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Conodonts from the Maggol- and the Jeongseon Formation(Ordovician), Kangweon-Do, South Korea

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ABSTRACT: 38 form species referable to 18 genera and 2 form species of the form genus *Scolopodus* are described from the Maggol- and the Jeongseon Limestone distributed in Kangweon-Do, South Korea. *Oepikodus maggolensis* sp. nov. and two unnamed new species are proposed. The Maggol Fauna is divided into the Lower and the Upper Group. The former is dated to Arenigian and the latter is closely related to the fauna of the early Middle Ordovician, particularly the faunas of the Fort Pena Formation, Texas and the Pratt Ferry Formation, Alabama in North America. The Jeongseon Fauna may also be dated as Middle Ordovician. It needs, however, more detailed work based on sufficient materials for reliable correlation.

1. Introduction

Conodont study on the Cambro-Ordovician formations in Korea, although as an early stage, has brought some significant stratigraphical results. One of these is, as indicated by Müller (1964) and Lee (1970), that the conodont is a suitable tool in regional correlation, particularly in the correlation between far-separated continents.

Recently in South Korea the stratigraphic correlation of the Early Paleozoic formations has been a subject of intensive study, and stratigraphical research on the Ordovician "Great Limestone Group" distributed in Kangweon-Do, South Korea was carried out by the faculty members of Geology Department, Yonsei University in 1971(Prof. Kim, O.K., Prof. Lee, D.S. and Associate Prof. Lee, H.Y.).

Since that time the samples for conodont study have been collected from nearly all the formations of the Great Limestone Series, in Samcheok, Jeongseon and Yongweol districts, Kangweon-Do, where the Cambro-Ordovician Systems are mainly exposed in South Korea.

The purpose of this work is to describe systematically two conodont faunas which were collected from the Maggol- and the Jeongson Formation. Some conodonts of the Maggol Fauna identified already in the preliminary stratigraphic work (Lee, H.Y. & Lee, C.D., 1971) are reexamined in this work. And the systematic classification based on multi-elements could not be adopted in this work owing to deficiency of procured materials. All specimens in the illustrations are deposited in Department of Geology, Yonsei University (YSUG).

2. The collecting localities

The samples used in this study were col-

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lected in the following six sections, which are geographically separated from each other(see, text-fig.1).

Locality 1. Dongjeom District, Sangjang-Myeon, Samcheok-Gun, Kangwoen-Do.

Five samples(No.20-24) were collected by Mr. Jong Dock Lee along the measured section of the gorge between the Dongjeom Primary School and the village of Myeonsan. One of these samples yielded conodonts and its sample number and lithologic character is as follows:

Sample No.20: Dark grey limestone, partially crystallized.

Locality 2. Dongjeom District, Sangjang-Myeon, Samcheok-Gun, Kangweon-Do.

Eleven samples(Samples No. 30-40) were collected by Mr. Jong Dock Lee from the Maggol limestone exposed along the side of the rail road between Samkeori and the tunnel of Napal-Gogae(Hill). Eight of these samples yielded conodonts, and their lithologic characters are as follows: (Text-fig 2 shows the columnar section of the Maggol Formation with the sampling intervals in the collected section)

Sample No. 30-32 : Light bluish gray massive limestone.

Sample No. 33 : Milky white crystalline limestone.

Sample No. 34 : Light bluish gray massive limestone.

Sample No. 36 : Bluish gray massive limestone. Thin calcite veins are precipitated in fractures.

Sample No. 37 : Light blusih gray limestone with cölitic texture.

Sample No. 38 : Light bluish gray to light yellowish gray limestone.

Locality 3. Sangdong, Sangdong-Myeon, Yeongweol-Gun, Kangweon-Do.

Fourteen samples(No.165-178) were collected by the writer from the Maggol Limestone exposed along the southern slopes of Mt. Baekun, which is located on the north side of the Sangdong Scheelite Mine. Five of these samples yielded conodonts and their lithologic characters are as follows: (Text-fig 2 shows the columnar section of the Maggol limestone with the sampling intervals in the collected section)

Sample No. 167 : Light bluish gray microcrystalline limestone.

Sample No. 169 : Light gray massive limestone.

Sample No. 172 : Bluish gray banded limestone.

Sample No. 173 : Bluish gray limestone, thin calcite veins are precipitated in fractures.

Sample No. 175 : Bluish gray microcrystalline limestone.

