
Anomocare nanum DAMES
(?) *Liostracus* sp. indet. and
an indeterminable pygidium.

3) The Wulopu collection from the débris in a slope is composed of two kinds of rocks as below:—

a) Dark gray massive limestone containing
Dorypyge richthofeni DAMES and
Anomocare planum DAMES

b) Light gray oolitic limestone with
Dorypyge richthofeni DAMES and
Liostracus megalurus DAMES.

DAMES opined that the faunas of Saimaki and Taling might probably be equated to the Andrarum in Scandinavia as well as the lowest portion of the Potsdam sandstone of North America. Because of the resemblance of *Dorypyge richthofeni* with *Dikelocephalus gothicus* and *D. quadriceps*, the *richthofeni* limestone of Wulopu was correlated to the Quebec group in the Ordovician. No exact equivalent of the limestone, however, could not be found in Europe, but the Scandinavian *Ceratopyge* limestone might be suggested for it.

As to the brachiopod faunas of Taling and Saimaki KAYSER[1] supported the view of the Middle Cambrian age, but GOTTSCHE[2] suggested the late Middle Cambrian for the Saimaki as well as Wulopu, but the Ordovician for the Taling fauna.

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1) E. KAYSER (1883), Cambrische Brachiopoden von Liaotung, in Richthofen's China Vol. IV, pp. 34-36, pl. III.

2) C. GOTTSCHE (1886), Geologische Skizze von Korea (Sitzungsber, d. Akad. d. Wissensch. zu Berlin), p. 866.

All of the three faunas were regarded, however, as the Middle Cambrian by WALCOTT[1]. In Lethaea Geognostica FRECH[2] expressed a view that the Wulopu fauna might be older than those of Saimaki and Taling and could possibly be as old as the Lower Cambrian. On the contrary BERGERON[3] took the Saimaki fauna for the Upper Cambrian.

Finally, LORENZ[4] through the actual comparison of his collections with DAMES' types, was lead to the conclusion that the Wulopu fauna is of the Middle Cambrian age, but the Saimaki of the Upper. He believed further, "dass die Fauna von Taling sowohl dem Mittel- als auch dem Oberkambrium gehört."

Thus, concerning the chronology of the three faunas have been established various views. Since WALCOTT's monumental work on the Cambrian faunas of China had appeared in 1913, later students, however, founded their studies mainly upon his monograph and did not look into the previous works very closely.

During my visit to Berlin I had an opportunity to make a restudy on the DAMES' types and unexpectedly found that WALCOTT's identification has not correctly been done. For example, such a well known species as *Agnostus chinensis* is in fact not the Middle Cambrian as so believed for a long time. DAMES founded his species upon two species of the Upper Cambrian agnostids, both of which are generically distinct from WALCOTT's *chinensis*.

This study is therefore hoped to straight out the confusion of nomenclature which has long been put outside the vision of later students. I wish to record here my best thanks to Professor Hans STILLE and Professor W. JANENSCH of the Geologisch-Paläontologisches Institut und Museum der Universität at Berlin for their courtesies which they extended me in connection with this study.

It is extremely difficult to point out the proper correlation

1) C. D. WALCOTT (1891), Correlation Papers. Cambrian, (U. S. Geol. Surv. Bull. No. 81), p. 377.

2) F. FRECH (1897), Lethaea Geognostica, 2, Lief. I. S. 58.

3) J. BERGERON (1899), Etude quelques trilobites de Chine, (Bull. de la Soc. géol. de France 3e Ser. Vol. 27).

4) Th. LORENZ (1906) Beiträge zur Geologie u. Paläontologie von Ostasien, II, (Zeitsch. deutsch. geol. Gesell. Vol. 57), p. 113.

in such an early date as DAMES' time, but nowadays the general succesion of the Cambrian faunas in the Taitzuho area in Liaotung is determined and the geological age of each fauna is more exactly determinable.

The Saimaki faunas came from two horizons in the Upper, instead of the Middle, Cambrian strata. The higher one is the *Chuangia* zone and the lower the *Prochuangia* zone. The generic references of contained species are changed in the following way:—

a) *Prochuangia* zone (Present determination)
Conocephalites quadriceps .... *Prochuangia*
Anomocare subcostatum .... *Anomocarella*
Anomocare majus .... *Anomocarella*
Anomocare (?) *latelimbatum* .... *Saimachia damesi* (nov.)
Agnostus chinensis .... *Agnostus hoiformis*

b) *Chuangia* zone
Conocephalites frequens .... *Chuangia*
Anomocare latilimbatum .... *Lioparia*
Agnostus chinensis .... *Pseudagnostus*

Besides these faunas DAMES' *Liostracus* sp. indet. in figure 17 on plate II is described from Saimaki is possibly a pygidium of suakid.

Taling faunas belong to the Middle Cambrian except for *Chuangia frequens* which is a Upper Cambrian trilobite. The present generic reference of DAMES' species are cited below:—

a) *Conocephalites frequens* .... *Chuangia*
b) *Anomocare minus* .... *Anomocarella*
Conocephalites talingensis .... *Ptychoparia*
c) *Conocephalites subquadratus* .... *Anomocarella*
d) *Conocephalites* sp. indet. .... *Manchuriella*
Anomocare typus .... *Inouyella*
Anomocare nanum .... *Metagraulos*
? *Liostracus* sp. indet. .... *Anomocarella*

It is interesting to note that the DAMES' pygidium in figure 23, on plate I is associated with several cranidia af *Conocoryphe* in the same slab. Another pygidium in figure 22 on the same plate belongs to *Anomocarella tatian* or its allied species; the free cheek in figure 25 on the same plate to *Anomocarella temenus* or its relative.

Finally the Wulopu faunas are both Middle Cambrian and composed of the following genera:—

a) *Dorypyge richthofeni*..................*Dorypyge*
Anomocare planum ....*Anomocarella*

b) *Dorypyge richthofeni*..................*Dorypyge*
Liostracus megalurus..................*Megalophthalmus*

Chuangia frequens (DAMES)

Plate 17 (6), figures 1a-d.

Conocephalites frequens DAMES (1883), Op. cit. p. 7, pl. II, figs. 1-7.
Schantungia frequens LORENZ (1906), Op. cit. p. 94, text-fig.

Three cranidia, one free cheek, two hypostomata and one pygidium are illustrated by DAMES. Since the species is found associated with *Anomocare latelimbatum*, he retains some doubt as to the reference of the hypostoma to this species, but emphasizes the probability which is higher in *frequens* than in *latelimbatum*, because it fits better in *frequens* than in *latelimbatum* in size. He noted that this species resembles *Crepicephalus iowensis* (OWEN) but no spine on this pygidium.

Out of *Schantungia buchruckeri* LORENZ, LORENZ established *Schantungia* and to which genus he referred this species together with *Conocephalites quadriceps* DAMES and *Schantungia Monkei* LORENZ. WALCOTT, however, suggests that *Schantungia* LORENZ, 1906 is desirable to be interplaced by *Chuangia* WALCOTT 1911[1] by the reason that he has already established *Shantungia* in 1905[2] and a simple difference as to " c " easily leads the reader into confusion. Furthermore, *Shantungia* and *Schantungia* are derived from a name of the same Province in China.

The species reveals the aspects diagnostic of *Chuangia*. Its specific characteristics are the slight convexity of the carapace, relatively long cranidium, narrow truncato-conical glabella, rather posterior eyes, transversely elongated postero-lateral limb of the fixed cheek, well developed genal spine and narrow axis of the pygidium.

The transversely striated frontal brim which is probably a part

1) C. D. WALCOTT (1911), Cambrian Faunas of China, (Smiths. Misc. Coll. Vol. 57, No. 4), p. 72.

2) C. D. WALCOTT (1905), Cambrian Faunas of China, (Proc. U. S. Nat. Mus. Vol. 29), p. 87.

of the doubleure is sharply edged along the inner margin. This edge, however, crosses the marginal border obliquely on the free cheek. In the dorsal view the glabellar outline almost reaches the brim, but inside of the carapace a narrow space is left for the frontal limb. A longitudinal axial ridge, three pairs of glabellar pits and occipital furrow are distinctly impressed under the test.

This species is most allied to *Chuangia transversalis* KOBAYASHI[1] which is, however, can be distinguished through the convexity of the carapace and position of the eyes.

Prochuangia quadriceps (DAMES)

Plate 17 (6), figures 2a–c.

Conocephalites quadriceps DAMES (1883), Op. cit. p. 9, pl. I, figs. 13–16.
Schantungia quadriceps LORENZ (1906), Op. cit. p. 94, text-fig.

This species is known of the cranidium and pygidium. On account of having a pair of spines on the pygidium DAMES brought *Crepicephalus* and *Ceratopyge* into its comparison. LORENZ on the other hand referred it to *Schantungia* i. e. *Chuangia*.