In addition, Mr. Pil Yun Bong, a senior student, Geology Department of Yonsei University in 1975 collected one sample from the Maggol Formation in nearly the same locality mentioned above. The sample yielded some conodonts and its lithologic characters is as follows

Sample No. 453. Bluish gray massive limestone

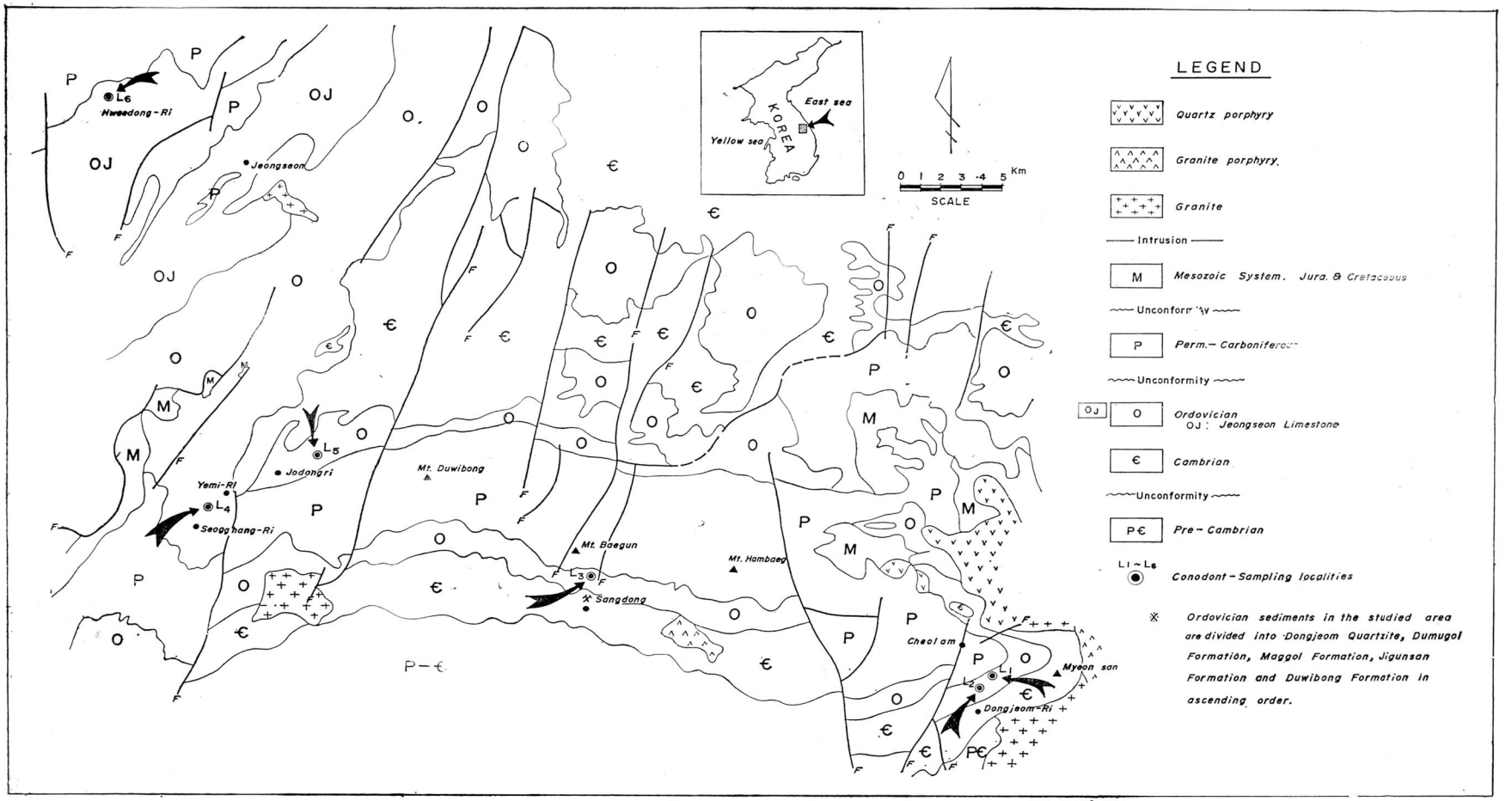
Locality 4. Yemiri, Sindong-Myeon, Jeongseon-Gun, Kangweon-Do.

Eigthteen samples(No. 232-249) were collected by Mr. Min Soo Oh, a graduate student, Geology Department of Yonsei University in 1972 from the Maggol Limestone exposed along the road side between the villages Sukhang and Hambaeg. Only one sample yielded conodonts.

Sample No. 245 : Dark gray massive limestone

Locality 5. Jodong-Ri (Hambaek Coal Mine district), Sindong-Myeon, Jeongseon-Gun, Kangweon-Do.

Seven sample(No. 464-470) were collected by Mr. Se Kon Kim, a senior student, Geology Department of Yonsei University



Text-fig. 1 : *Geologic index map showing the Conodont-Sampling localities.*
(Geologic map after the Geological Investigation Corps of Taebaegsan Region, 1962 and modified by C. M. Son & S. J. Kim.)

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from the Maggol Limestone exposed along the valley between Jodong-Ri and Suri-Jae. Some identifiable conodonts were procured from two of the collected samples and the lithologic characters of the conodont yielding samples are as follows.

Sample No. 468 : Gray massive limestone.

Sample No. 470 : Light gray massive limestone.

Locality 6. Jeongseon district, Jeongseon-Myeon, Jeongseon-Gun, Kangweon-Do.

Fifty-nine samples(No. 256-314) were collected by the writer from the Jeongseon Formation with assistance of the senior students in the Geology Department, Yonsei University. Two of the collected samples yielded conodonts, and their lithologic characters are as follows:

Sample No. 291 : Light bluish gray microcrystalline limestone.

Sample No. 292 : Light bluish gray microcrystalline limestone.

3. Stratigraphic Summary

The Maggol Limestone

The Maggol Limestone was first named by Kobayashi(1928) for a limestone formation of *"the Great Limestone Group" near the Sangdong Scheelite Mine, Sangdong-Myeon, Yeongweol-Gun after the village name "Maggol".

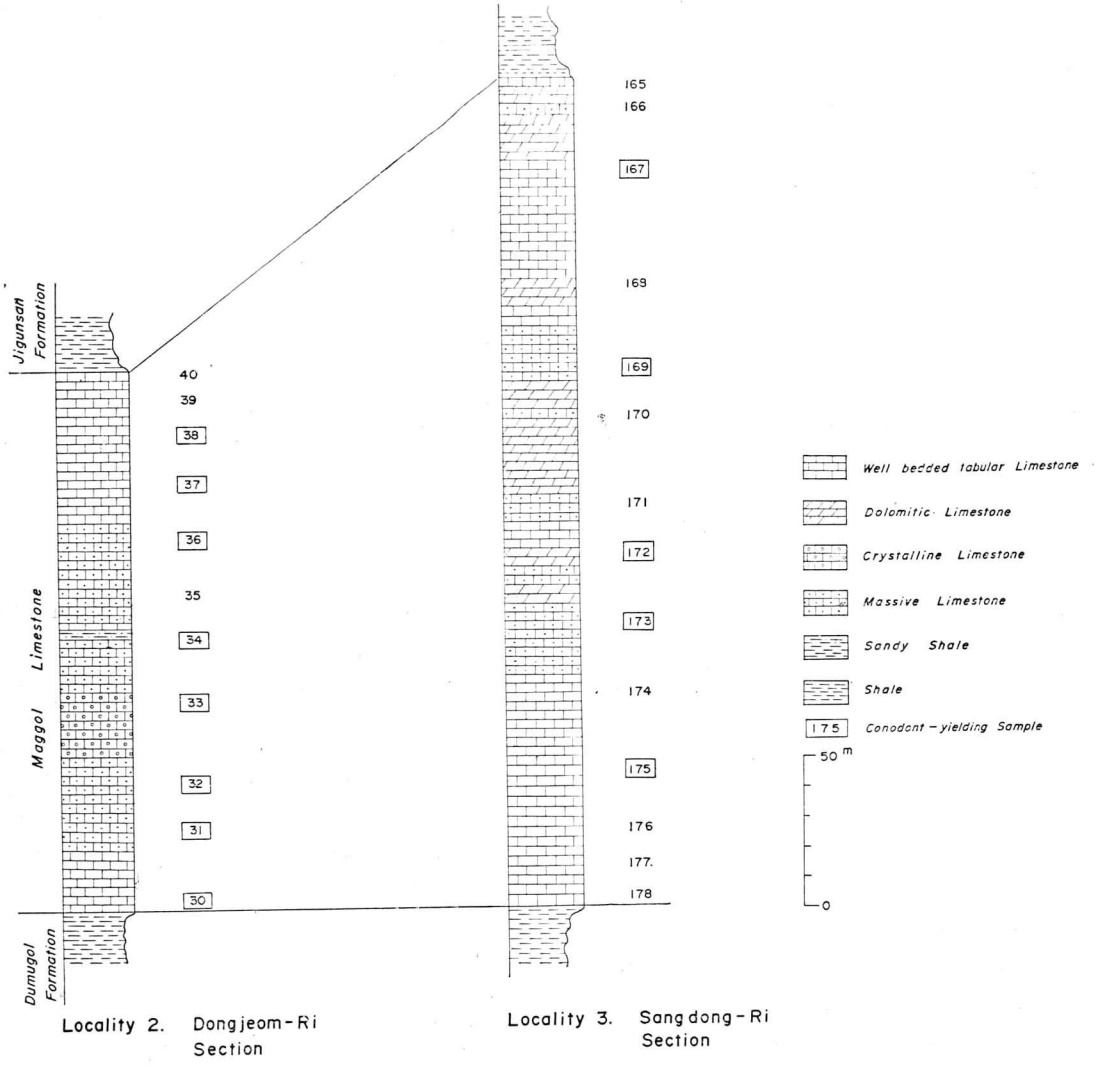
The Maggol Formation crops well out in the southern and northern limbs of the Baegun Syncline Basin. The Baegun Syncline Basin (The Hakun Syncline Basin in old Japanese pronounciation) was first named by Kobayashi et al (1942) and lies on the eastern central region of South Korea with an eastwesterly elongated elliptical shape about 40km in E-W length and 10km in N-S width. The basin covers a rather large area including the western part of Samcheok-Gun, the eastern part of Yongweol-Gun and the southern part of Jeongseon-Gun, and is formed by Cambro-Ordovician and Permo-Carboniferous sediments with a great hiatus ranging from Upper Ordovician to Lower Carboniferous.