This species is well characterized by the long, gradually tapering glabella provided with relatively deep furrows and elevated above the cheeks, raised brim narrowing laterally, and medium sized eyes connected with the glabella by the oblique palpebral ridge on the cephalon, and by the subcylindrical axis, distinctly defined articulating segment, obscure furrows on the pleural lobes, developed lateral spine and slightly developed marginal border of the pygidium.

These characteristics point the alliance of the species to *Kaolishania* and *Prochuangia*, but are not quite diagnostic of either one of them. In the outline of the glabella and deep furrows on it this species fits in *Kaolishania* better than in *Prochuangia*, but the fixed cheek is wider in this and on which account it agrees with the latter genus quite nicely. Furthermore, the associated pygidium is much more resembling *Prochuangia mansuyi* than *Kaolishania pustulosa*. Therefore this is here provisionally

1) T. KOBAYASHI (1931), Upper Cambrian of the Wuhutsui Basin, Liaotung with special Reference to the Limit of the Chaumitian (or Upper Cambrian) of Eastern Asia and its Subdivision, (Japan. Jour. Geol. & Geogr. Vol. 11.) p. 108, pl. 10, figs. 7, 14–15.

referred to *Prochuangia*.

Inouyella typa (DAMES)

Plate 17 (6), figures 3a–b.

Conocephalites typus DAMES (1883), Op. cit. p. 11, pl. II, figs. 11–12.
Ptychoparia typus LORENZ (1906), Op. cit. p. 111.
Ptychoparia typus WALCOTT (1911), Op. cit. p. 71.
non *Ptychoparia typus* WALCOTT (1913), Cambrian Faunas of China, (Research in China III), p. 134, pl. 12, figs. 14–14a.

DAMES mentioned that this species agrees with *Conocephalites sulzeri* (SCHLOTHEIM) in most features of the cranidium and pygidium but a triangular area in front of the glabella. *Sulzeri*, however, looks to me quite different from *typus* in the breadth of the cranidium.

In this species the cranidium is rather convex; glabella convex, abruptly narrowing forward and somewhat rounded in front; three pairs of glabellar furrows oblique and shallow; circum-glabellar furrow deep; occipital furrow distinct; frontal brim wire-like and rising up in the middle; and a pair of furrows branching off from the median point of the glabellar front and marking off a depressed area.

Among others the most significant features of this species are the preglabellar furrows and area through which this can be distinguished from *Ptychoparia* and most other ptychoparid genera. In *Mapania*[1] and some forms of *Anomocarella* the frontal brim is produced behind and joins with the median point of the glabellar front, but they do not have any depressed area as in *typus*. Therefore the present species cannot be referred to *Mapania* RESSER and ENDO and WALCOTT's identification of his specimen from a shale of the Fuchou series in Tschang-hsing-tao Island, Liaotung with DAMES' *typus* is an error.

On the other hand this species is nicely set in *Inouyella* RESSER and ENDO[2], because it agrees with *Inouyella peiensis* RESSER and ENDO in most features except for the preglabellar

1) T. KOBAYASHI (1935), The Cambro-Ordovician Formations and Faunas of South Chosen, Palaeontology, Part III, Cambrian Faunas of South Chosen with a special Study on the Cambrian Trilobite Genera and Families, (Jour. Fac. Sci. Imp. Univ. Tokyo, Sect. II, Vol. 4, Pt. 2), p. 228.

2) KOBAYASHI (1935), Op. cit. p. 236, pl. 24, fig. 1.

area which is flat or rather concave in this, instead of convex in *peiensis*. Furthermore, the glabella is more convex and rounded in the latter, and these distinctions serve for the specific separation between them.

The associated pygidium is sublenticular; axis rather flat-topped and divided into about five rings; articulating margin shouldered at the middle point of the pleural lobe; pleural lobe divided into four by three narrow grooves; and marginal border ill-defined.

The surface of the carapace is smooth.

The associated pygidium is quite different from that of *peiensis*. However, the combination of detached parts of carapace is frequently a play of imagination. Unless we learn more of *Inouyella*, it is hard to tell what kind of pygidium goes with this species.

Anomocarella (?) *subquadrata* (DAMES)

Plate 17 (6), figures 4a-b.

Conocephalites subquadratus DAMES (1883), Op. cit. p. 12. pl. 1, figs. 10-11.
Megalophthalmus subquadratus LORENZ (1906), Op. cit. p. 111.
Anomocare? *butus* WALCOTT (1905), Op. cit. p. 49.
Anomocarella butus WALCOTT (1913), Op. cit. p. 199, pl. 19, figs. 7-7d.
non *Anomocare subquadratus* WALCOTT (1913), Op. cit. p. 194, pl. 18, fig. 11.

WALCOTT provisionally located this species in *Anomocare* and pointed out its resemblance with *Anomocarella butus*. According to him, *butus* "differs from *Anomocare* (*Conocephalites*) *subquadratum* DAMES in having a more convex glabella and frontal limb, and the front of the glabella is slightly transverse." This distinction can be recognized between *butus* and WALCOTT's *subquadratus*, but through the close examination on the type cranidia of DAMES' *subquadratus* and WALCOTT's *butus* I failed to find any specific distinction.

The associated pygidia of *subquadratus* and *butus* are, however, quite different and which one of the two will correctly be referred to this species is uncertain.

Lioparia latelimbatum (DAMES)

Plate 17 (6), figure 5.

Anomocare latelimbatum DAMES (1883), Op. cit. p. 14, pl. 2, figs. 9-10, non 13, 16 & 16a.
Lioparia latelimbatum LORENZ (1906), Op. cit. p. 73.

non *Anomocare latelimbatum* WALCOTT (1913), Op. cit. p. 191, pl. 2b-e.

Three distinct species are included in DAMES' *latelimbatum*. LORENZ confined *Anomocare latelimbatum* to the form in figs. 16–16a and established *Lioparia* for the form represented by figs. 9-10, but expressed no opinion as to the free cheek in fig. 13 which, I think, belongs to a certain form of *Chuangia*.

According to DAMES' description it is evident that he based his species on the specimens referred to *Lioparia* by LORENZ, because he regards another in fig. 16 as an immature form of the species. Therefore the specimens in figs. 9-10 should stand for the types of this species.

As DAMES' and LORENZ's illustrations are obscure, WALCOTT refigured the original specimens in figs. 11 and 16a, but misidentified an absolutely different species from the Middle Cambrian of Shantung with this species.

During my stay at Washington, I have studied WALCOTT's types. Then I, however, believed WALCOTT's identification and gathered the conception of *latelimbatum* from his specimens. Hence I established *Yokusenia* (nov.) out of *Yokusenia vulgaris* KOBAYASHI from the early Upper Cambrian of South Chosen which is, however, now substanciated to be congeneric with DAMES' *latelimbatum*. Thus, *Yokusenia* should be synonymized with *Lioparia* and *Anomocare latelimbatum* s. str. is the type of the genus.

Lioparia latelimbatum is different from *L. vulgaris* in its shorter preglabellar area and more widely divergent anterior facial suture. Lorenz's *latelimbatum* is, so far as I can see on its cranidium in fig. 19, on pl. 5, more allied to *vulgaris* than to *latelimbatum*. The associated pygidium in fig. 20 on pl. 5 on the other hand resembles that of *Changshania conica*.

Genus **Lioparella** KOBAYASHI, new genus

Lioparia KOBAYASHI (1935), Op. cit. p. 239.

WALCOTT's *latelimbatum* and *Lioparia expansus* KOBAYASHI reveal a solid genus for which a new name, *Lioparella*, is introduced here and its type species is *Lioparella walcotti* (nov.) i. e. WALCOTT's *latelimbatum* (figs. 2d and 2e, pl. 16.) The description and discussion of *Lioparia* presented in my previous paper are appiled to *Lioparella*, instead of *Lioparia* here specified.

Genus **Saimachia** KOBAYASHI, new genus.

This genus is characterized by the trucato-conical glabella, large palpebral lobes with a distinct palpebral ridge and broad eye-band and raised frontal brim.

Genotype:—*Saimachia damesi* KOBAYASHI, new species.

Orlovia[1] is allied to this genus, but it has a smaller eye and its palpebral ridge is obsoleted.

Saimachia damesi KOBAYASHI, new species.
Plate 17 (6), figre 16.

Anomocare latelimbatum DAMES (1883), Op. cit. p. 14, pl. 2, figs. 16 & 16a.
Anomocare latelimbatum LORENZ (1906), Op. cit. p. 112.
Anomocare latelimbatum WALCOTT (1913), Op. cit. pl. 18, fig. 2a.