The Cambro-Ordovician sediments including the Maggol Limestone are exposed along the rim of the basin, whereas the Permo-Carboniferous occupies the central region of the basin.

The type localities of the Maggol Formation (Kobayashi 1966) are the Daegi- and Dongjeom Sections which are located in the eastern part of the southern limb of the above mentioned syncline basin. The Maggol Limestone with other Lower Paleozoic Formations is also extended to the eastern portion of Tanyang area which is situated on about 40km south-west of the Baegun Syncline Basin. The detailed stratigraphic works on the Cambro-Ordovician formations with the Maggol Limestone have been carried out by Kobayashi(1966), the Geological Investigation Corps of Taebaeksan Region(1962), Cheong (1969) and Kim & Lee (1973) respectively.

The Maggol Limestone consists mainly of bluish gray to gray massive or platy limestones with thinly intercalated light pinkish limestones or gray crystalline dolomitic limestones, and its thickness is estimated at about 230m in Dongjeom Section and 200m in Sangdong Section where the samples for this study were collected.

The Formation overlies the Dumugol Formation and is underlain by the Jigunsan Formation conformably. Kobayashi (1934, 1966) described megafossils such as *Pomatotrema shinsoensis* Kobayashi, *Clarkella vulgaris* Kobayashi, *Hystricurus megalops* Kobayashi, *Illaenus hinomotoensis* Kobayashi etc. from the basal part of the formation and he concluded, on the basis of the paleontological study, that the formation is correlated with Middle to Late Canadian



Text-fig. 4. *Columnar section of the Maggol Limestone showing the sampling intervals in Dongjeom-Ri and Sangdong-Ri Section.*

in North America which corresponds approximately to Arenigian in Europe.

* The Great Limestone Group.

In Korea the Early Paleozoic Systems ranging from Lower Cambrian to Middle Ordovician were first designated by Inoue (1907) as the Choson or Joseon(Chosen in old Japanese pronounciation) System or Supergroup.

The Choson Supergroup is divided into two groups, the lower Yangduk- and the upper Great Limestone Group in the studied area.

The Yangduk Group consists mainly of the clastic meta-sediments such as quartzite and slate, and is also subdivided into two formations, the lower Jangsan Quartzite and the upper Myobong Slate.

The Great Limestone Group is composed chiefly of the carbonate rocks such as limestones and dolomitic limestones, and is subdivided into eight formations, that is, the Daegi Formation, the Dongjeom Quartzite, the Dumugol Formation, the Maggol Limestone, the Jigunsan Shale and

the Duwibong Limestone in ascending order.

The Jeongseon Limestone

The Jeongseon Limestone (Syn. Seizen Formation in Japanese pronounciation) was first proposed by Hisakoshi (1943) for the upper part of the Great Limestone Group distributed in Jeongseon area after the name of town "Jeongseon".

The Formation crops out in the western and central region of Jeongseon Gun which is located in north-western side out of the Baegun Syncline Basin. The Jeongseon Limestone is lithologically so different from those of the Baegun Syncline Basin that it has not been well correlated with the latter.

The Formation consists mainly of dark bluish gray, light gray, brown to light pink coloured limestones with thinly intercalated dark gray shales, and is estimated at about 400m in thickness. The Limestone is covered unconformably by the Permo-Carboniferous System called "the Pyeongan Group", the lower relationship of the formation is the subject of some controversy. Hisakoshi (1943) and Kim et al (1973) considered that the formation corresponds to the compound sequence of the Maggol Limestone, Jigunsan Shale and the Duwibong Limestone in the Baegun Syncline Basin whereas the Geological Investigation Corps of Taebaegsan Region (1962) stated that the formation covers the Duwibong Limestone, the uppermost formation of Great Limestone Group in the Baegun Syncline Basin. This discrepancy about the stratigraphic correlation of the formation is due to lithological difference of the Great Limestone Group between the Jeongseon area and the Baegun Syncline Basin and also to deficiency of the procured fossils.

Only a few fragmentary acticeroid fossils have been reported from the Jeongseon Formation, so that any age determination of the formation has been not attempted on the basis of paleontology.

The stratigraphic works on the formation were carried out by Hisakoshi(1943), The Geological Investigation Corps of Taebaegsan Region (1962), Kobayashi (1953, 1966) and Kim et al (1973).

4. Conodont faunas and their stratigraphic significances.

The Maggol Fauna

Nineteen of fifty seven samples taken from the Maggol Limestone in five separated sections yielded 172 identifiable conodonts. Each sample weighed one kilogram and was digested with 15% of acetic acid. The richest conodonts, 48 specimens in number, were recovered from the sample No.38 and 38 specimens were also collected from the sample No. 20. One to about 10 specimens were procured from other samples. The conodonts were relatively well preserved and dark coloured, but the specimens of sample No. 169 and No. 254 were white-coloured.

The conodont elements are assigned to 39 form species of 16 form genera and Table 1 shows their distribution in the Maggol Formation.

The conodont fauna of the Maggol Formation is divided into two faunas, that is, the lower and the upper fauna, according to their stratigraphic correlation with the established faunas.

The Lower Fauna

The lower fauna includes the conodonts, which are yielded from samples No. 20, 30, 31, 32 and 33 in Dongjeom Section and from samples No. 173 and 175 in Sangdong Section. The fauna consists entirely of simple distacodid conodonts of lower Ordovician.

They are as follows:

Acodus deltatus Lindström

Acontiodus sp. A

Form-Species \ Formation / Sample Number	Maggol Limestone																		Jeongseon Limestone		Total
	20	30	31	32	33	34	36	37	38	167	169	172	173	175	245	453	468	470	291	292	
Acodus deltatus Lindström	2																				2
Acontiodus rectus Lindström										1											1
A. sp. *A*		1																			1
A. sp. *B*					2											1					3
A. sp. *C*													1								1
Coelocerodontus digonius Sweet & Bergström						1															1
Cordylodus concinnus Branson & Mehl									5												5
C. sp. nov. Lee							5		13						4						22
C. sp. A							2		1												3
C. sp. B						4	1														5
Drepanodus altipes Henningsmoen		2																			2
D. arcuatus Pander	3																				3
D. homocurvatus Lindström						1						2	2								5
D. suberectus (Branson & Mehl)		2					1														3
D. too meyi Ethington & Clark			1	1																	2
D. sp. A	1			3																	4
D. sp. B		1		2																	3
Gothodus sp. nov.									3												3
Gyrognathus sp.									1												1
Lonchodus sp.									1												1
Oepikodus maggolensis sp. nov. Lee									2												2
O. sp. nov.									2												2
Oistodus contractus Lindström	4	2			3																9
O. inaequalis Pander	5	4																			9
O. inclinatus Branson & Mehl								1	7						1						9
Paltodus inconstans Lindström	4	1																			5
Polycaulodus resupinatus Branson & Mehl							2		2												4
Prioniodina macrodentata (Graves & Ellison)							2														2
Ptiloconus sp.									2												2
Scandodus furnishi Lindström		3																			3
S. sp.														1							1
Scolopodus alatus Bradshaw																			1		1
S. cornutiformis Branson & Mehl									1												1
S. filosus Ethington & Clark	1	3	1		1	2										4					12
S. giganteus Sweet & Bergström											3						2			5	10
S. rex paltodiformis Lindström	3	6		1														5			15
Trapzognatus sp.												2									2
Tricladiodus? *aurilobus* Lee									2												2
	23	25	2	7	6	8	13	1	42	1	3	4	3	1	5	5	2	5	1	5	162

Table 1. Distribution of the conodont fauna procured from the Maggol and Jeongseon Limestone.