This species is readily distinguished from *Lioparia latelimbatum*. It is allied to *Anomocare nereis* (WALCOTT)[2] and *Anomocare flava* WALCOTT[3], but can easily be distinguished from *nereis* by its smaller glabella and wider frontal brim and from *flava* by its more conical and furrowed glabella and shorter frontal limb. Neverthless, *nereis* and *flava* belong probably to the same genus with *damesi*.

Anomocarella minus (DAMES)
Plate 17 (6), figure 6.

Anomocare minus DAMES (1883), Op. cit. p. 15, pl. I, fig. 24.
Megalophthalmus minus LORENZ (1906), Op. cit. p. 76.
Non *Anomocare minus* WALCOTT (1913), Op. cit. p. 192, pl. 9, figs. 1, 1a-d.

This species certainly resembles WALCOTT's *minus* in a glance, but an essential distinction can be made out in the curvature of preglabellar area. DAMES mentioned that the Limbus is " flach und schief nach vorn." Precisely, the frontal limb is gently inclined forward and continues to the nearly horizontal brim. On this account only DAMES' *minus* coincides with *Anomocarella bigsbyi*

1) C. D. WALCOTT and C. E. RESSER (1924), Trilobites from the Ozarkian Sandstone of the Island of Novaya Zemlya, (Rep. Sci. Results of Norwegian Exp. to Novaya Zemlya 1921, No. 24), p. 8.

2) WALCOTT (1913), Op. cit. p. 193, pl. 18, fig. 10.

3) WALCOTT (1913), Op. cit. p. 190, pl. 18, figs. 8-8c.

(WALCOTT)[1] and *Anomocarella tenes* (WALCOTT)[2], although they are distinct in other respects.

On the other hand WALCOTT's *minus* has a frontal brim which is convex and elevated above the frontal limb. As mentioned elsewhere[3], RESSER and ENDO established *Manchuriella* out of WALCOTT's *minus* (partim) which in turn was distinguished from DAMES' *minus* as a distinct species, i. e. *typus* nov. I think that their opinion is justifiable.

Anomocarella planum (DAMES)

Plate 17 (6). figure 7, a-b

Anomocare planum DAMES (1883), Op. cit. p. 16, pl. 2, fig. 8.
Liostracus planum LORENZ (1906), Op. cit. p. 111.

DAMES compared this species with *Conaspis pattersoni* (HALL) and *Anomocare limbatum* ANGELIN, but it belongs neither to *Conaspis* nor to *Anomocare*. Its reference to *Liostracus* is also not tenable.

WALCOTT[4] noted that *Anomocarella temenus* differs from *planum* in its narrower fixed cheek and larger glabella. Further distinctions are made in the proportion of the length between the cranidium and glabella and indistinctly separated frontal limb and rim.

Metagraulos nanum (DAMES)

Plate 17 (6), figure 8.

Anomocare nanum DAMES (1883), Op. cit. pl. 2, fig. 14.
Agraulos nanum LORENZ (1906), Op. cit. p. 112.
Agraulos dryas WALCOTT (1905), Op. cit. p. 36.
Agraulos dryas WALCOTT (1913) Op. cit. p. 157, pl. 14, fig. 20.
Metagraulos (?) *dryas* KOBAYASHI (1935), Op. cit. p. 207.

DAMES' *nanum* coincides with WALCOTT's *dryas* from Shantung in size, outline and convexity, but the punctation is insignificant in *nanum*. I examined several specimens of mine collected from the Taitzu area, South Manchuria. Some of them are punctated, but others are smooth. None of them, however, is so densely punctated as in *dryas*. As the difference is only in the density, I am inclined to believe that *dryas* belongs probably to this species.

1) WALCOTT (1913), Op. cit. p. 198. pl. 21, figs. 3-3b.
2) WALCOTT (1913), Op. cit. p. 207, pl. 21, figs. 4,
3) KOBAYASHI (1935), Op. cit. p. 288.
4) WALCOTT (1913), Op. cit. p. 206, pl. 20, figs. 7-7d.

Anomocarella majus (DAMES)

Plate 17 (6) figure 9.

Anomocare majus DAMES, (1883), Op. cit, p. 17. pl. 1, fig. 19.
Anomocare majus LORENZ (1906), Op. cit. p. 111.

This pygidium is typical of *Anomocarella*. It resembles the pygidia of *Anomocarella albion* WALCOTT[1] (pl. 20, fig. 1d) and *Anomocarella baucus* WALCOTT[2] (pl. 20, fig. 2a) closely, but it has a longer outline with a broader axial lobe.

Anomocarella subcostatum (DAMES)

Plate 17 (6), figure 10

Anomocare subcostatum DAMES (1883), Op. cit. p. 18, pl. 2, fig. 15.
Anomocare subcostatum LORENZ (1906), Op. cit. p. 112.

In the outline this pygidium is allied to *Anomocarella* as well as *Briscoia*, but distinguished from the latter genus through the aspect of pleural rib, indistinct post-axial ridge and relatively narrow marginal border. With the strengh of its resemblance with the preceding pygidium this species is provisionally referred to the former genus.

Ptychoparia talingensis (DAMES)

Plate 17 (6), figure 11.

Liostracus talingensis DAMES (1883), Op. cit. p. 19, pl. 1, fig. 20.
Ptychoparia talingensis LORENZ (1906), Op. cit. p. 111.

As noticed by DAMES, this appears similar to *Liostracus linnarssoni* BRÖGGER[3] but the Norwegian species is quite distinct from this Manchurian one in the glabellar outline, curvature of the preglabellar area and especially in the wire-like frontal brim of this species. Another species he compared with it was *Crepicephalus* (*Loganellus*) *similator* HALL and WHITFIELD which was later referred to *Inouyia* by WALCOTT[4] and then to *Dunderbergia* by RESSER[5]. This American form is also differrent from this in

1) WALCOTT (1913), Op. cit. p. 195, pl. 20, figs. 1, 1a-f.

2) WALCOTT (1913), Op. cit. p. 196, pl. 20, figs. 2, 2a.

3) W. C. BRÖGGER (1878), Om Paradoxidesskiferne ved Krekling, (Nyt Mag. for Naturv. 24, I), p. 31, pl. 3, fig. 4.

4) C. D. WALCOTT (1916), Cambrian Geology and Paleontology III, 3, Cambrian Trilobites, (Smiths. Misc. Coll. Vol. 64, No. 3), p. 204.

5) C. E. RESSER (1935), Nomenclature of some Cambrian Trilobites (Smiths. Misc. Coll. Vol. 93, No. 5), p. 24.

its narrow cranidium and obscurely furrowed glabella.

I thihk that LORENZ has properly located this species in *Ptychoparia*, because it agrees with *Ptychoparia striata* EMMERICH in the broad cranidium, furrowed glabella, wire-like brim, oblique ocular ridge, medium sized eye and so forth. But the size of this glabella is rather large in proportion with the cranidium. Hence this species belongs probably to *Ptychoparia*, but appears to approach *Solenoparia* in the outline and size of the glabella, the view being suggested by its close resemblance with *Solenoparia thraso* (WALCOTT)[1] as well as *S. subrugosa* (WALCOTT)[2]:

Megalophthalmus megalurus (DAMES)

Plate 17 (6), figures. 12a-b.

Liostracus megalurus DAMES (1883), Op. cit. pl. 1, figs. 7-8, ? 9, non 10.
Megalophthalmus megalurus LORENZ (1906), Op. cit. p. 76.
non *Ptychoparia* (*Liostracus*) *megalurus* WALCOTT (1905), Op. cit. p. 9.
non *Anomocare megalurus* WALCOTT (1913), p. 192, pl. 18, fig. 9-9e.

The cranidium of WALCOTT's *megalurus* in fig. 9, on pl. 18 has a more rounded outline than shown in his illustration. WALCOTT's *megalurus* differs from DAMES' in the breadth of the frontal limb and outline and convexity of the glabella. Moreover, in DAMES' a distinct line is impressed across the middle of the frontal border, but none is seen in WALCOTT's.

DAMES included two different pygidia, and that of WALCOTT's is still distinct from them. The pygidium in fig. 8, pl. I in DAMES' paper, i. e. in fig. 12b on pl. 17(6) in this paper is here provisionally referred to this species.

Genus **Megalophthalmus** LORENZ, 1906.

Megalphthalmus LORENZ (1906), p. 76.

LORENZ established this genus with the foundation of *megalurus* and *minus* between which the former species was selected for the genotype by myself[3].

Generic diagnosis is emended here as below:—

Glabella convex, conical, rounded in front and wide at the base; eyes medium sized and opposed at the mid-length of the

1) WALCOTT (1913), Op. cit. p. 208, pl. 19, figs. 14, ? 14a
2) WALCOTT (1913), Op. cit. p. 205, pl. 19, fig. 12.
3) KOBAYASHI (1935), Op. cit. p. 87.

cranidium; ocular ridge distinct and oblique; and frontal border flat.