A. sp. B
A. sp. C
Drepanodus altipes Henningsmoen?
D. *arcuatus* Pander
D. *homocurvatus* Lindström
D. *suberectus*(Branson & Mehl)
D. *toomeyi* Ethington & Clark
D. sp. A
D. sp. B
Oistodus contractus Lindström
O. *inaequalis* Pander
Paltodus inconstans Lindström
Scandodus furnishi Lindström
Scandodus sp.
Scolopodus filosus Ethington & Clark
S. *rex paltodiformis* Lindström

Many of the conodonts listed above have been known only from the lower Ordovician.

Acodus deltatus Lindström and *Oistodus inaequalis* Pander have been known from the lowermost to lower Ordovician ranging from Tremadocian to Arenigian in Baltic Region, North America and Australia. *Drepanodus toomeyi* Ethington & Clark and *Paltodus inconstans* Lindström have a relatively definite stratigraphic range of Arenigian in Europe and its equivalent age in other continents. *Scolopodus rex paltodiformis* Lindström has been relatively less known, but it has been reported from the Arenigian in Europe and North America (Lindström, 1955, Ethington 1972).

On the other hand *Drepanodus arcuatus* Pander, *Oistodus contractus* Lindström and *Scolopodus filosus* Ethington & Clark have been described from Lower to Middle Ordovician in Europe, and North America.

Drepanodus altipes Henningsmoen has been reported mostly from Middle to Upper Ordovician in Europe and North America. Recently the species has been known, however, from Lower Ordovician(Lee, 1970) and from Lower and early Middle Ordovician(Barnes & Poplawski, 1973).

Mutual occurrence of these conodonts indicates, therefore, that the lower Maggol Fauna is of Lower Ordovician in age. In consideration of the typical Latorpian fauna of the Dumugol Formation(see Lee 1975b). which is overlain by the Maggol Formation, these fauna may be dated to late Arenigian, even if some conodonts of these fauna have been known only from the Latorpian Stage in Europe, or the stratigraphically corresponding sequences in other continents. Regretfully no distinct zone fossil of the late Arenigian species such as *Baltoniodus triangularis*(multielements) and *Microzarkodina flabellum*(multielements) etc. has been found from this formation.

The dating by this conodont study agrees well with the age determination based on the megafossils. Kobayashi(1966) stated, on the basis of the study of megafossils collected from the basal part of the Maggol Formation, that the age of the formation is dated to Late to Middle Canadian in North America which is approximately equivalent to Arenigian in Europe.

The Upper Fauna

The Upper fauna of the Maggol Formation includes the conodont elements of samples No. 34, 36, 37, and 38 in Dongjeom Section, samples No. 167, 169 and 172 in Sangdong Section and sample No. 241 of Yemi-Ri Section. These fauna is classified into 25 form species of 16 form generas as follows.

Acontiodus rectus Lindström
A. sp. B
Coelocerodontus digonius Sweet & Bergström
Cordylodus? concinnus Branson & Mehl
C. sp. nov. Lee 1975
C. sp. A.
C. sp. B.
Drepanodus homocurvatus Lindström
D. suberectus (Branson & Mehl)
Gothodus sp. nov.
Gyrognathus sp.

Lonchodus sp.
Oepikodus maggolensis sp. nov.
O. sp. nov.
Oistodus inclinatus Branson & Mehl
Polycaulodus resupinatus Branson & Mehl
Prioniodina macrodentata(Graves & Ellison)
Ptiloconus sp.
Scandodus sp.
Scolopodus cornutiformis Branson & Mehl
S. giganteus Sweet & Bergström
Trapezognathus? sp. Bradshow 1969
Tricladiodus? aurilobus Lee

Of the conodonts listed above some species such as *Acontiodus* sp. B., *Cordylodus* sp. A, *Cordylodus* sp. B, *Oepikodus* sp. nov. *Ptiloconus* sp. *Scandodus* sp. and *Trapezognathus* sp. could not be identified into specific levels owing to their poor preservation or deficiency of material. Therefore, they have relatively limited stratigraphic value.

However, such species as *Coelocerodontus digonius* Sweet & Bergström, *Polycaulodus resupinatus* Branson & Mehl, *Prioniodina macrodentata* (Graves & Ellison), *Scolopodus giganteus* Sweet & Bergström, are rather definite Middle Ordovician elements.

Polycaulodus resupinatus Branson & Mehl was fist described from the Joachim Limestone(Branson & Mehl, 1933) and the species was later recorded also from the same formation (Andrew 1967, described as *P. inclinatus*) which is dated from Late Chazyan to Early Black River Stage. Recently Moskalenko (1970) reported *Polycaulodus tridentatus* Branson & Mehl, which seems to be conspecific with *P. resupinatus*, from the Zone of *Coleodus* and *Neocoleodus* in the Siberian Platform which is correlated with upper part of Llanvirnian in Europe and also with upper part of Chazyan in North America.

Prioniodina macrodentata was first known from the Fort Pena Formation (Graves & Ellison 1941, as *Ozarkonina macrodentata*) and further recovered from the Morroch Bay in south western Scotland (Lindstöm 1957), the Pratt Ferrey Formation (Sweet & Bergström, 1962), the Ampyx Limestone, Norway (Hamar, 1966), the Levis Limestone, Canada (Uyeno & Barnes, 1970), and the Table Head Formation (Fahraeus, 1970). The stratigraphic range of the formations mentioned above fall within early to middle Middle Ordovician.

Scolopodus giganteus Sweet & Bergström was first found from the Pratt Ferry Formation (Sweet & Bergström, 1962) and further known from the lower Setul Limestone in Malaya (Igo and Koike, 1968). the Fort Pena Formation (Bradshaw, 1968) and the Mystic Limestone(Barnes & Poplawski, 1973). The stratigraphic range of these formations is dated also to early to middle Middle Ordovician.

Scolopodus filosus Ethington & Clark has been known hitherto from Lower Ordovician in North America and Australia.

The stratigraphic range of species appears however, to be extended to early Middle Ordovician. Mound(1965) reported the species from the Joins Formation and recently Fahraeus(1970) found the species with *Prioniodina macrodentata* from the middle Member of the Table Head Formation.

Scolopodus cornutiformis Branson & Mehl has been known mainly from Lower Ordovician, chiefly in North America. The stratigraphic range of *Scolopodus cornutiformis* may be extended (?) to early Middle Ordovician.

Taking into consideration the established stratigraphic range of the conodont elements listed above, the Upper fauna of the Maggol Formation may fall within early to middle Middle Ordovician corresponding to Chazyan in North America.

Particularily the upper fauna of the Maggol Formation are closely related to those of the Fort Pena Formation, and the Pratt

Ferry Formation of North America; seven form species are common to both fauna.

The Jeongseon Fauna

Only two form species of the genus *Scolopodus*, *S. alatus* Bradshaw and *S. giganteus* Sweet & Bergström were procured from two of the fifty nine samples from the Jeongseon Limestone. *Scolopodus giganteus* Sweet & Bergström, as noted in the previous paragraph, has been known from early to middle Middle Ordovician in North America and Asia. Recently *S. alatus* Bradshaw was found from the Fort Pena Formation, North America with *S. giganteus* Sweet & Bergström. (Bradshaw, 1969)

5. Systematic Description

Genus *Acodus* Pander, 1856

Acodus deltatus Lindström, 1955

pl. 1, fig. 1, Text-fig. 2 A

1955 *Acodus deltatus* Lindström, p. 544, pl. 3, fig. 30.
1975 *Acodus deltatus* Lindström, Lee, p. 80, pl. 1, fig. 2., Tex-fig. 3-B.
Further Synonyms, See Lee(1975b).

Remarks: The Maggol specimens differ somewhat from the holotype from South Central Sweden (Lindström, 1955) in having more slender cusp and less expanded base. The former conforms well to the latter, however, through the three divergent edges carinated anteriorly, posteriorly and laterally. The present specimens are in fairly good agreement with the prioniodiform element of the species from the Emanuel Formation, Australia (Mctavish, 1973 pl. 1, fig. 6, 7).

Occurrence: Maggol Formation (No. 20).

Material: 2 specimens.

Genus *Acontiodus* Pander, 1856

Acontiodus rectus Lindström, 1955

pl. 1, fig. 2, text-fig. 2 B

1955 *Acontiodus rectus* Lindström, p. 549, pl. 2, fig. 7-11, text-fig. 2, k-m, text-fig. 3, B.
1975 *Acontiodus rectus* Lindström; Lee, p. 83, pl. 1, fig. 5, text-fig. 3-E.
Further Synonyms, See Lee (1975 b).