The associated pygidium has well defined horizontal border which is sinuated behind the axis.

Dorypyge richthofeni DAMES

Plate 17 (6), figures 13 a-b.

Dorypyge richthofeni DAMES (1883), Op. cit. p. 24, pl. 1, figs. 1-6.
Dorypyge (Olenoides) richthofeni LORENZ (1906), Op. cit. p. 81, pl. 4, figs. 1-5.
Dorypyge richthofeni WALCOTT (1913), Op. cit. p. 8, pl. 1, 1a-f.
Dorypyge richthofeni SUN (1924), Contribtions to the Cambrian Faunas of North China, (Palaeontol. Sinica Ser. B, Vol. 1, Fasc. 4), p. 29, pl. 2, figs. 3a-d.

As the species and genus have already been discussed by several authors, no additional remark is in need.

Pseudagnostus chinensis (DAMES)

Plate 17 (6), figures 14a-b.

Agnostus chinensis DAMES (1883), Op. cit. p. 27, pl. 2, figs. 18-19.
Agnostus fallax LINNARSSON var. *chinensis* LORENZ (1906), Op. cit. p. 112.
Pseudagnostus orientalis KOBAYASHI (1933), Op. cit. p. 98, pl. 9, figs. 20-22.

LORENZ took *chinensis* for a variety of *fallax*. The poor original illustration leads WALCOTT's misidentification of a Middle Cambrian agnostid with this species and later students followed him fell into the same error. However, WALCOTT's *chinensis*[1] is totally different from DAMES' and hence the former was distinguished from the latter as *Peronopsis rakuroensis* (KOBAYASHI)[2].

DAMES founded his species upon the cephalon from the *Chuangia* zone and the cephalon and pygidium from the *Prochuangia* zone. The two forms from different horizons, however, do not belong to a single species. The former species illustrated in figures 15a-b on plate 17(6) in this paper is identical with *Agnostus hoiformis*[3] while the latter, as seen in figures 14a-b on the same plate, coincides with *Pseudagnostus orientalis*.

DAMES' illustration reveals the bilobed glabella and distinct axial furrow. I missed to find any specimen having the combination of both characters. According to his illustration the axial lobe of the pygidium is not so expanded as in *Pseudagnostus*, and

1) WALCOTT (1913), Op. cit. p. 99, figs. 4-5c.
2) KOBAYASHI (1935), Op. cit. p. 101.
3) KOBAYASHI (1931) Op. cit. p. 97, pl. 10, figs. 1-3

Agnostus hoiformis agrees better with his figure. On the other hand he points out the close resemblance of his pygidium with *Pseudagnostus,* such as *cyclopyge* and *josepha,* in his description. Thus DAMES' *chinensis* is a composite species in which *orientalis* and *hoiformis* are included with the same weight. However, I venture to synonymize *orientalis* with *chinensis* with the stress of the axial furrow of the cephalon and the pygidium of *cyclopyge* type, and *Agnostus hoiformis* is left as a valid species,

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Explantion of Plate. 17 (6)

Chuangia frequens (DAMES)······························p. 425 (74)
Fig. 1a. Holotype illustrated in fig. 2 pl. II, in DAMES' paper. ×1½
Fig. 1b. Paratype in fig. 4, on pl. II. ×1½.
Fig. 1c. Paratype in fig. 6, pl. II. ×2.
Fig. 1d. Paratype in fig. 7, pl. II. ×1½.
Locality Saimachi (i. e. Saimaki)

Prochuangia quadriceps (DAMES) ·························p. 426 (75)
Fig. 2a. Holotype in fig. 13, pl. II. ×1.
Fig. 2b. Paratype in fig. 16, pl. II. ×1½.
Fig. 2c. Paratype in fig. 17 (?) pl. II. ×1.
Loc. Saimachi.

Inouyella typa (DAMES) ·································p. 427 (76)
Fig. 3a. Holotype in fig. 11, pl. II. ×2.
Fig. 3b. Paratype in fiig. 12, pl. II. ×2.
Loc. Taling

Anomocarella (?) *subquadrata* (DAMES)······················p. 428 (77)
Fig. 4a. Holotype in fig. 19, pl. II. ×2.
Fig. 4b. Paratype in fig. 11, pl. II. ×1½.
Loc. Taling

Lioparia latelimbatum (DAMES) ··························p. 428 (77)
Fig. 5. Holotype in fig. 10, pl. II. ×2. Loc. Saimachi.

Anomocarella minus (DAMES) ····························p. 430 (79)
Fig. 6. Holotype in fig. 24, pl. I. ×2. Loc. Taling.

Anomocarella planum (DAMES) ···························p. 431 (80)
Fig. 7a. Holotype in fig. 8, pl. II. ×1.
Fig. 7b. Paratype in fig. 12, pl. I. ×1.
Loc. Wulopu.

Metagraulos nanum (DAMES) ····························p. 431 (80)
Fig. 8. Holotype in fig. 14, pl. II. ×4. Loc. Taling.

Anomocarella majus (DAMES) ····························p. 432 (81)

Fig. 9. Holotype in fig. 19, pl. I. ×1. Loc. Saimachi.

Anomocarella subcostatum (DAMES) ························p. 432 (81)

Fig. 10. Holotype in fig. 15, pl. II. ×1. Loc. Saimachi.

Ptychoparia talingnesis (DAMES)···························p. 432 (81)

Fig. 11. Holotype in fig. 20, pl. I. ×2. Loc. Taling.

Megalophthalmus megalurus (DAMES) ······················p. 433 (82)

Fig. 12a. Holotype in fig. 7, pl. I. ×1½.

Fig. 12b. Paratype in fig. 8, pl. I. ×1½.

Loc. Wulopu.

Dorypyge richthofeni (DAMES) ···························p. 434 (83)

Fig. 13a. Holotype in fig. 1, pl. I. ×2.

Fig. 13b. Paratype in fig. 5 pl. I. ×1½.

Loc. Wulopu.

Pseudagnostus chinensis (DAMES) ·························p. 434 (83)

Fig. 14a. Paratype in fig. 18 pl. II (?). ×4.

Fig. 14b. Holotype. ×4.

Loc. Saimachi.

Agnostus hoiformis KOBAYASHI ····························p. 434 (83)

Fig. 15a. Paratype ×4.

Fig. 15b. Holotype in fig. 19, pl. II (?) ×4.

Loc. Saimachi.

Saimachia damesi KOBAYASHI, n. sp.························p. 430 (79)

Fig. 16. Holotype in fig. 16. pl. II. ×2. Loc. Saimachi.

Gen. et sp indet.··p. 424 (73)

Fig. 17. Pygidium in fig. 10, pl. I. ×1½. Loc. Taling.

遼東產ダーメス氏の寒武利亞紀三葉蟲化石タイプの再研究（摘要）

小 林 貞 一

筆者がベリルン滯在中ダーメス氏の記載せし原品を研究せし結果は次の樣である。

1) 屬的位置の變更を要するもの

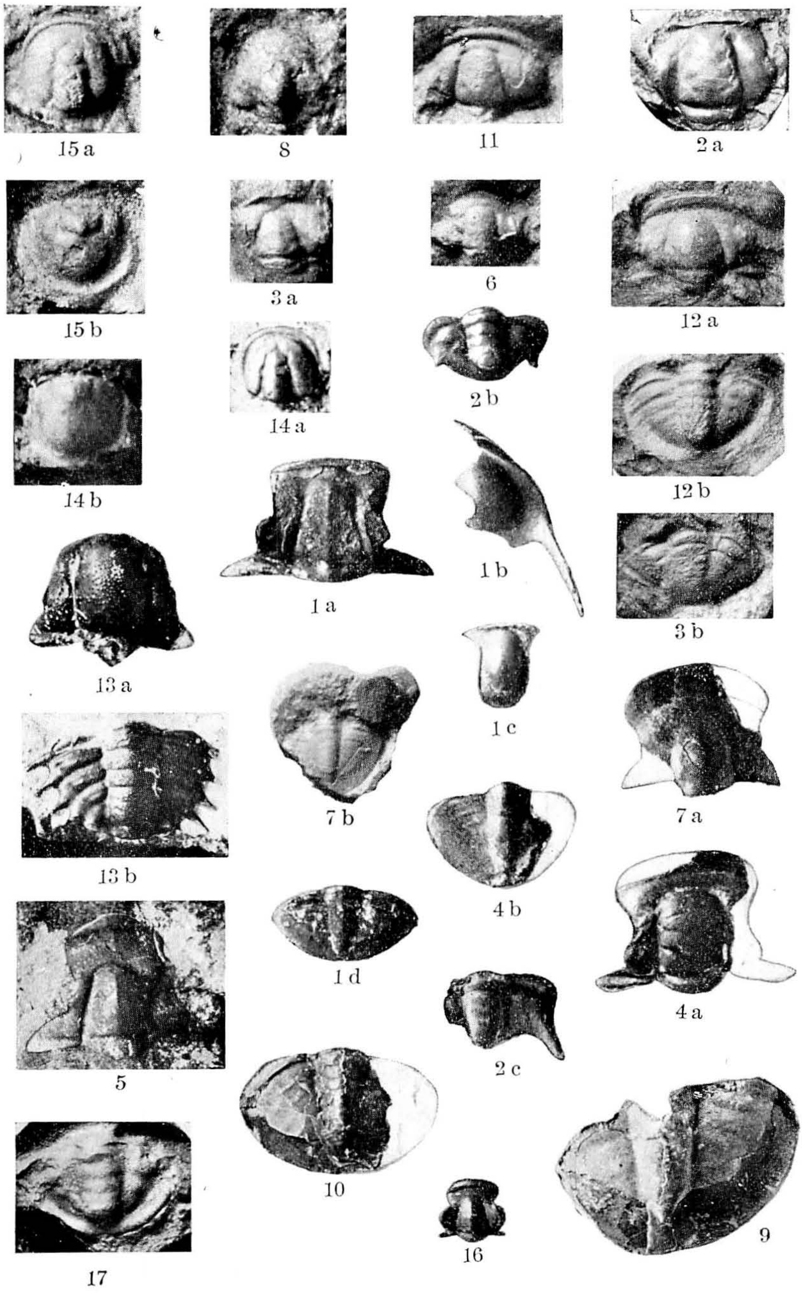
ダーメス氏の種	屬的位置
Conocephalites frequens	*Chuangia*
Conocephalites quadriceps	*Prochuangia*
Conocephalites typus	*Inouyella*
Conocephalites subquadratus	*Anomocarella* (?)
Anomocare minus	*Anomocarella*
Anomocare planum	*Anomocarella*
Anomocare nanum	*Metagraulos*

Anomocare subcostatum	*Anomocarella*
Liostracus talingensis	*Ptychoparia*
Liostracus megalurus	*Megalophthalmus*

2) *Anomocare latelinbatum* は複合種にして *Lioparia latelimbatum*, *Saimachia damesi* (新屬新種) 及び *Chuangia* sp. を含み, ワルコットの *latelimbatum* は全然相異ない *Lioparella walcotti* (新屬新種) として區別される。

3) *Agnostus chinensis* DAMES は *Pseudagnostus orientalis*, *Agnostus hoiformis* を含む複合種であつてダーメスの種を *orientalis* の synonym として, *hoiformis* は獨立の種として取扱ふ。ワルコットの *chinensis* は全然之等と相異る種で *Peronopsis rakuroensis* として區別さる可きである。

之等諸化石の示す諸フォーナの時代に就いて種々なる意見が發表されてゐたが,798馬集のものは上部寒武利亜紀に, 大岑のものは *Chuangia frequens* は上部寒武利亜紀, 他中部寒武利亜紀, 臥龍舗のものは, 中部寒武利亜紀に屬する。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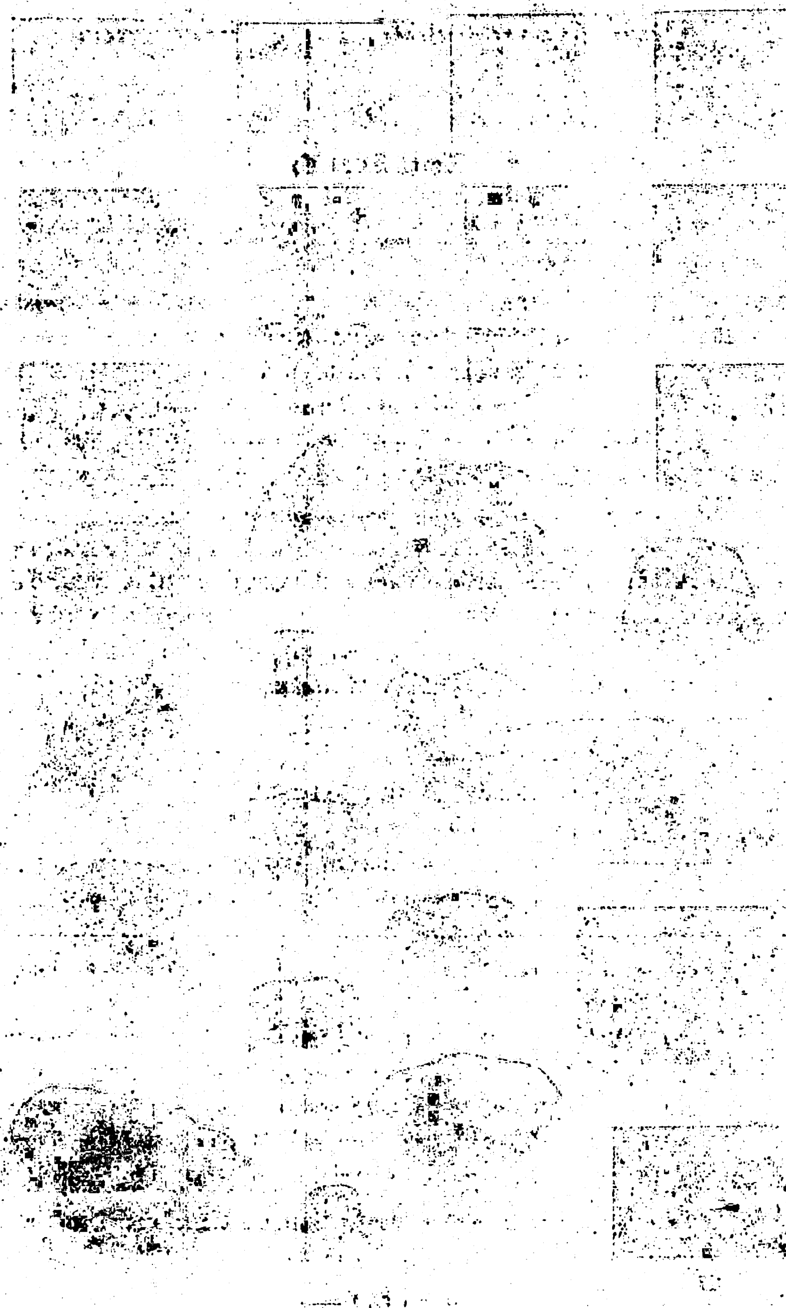

38. Some Fossil Terrestrial Gastropods from Tuizi, Kuzuu-mati, Totigi Prefecture.

By

Kôiti SUZUKI

(Geological Institute, Faculty of Science, Imperial University of Tokyo. Read Nov. 21 st., 1936; received Feb. 13 th., 1937.)

During the hunting of the Mammalian fossils in a limestone cave at Tuizi, Kuzuu-mati, TOKUNAGA, TAKAI and NAORA have collected a small lot of terrestrial snails and submitted them to me for determination. The snails are found associated with a molar tooth of *Palaeoloxodon* in a Pleistocene fissure filling deposit and hence there is the least possibility of mixing the recent snails with the fossils. Most of the specimens before hand are not well preserved. However, as illustrated in figs. 1 a–c on plate 18 (7), some traces of colour patterns are still retained in a specimen of *Cyclophorus herklotsi*.

This faunule is composed of five species as follows:—

Cyclophorus herklotsi v. MARTENS.
Paludinella ? kuzuuensis n. sp.
Phaedusa sp.
Euhadra quaesita (DESHAYES).
E. brandtii (KOBELT) var.

In addition to a rich Mammalian fauna, SHIKAMA[1] has listed 16 species of terrestrial gastropods from the fissure filling deposits of Ôgano, Ôkubo, Tuizi and Izuruhara, all in the environs of Kuzuu, among which *Cyclophorus herklotsi*, *Phaedusa* sp. and *Euhadra quaesita* are included.

Except for the new species of *Paludinella ?* and the indeterminable form of *Phaedusa*, all our species are now inhabited in this district. Namely, *Cyclophorus herklotsi* and *Euhadra quaesita* are common snails in North and Central Honsyû, while *Euhadra brandtii* var. is a local form restricted to the Etigo and Asio

1) T. SHIKAMA; "On the Kuzuu Beds", Jour. Geol. Soc. Tokyo, vol. 40, 1933, pp. 706, 715, 717, 718.

Mountains. Such a minute form as *Paludinella ? kuzuuensis* is not improvable to be living in this area, but simply out of our vision at present. Therefore, in my opinion, the Pleistocene faunule under consideration is not much different from the recent one.

My sincere thanks are due to Dr. S. TOKUNAGA and Messrs. F. TAKAI and N. NAORA for the happy opportunity to study this material, to Mr. T. KURODA for his valuable suggestions as to the identifications, and to Dr. T. KOBAYASHI for reading this manuscript. My thanks are also due to Mr. C. UEKI for photographing.

Descriptions of Species.

Cyclophorus herklotsi von MARTENS.

Pl. 18 (7), figs. 1a-c.

Cyclophorus herklotsi MARTENS, Malac. Blätter, vol. 7, 1860, p. 42; PREUSS. Exped. Ost-Asien, Zool., vol. 2, 1867, p. 13, pl. 3, fig. 1; KOBELT, Fauna Moll. Extramar. Japoniae, 1879, p. 113, pl. 10, figs. 6-9; HIRASE, Nippon Dôbutu Zukan (Figuraro de Japanaj Bestoj), 1927, p. 1386, text-fig. 2664; Coll. Japanese Shells 1934, pl. 78, fig. 12.

TOKUNAGA and TAKAI's collection contains some incomplete specimens of this common snail. SHIKAMA has reported its occurrences at Tuizi and Izuruhara.

Living :—Widely distributed all over Honsyû, Sikoku, Kyûsyû and South Tyôsen (Corea).

Paludinella ? kuzuuensis n. sp.

Text-fig. 1; Pl. 18 (7), figs. 2-7.

Dimensions :—

Specimen number	Number of whorls	Height in mm.	Diameter in mm.	Aperture	
				Height in mm.	Diameter in mm.
Holotype	5	2.0	1.3	0.8	0.6
Paratype no. 1	4¾	1.8	1.3	0.8	0.6
Paratype no. 2	4½	1.8	1.3	0.7	0.6
Paratype no. 3	4½	1.8	1.3	0.7	0.6
Paratype no. 4	4½	1.7	1.3	0.7	0.6
Paratype no. 5	4½	1.7	1.3	0.7	0.5
Paratype no. 6	5¾	2.3	1.5	1.0	0.8

Description :—Shell small, elongate conic, narrowly umbilicate, and thin. Spire elevated, about twice as high as the aperture; apex bluntly pointed. Protoconch consisting of about 1.5 convex whorls, smooth and lustrous. Whorls more than five, regularly and gradually increasing, slightly shouldered, and well rounded below; suture distinct, constricted and impressed; last whorl well inflated; base convex; umbilicus open, rather narrow and deep. Surface smooth, polished, and provided with fine incremental striae. Aperture slightly oblique, ovate, somewhat angled above and broadly rounded below; outer lip entire and a little expanded; columellar lip reflexed, covering a part of the umbilicus; parietal wall covered by a callus.

Remarks:—Most specimens in Naora's collection are young shells but one (paratype no. 6) which may almost be regarded as a mature form. Therefore I have once intended to select it for the holotype. But it was unfortunately broken down into two pieces during the preparation of its photograph. A hand-drawing of the specimen which has been done by myself before this destruction is, however, inserted here (text-fig. 1).

Text-fig. 1. ca×7.

Unless the radula and operculum of this species are examined, the generic position is hardly determinable in the Assimineidae. Hence its reference to *Paludinella* is only provisional. Morphologically, it is also closely related to *Conacmella* and *Assiminea* as well as to *Omphalotropis*.

This species is very closely related to *Assiminea ?* (or *Paludinella ?*) *paludinoides* (Yokoyama)[1] described from the Pleistocene deposits of Dôkwanyama and Ôzi in Tokyo, but it differs from the Yokoyama's species in its more rounded whorls, higher spire, larger protoconch and somewhat wider umbilicus as well as in the shape of the aperture.

This species resembles *Paludinella vitrea* Thiele[2] inhabited in

1) M. Yokoyama: "Mollusca from the Upper Musashino of Tokyo and its Suburbs", Jour. Fac. Sci., Imp. Univ. Tokyo, sect. 2, vol. 1, pt. 10, 1927, p. 415, pl. 46, fig. 23, as *Rissoa* (*Cingula*).

Incidentally, *Littorina lucida* Yokoyama described from the raised beach deposit of Edogawa, Tiba prefecture, (Jour. Fac. Sci., Imp. Univ. Tokyo, sect. 2, vol. 1, pt. 10, 1927, p. 451, pl. 51, fig. 9), may be a synonym of *Assiminea japonica* Pilsbry.

2) Joh. Thiele: "Über die Schneckenfamilie Assimineidæ", Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere, Band 53, 1927, p. 129, pl. 1, fig. 2.

the Palau Islands, but its whorl is much rounded and its periphery is not angled as in *vitrea.* It is also allied to *Conacmella vagans* ('PILSBRY' HIRASE)[1], the type species of the genus, as well as to *C.* (?) [or *Paludinella* ?] *scalaris* (HEUDE)[2] in the general outline. It can, however, be distinguished by its small size, much inflated whorls with constricted sutures and rather wide umbilicus from these two Japanese species of *Conacmella.* In comparison with *Paludinella japonica* (PILSBRY)[3] and its subspecies, *polita* (PILSBRY)[4], *takanoshimana* (PILSBRY)[4] and *yokohamensis* THIELE[5], this species is smaller and has more inflated whorls, more constricted sutures, higher spire and wider umbilicus surrounded by no keel.

Moreover, *Assiminea angustata* PILSBRY[6] and *satsumana* PILSBRY[7] somewhat resemble this form, but they are larger and their whorls are less convex and their umbilicus is narrower.

Phaedusa sp. indet.

The NAORA's collection includes many specimens. However, their specific determination can hardly be possible, because they are all immature.

Euhadra quaesita (DESHAYES).

Helix quaesita DESHAYES, in Ferussac, Hist. nat. moll., pl. 10 b, figs. 10-12, 1850; ibid., texte I, p. 179, 1850; REEVE, Conch. Icon., vol. 7, *Helix* sp. 1355, pl. 203, fig. 1355, 1854; v. MARTENS, Preuss. Exped. Ost-Asien, Zool., vol. 2, p. 28, pl. 15, fig. 5, 1867; KOBELT, Fauna Moll. Extramar. Japoniae, p. 42, pl. 5, figs. 4-6, 1879; IIJIMA, Jour. Zool. (Soc. Tokyo), vol. 3, p. 119, pl. 3, fig. 33, 1891.

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1) Y. HIRASE: "Japanese Land Mollusks", pl. 4, fig. 53, Conch. Mag., vol. 1, no. 4, 1907, as *Acmella vagans* PILSBRY.

Jon. THIERE: Op. cit., p. 130, pl. 1, fig. 5.

2) P. M. HEUDE: "Notes sur les mollusques terrestres de la vallée du fleuve bleu", Mémoires concernant l'histoire naturelle de l'empire Chinois par des pères de la compagnie de Jésus, 1882, p. 83, pl. 21, figs. 5, 5a, 5b, 5c, as *Assiminea.*

3) H. A. PILSBRY: "New Japanese Marine, Land and Fresh-Water Mollusca", Proc. Acad. Nat. Sci. Philadelphia, vol. 53, 1901, p. 405, as *Omphalotropis.*

Y. HIRASE: "Japanese Land Mollusks", pl. 4, fig. 52, Conch. Mag., vol. 1, no. 4, 1907, as *Omphalotropis.*

4) H. A. PILSBRY: "On Some Japanese Land and Fresh Water Mollusks", Proc. Acad. Nat. Sci. Philadelphia, vol. 76, 1924, p. 13, as *Omphalotropis.*

5) Joh. THIELE: Op. cit., p. 131, pl. 1, fig. 8.

6) H. A. PILSBRY: Op. cit. (1901), p. 396.

Joh. THIEIE: Op. cit., p. 135.

7) H. A. PILSBRY: Op. cit. (1901), p. 391.

Helix (Euhadra) quaesita PILSBRY, Man. Conch., ser. 2, vol. 6, p. 108, pl. 29, figs. 11-13, 1890.

Eulota (Euhadra) quaesita PILSBRY, Op. cit., vol. 9, p. 214, 1894 ; HIRASE, Nippon Dôbutu Zukan, p. 1490, text-fig. 2868, 1927.

Euhadra quaesita HIRASE, Coll. Jap. Shells, pl. 125, fig. 24, 1934.

Two incomplete specimens were collected by NAORA. This species is listed in the SHIKAMA's fossil list of Tuizi and Ôkubo.

Living :—Very common in North and Central Japan.

Euhadra brandtii (KOBELT) var.

Pl. 18 (7), figs. 8 a-c.

Euhadra sp. HIRASE, Cat. Moll. Gunma Prefecture, 1934, p. 72.

Description—Shell medium sized, depressed conic, with an open umbilicus, thin. Spire low conoid; apex obtuse. Protoconch consisting of about 1½ convex, smooth and polished whorls. Whorls 6, regularly and slowly increasing, moderately convex; suture impressed, tolerably deep; last whorl well inflated, hardly descending in front; base convex, suddenly sloping into the umbilicus; umbilicus narrow, containing about one-fourth of the diameter of the shell, deep and well perspective. Surface rather rough with irregular, oblique incremental striae, and microscopical, closely-set spiral threads. Aperture oblique, rounded lunate; outer lip broken; columellar lip thickened, a little reflexed, covering a trifle the umbilicus.

Only a single imperfect specimen is found in the TOKUNAGA and TAKAI's collection.

Living :—Asio and Etigo Mountains; Sado Island.

Remarks :—This fossil specimen coincides with the living ones collected from the Etigo Mountains and stored in KURODA's collection at the Geological Institute, Kyoto Imperial University.

S. HIRASE has announced the occurrences of this form under the name of *Euhadra* sp. from the Oze district, giving no mention regarding its relation to *E. brandtii* KOBELT. But, so far as I can see on our specimens, recent and fossil, actually I failed to find any specific distinction from *brandtii*. Therefore I opine that this form is no more than a local variety of the KOBELT's species.

Explanation of Plate 18 (7).

Figs. 1 a-c. *Cyclophorus herklotsi* v. MARTENS. ×1.5.

Figs. 2-7. *Paludinella? kuzuuensis* SUZUKI, n. sp. ×12.

Figs. 2 a, b, holotype; figs. 3-7, paratypes.

Figs. 8 a-c. *Euhadra brandtii* (KOBELT) var. ×1.5.

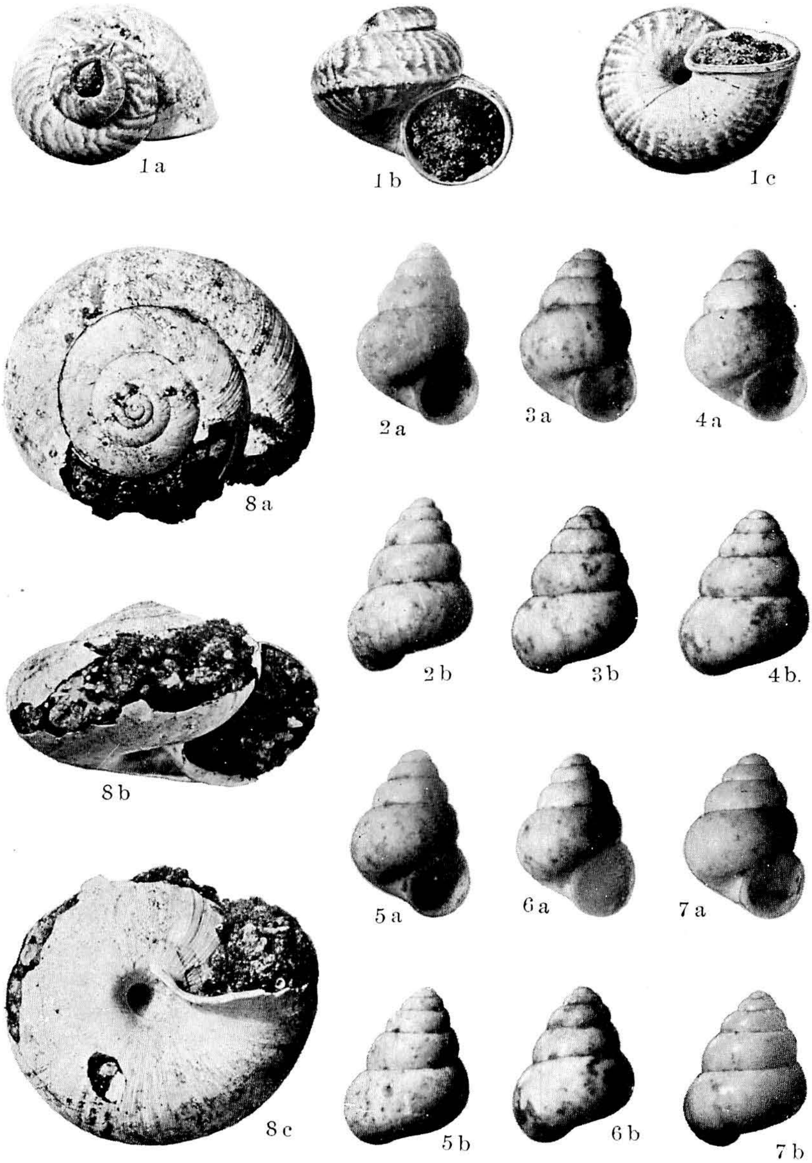
栃木縣葛生町築地產陸棲貝類化石（摘要）

鈴 木 好 一

徳永重康先生並びに高井冬二，直良信夫の兩氏が昭和 9 年夏葛生町築地の石灰洞堆積物中より採集された陸貝化石 5 種に就いて記述した。これらの標本は全て *Palaeoloxodon* を含む堆積物中より直接採取されたもので，確に化石であるとの事である。

この 5 種の中，*Cyclophorus herklotsi*, *Phaedusa* sp. 及び *Euhadra quaesita* の 3 種は既に昭和 8 年に鹿間時夫氏によつて同じく築地（及び其他の場所）より報告されて居り，*Paludinella? kuzuuensis* (n. sp.) と *Euhadra brandtii* var.（ヲゼマイマイ）とが今回新たに加へられたものである。この 2 種には記載を與へておいた。

5 種中種迄確定せる 4 種は，新種たる *Paludinella* を除けば，何れも現在當地方に生息してゐる。恐らく *Paludinella? kuzuuensis* も同様であらうと思はれる。



C. UEKI photo.

39. 瀨戸内海產化石象に生じた齒牙腫に就て

德永重康，高井冬二

(昭和 12 年 1 月 30 日講演，3 月 15 日受理)

本邦產化石に就ては從來地史學の基礎として分類學的並びに系統學的研究のみ行はれ，これを過去の生物として古病理學的に取扱つたものは殆んど無かつた。今回此處に報告するものは單に古病理學的に興味深いもので，地史學には何等の意味もないものである。

該標本は昭和 8 年 1 月香川縣香川郡小槌島近海より右下顎體（第 1，第 2 後臼齒附著）と第 3 後臼齒と夫々別箇に引き上げられ，高松市の眞屋卯吉氏の御好意により早稻田大學の所藏となつた。

下顎體は第 1 後臼齒前緣及び枝骨部にて破損し，舌面及び下面を失ひ臼齒を露出してゐる。下顎體は齒科病理學に於て齒牙腫 (Odontoma) と稱する良性腫瘍の爲めに異常肥大 (Hypertrophy) を起し，肥大の程度は左下顎體に接する程である。

齒牙腫には次の 3 種が擧げられてゐる。

1. 單純齒牙腫 (Simple odontoma) 1 個の齒牙がその形成の際に齒質，琺瑯質，白堊質が不規則に結合し，徐々に發育し異常な石灰化を伴ふもので顎骨内に埋伏して居るのが通例である。上顎よりは下顎智齒部にあらはれる。之は人間のみならずしばしば動物にも起る現象である。

2. 複雜齒牙腫 (Compound odontoma) 多數の齒牙が結合し異常な石灰化を起したもので，下顎智齒部にあらはれる。即ち單純齒牙腫が 2 ケ以上癒合したものである。多數過剩齒牙の癒合或は永久齒牙の癒合による事もあるが，この場合には齒數の缺如があらはれる。

3. 附著齒牙腫 (Composite odontoma) 多少正規の形態を有する齒牙のある部分に附著して生ずる。齒質，琺瑯質，白堊質の配列は正常齒牙のそれと同樣である。冠生齒牙腫，根生齒牙腫，琺瑯質瘤等に分けられる。

本化石は第 1, 第 2 後臼齒が複雑齒牙腫を起したもので，兩臼齒の境界は咀嚼面に於て僅かに認められるが舌側面に於ては石灰化により詳かでない。複雑齒牙腫の爲めに第3後臼齒は舌側に向ひ斜に生えてゐる。咀嚼面の凹面の程度は正常臼齒に比し著しく，その幅も約 1.5 倍ある。咀嚼面に於ける琺瑯質の模様は寫眞圖に示すやうに全く不規則で，舌側面及下面には大小數個の石灰瘤が生じてゐる。第 3 後臼齒は後方の 4 乃至 8 稜と後踵を失つてゐるほか殆んど完全で，現在前踵と 12 稜を保存し，未だ磨削されて居ない。齒冠部に於ける最大長は 180 mm, 幅は第 6 稜にて 60 mm, 齒冠の高さは第 5 稜にて 128 mm, 第 10 稜にて 132 mm である。100 mm 中に含まれる稜數は 6.5 である。

第 1, 第 2 後臼齒が複雑齒牙腫となり，氣 3 後臼齒が未だ磨削されないためその種名を決定する事が困難であるが，日本の洪積世特に瀬戸内海地域に多産する廣義の *Palaeoloxodon namadicus* (FALCONER and CAUTLEY) に屬するものと考へられる。

終りに臨み多大の御教示を賜つた日本齒科醫學專門學校所敏一教授に對し深く感謝の意を表する。

Odontoma in a Fossil Elephant from the Inland Sea of Japan

(Résumé)

By

Shigeyasu TOKUNAGA and Fuyuji TAKAI

The Specimen, a fragment of the right horizontal ramus of the mandible containing the first, second, and third molars, was dredged from the sea bottom off the Island of Kotuti, Kagawa Prefecture in January 1933. It is now preserved at Waseda University, Tokyo.

The mandible is broken at the anterior margin of the first molar, the ascending ramus and the inner and lower sides of the horizontal ramus being also damaged.

Palaeopathologically speaking, a number of intresting features are observed in this specimen. First, a compound odontoma of the first and second molars has taken place, which is a benign tumor derived from an abnormal arrangement

of dentine, enamel, and cementum and a sporadic calcification in tooth development. Second, a great hypertrophy of the right ramus has happened, which has given rise to a bulbous appearance to the jaw. Third, the concavity of the diseased molar is greater than that of a normal molar. Fourth, the breadth of the former is one-and-a-half times that of the normal. And fifth, the enamel figure on the friction surface of the anomalous molar is irregular as shown in the plate.

The third molar, which now contains the anterior talon and twelve ridges, has lost 4–8 ridges and the posterior talon. Its grinding had not yet begun. The maximum length of its crown is 180 mm., and its width at the sixth ridge 60 mm. The height of the crown is 128 mm. at the fifth ridge, and 132 mm. at the tenth. The frequency of ridges in a standard length of 100 mm. is 6.5.

For reasons given above it is almost impossible to determine its specific name, but the writers believe that it may belong to *Palaeoloxodon namadicus* (FALCONER and CAUTLEY), the well known Pleistocene elephant.

Finally the writers wish to express their thanks to Professor Tosikazu Tokoro, Nippon Dental College, for dental information received.

Explanation of Plate 19 (8)

Fig. 1. Crown view of right mandible with first, second, and third molar $\times\frac{1}{4}$

Fig. 2. Inner view of the same $\times\frac{1}{4}$

Fig. 3. Crown view of second molar $\times\frac{1}{2}$

Fig. 1

Fig. 2

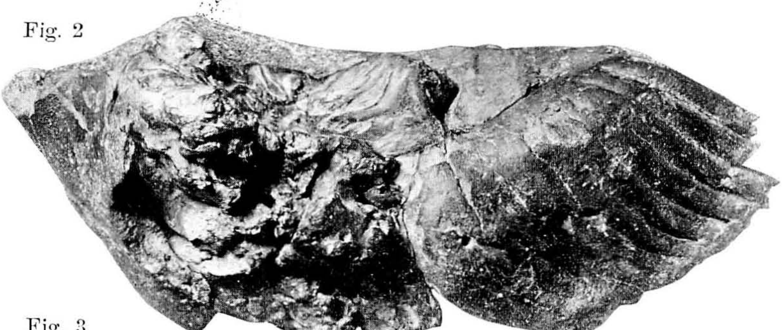
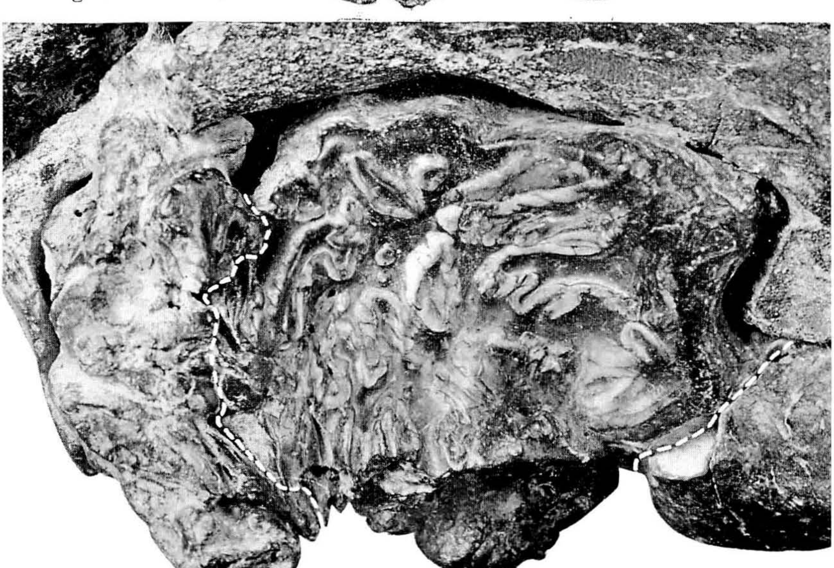


Fig. 3



日本古生物學會記事

昭和 12 年 1 月 30 日 第 6 回例會を 東京帝國大學理學部地質學教室に於て開催す。講演者並に講演題目次の如し。

New Occurrence of *Rotaliatina* in the Pliocene of Java. — Hisakatsu YABE and Kiyosi ASANO

Two Forms of *Tubipora* (代讀) — Hisakatsu YABE and Toshio SUGIYAMA

Some foraminiferous Fossils from the Kôten Series of Heizyô Coalfield. Tyôsen. — Haruyosi HUZIMOTO

Some Fusulinids from Kametubo, Kanzaki, Hyôgo-prefecture. — Haruyosi HUZIMOTO

Neogene Shells from the Tomioka-Simonita District, Gumma Prefecture, Japan. — Kôiti SUZUKI

庄原第三紀層の化石二三 — 大塚彌之助

彦島第三紀層の化石二三 — 大塚彌之助

Mesozoic Shells from Yosimo, Province Nagato, Japan. — Teiichi KOBAYASHI and Kôiti SUZUKI

On the Armenoceratidae. — Teiichi KOBAYASHI

An Occurrence of Phyllocarid in the Heian System of Chosen. — Teiichi KOBAYASHI

熱河產中生代ザリガニ化石, *Astacus licenti* van STRAELEN — 坂倉勝彥

自昭和六年至同十一年, 葛生骨洞群發掘概報 (代讀) — 鹿間時夫

Hypertrophy in the Jaw of a fossil Elephant. — Shigeyasu TOKUNAGA and Fuyuji TAKAI

朝鮮半島產新生代化石植物に就て (代讀) — 遠藤誠道

滿洲分頭營子產の植物化石二三 — 松澤勳

Type に就て (代讀) — 槇山次郎

會長演說 — 德永重康

昭和 12 年 1 月 1 日以降 3 月 31 日迄の入會會員氏名次の如し。

John C. Hazzard	尹贊勳	計榮森
俞建章	許傑	李毓堯
王鈺	T. Wyatt Durham	G. D. Harris
許德佑		

正 誤

Errata to H. YABE and T. SUGIYAMA: Sundry Notes on Living and Fossil *Tubipora* (Journal of the Geological Society of Japan, Vol. XLIV, No. 522, Transactions to the Palaeontological Society of Japan, No. 32, 1937)

P. 250 (34), 12 line, for dicisive, read decisive.

250 (34), last line, for aux, read eux.

251 (35), 3rd line, for millimètre, read millimètres.

251 (35), 3rd line, for tres, read très.

251 (35), replace the 4th line with chés, réguliers et assez lisses. Planchers exothécales nombreux.

251 (35), 7th line, for tentalees, read tentacles.

251 (35), 14th line, for large, read larges.

251 (35), 19th line, for éscar-, read écar-.

251 (35), foot-note 4, lst line, for Reports, read Report.

252 (36), 20th line, for known, read know.

252 (36), 28th line, for 25, read 2,5

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1. 本會ハ日本地質學會ノ部會ニシテ日本古生物學會ト稱ス
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事務所――編輯所

東京帝國大學理學部地質學教室

日本古生物學會

(振替口座東京第84780番)

Constitution of the Palaeontological Society of Japan.

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Article 2. The object of the Society is the promotion of palaeontology and related sciences.

Article 3. This Society to execute the scheme outlined under Article 2, shall hold annual meetings and discussions.

Article 4. Proceedings of the Society and articles for publication shall be published through the Journal of the Geological Society of Japan. Separates and circulations will be sent to members of the Palaeontological Society who are not members of the Geological Society of Japan.

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Article 6. This Society shall hold the following executives. President one person, Councillors several persons.

Article 7. The President and Councillors shall be elected annually. The President and Councillors shall be elected from the Society body by vote of its members. All elections shall be ballot.

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