Remarks: The maggol specimen bears less well developed postero-lateral costae than those of the original specimens from South Central Sweden (Lindström, 1955).

Occurrence: Maggol Formation (No. 167)

Material: 1 specimen

Acontiodus sp. A

pl. 1, fig. 3, text-fig. 2 C

Remarks: The single Maggol specimen is compared with *A. alveolaris* Stauffer in having the distinct lateral notch above basal sheath and the unexpanded base; in the Korean Specimen, however, the posterior carina is not so distinctly keeled, and also not longitudinally grooved as is the holotype.

Occurrence: Maggol Formation (No. 30).

Material: 1 specimen.

Acontiodus sp. B

pl. 1, fig. 5, text-fig. 2 E

Description: Unit simple, relatively long and nearly erect tapering toward apex slowly. Cusp broadly rounded anteriorly and sharply edged posteriorly with *Acontiodus latus*-like cross section. Both lateral sides bounded by sharply keeled lateral costae, accompanying longitudinal grooves on those posterior parts. Basal sheath slightly expanded with Pyramid-shaped outline. Basal cavity shallow and of triangle form in lateral view.

Remarks: The specimen at hand is similar to *A. latus* Pander. The Maggol specimen is distinguished, however, from the latter through its parallel extension of both lateral costae from base toward apex. The base of the latter is more widely expanded laterally.

Occurrence: Maggol Formation (No. 33, 453).

Material: 4 specimens.

Acontiodus sp. C

pl. 1, fig. 4, text-fig. 2 D

Remarks: The single specimen at hand is similar to the form species *A. iowaensis* in its stumpy triangular shape viewed posteriorly. The formers differ from the latter, however, through lack of grooves which flank the median posterior carina.

Occurrence: Maggol Formation (No. 173)

Material: 1 specimen.

Genus *Coelocerodontus* Ethington, 1959

Coelocerodontus digonius Sweet & Bergström, 1962

pl. 1, fig. 6, text-fig. 2 F

1962 *Coelocerodontus digonius* Sweet & Bergström, p. 1224, pl. 168, fig. 1, text-fig. 1 f.
1964 *Coelocerodontus digonius* Lindström; Hamar, p. 261, pl. 2, fig. 13, text-fig. 4, no. 8.
1966 *Coelocerodontus digonius* Lindström; Oberg, p. 137, pl. 16, figs. 5, 6.
1969 *Coelocerodontus* sp.; Bradshaw, p. 1148, pl. 132, fig. 15.
1973 *Coelocerodontus?* sp. s.f.; Barnes & Poplawski, p. 770, pl. 5, figs. 19, 19a.

Remarks: The single specimen at hand is well in agreement with the holotype of the species from the Pratt Ferry Formation in having a deep basal cavity and the sharply keeled anterior and posterior edges. The Maggol form is somewhat broader in the lateral breath of cusp than the original form. The form species *Coelocerodontus?* sp. which was described from the Mystic Formation (Barnes and Poplawski, 1973) may be conspecific to the species.

Occurrence: Maggol Formation (No. 34).

Material: 1 specimen.

Genus *Cordylodus* Pander, 1856

Cordylodus concinnus Branson & Mehl, 1933

pl. 2, fig. 1, text-fig. 3 F

1933 *Cordylodus(?) concinnus* Branson & Mehl, p. 117, pl. 10, figs. 1-3.
1936 *Cordylodus concinnus* Branson & Mehl;Furnish, Barragy & Miller, p. 1334, pl. 1, fig. 6.
1941 *Cordylodus concinnus* Branson & Mehl; Graves and Ellison, p. 5, 7, pl. 3, fig. 30.
1942 *Cordylodus concinnus* Branson & Mehl; Amsden and Miller, p. 303, pl. 41, fig. 19.
1955 *Cordylodus concinnus* Branson & Mehl; Sweet, p. 253, pl. 28, fig. 8.

Remarks: The species is characterized by the long cusp which is extended aborally with a moderately sharp antero-basal anticusp, and bears a relatively short posterior process with small, discrete denticles on its oral margin. The aboral margin of

cusp is arcuated upwards. The Maggol specimens are well in agreement with the illustration and description of the type figures of the species from the Plattin Formation(Branson and Mehl, 1933) in the above described features. The posterior process of the figured specimen at hand is partly broken.

Occurrence: Maggol Formation (No. 38).

Material: 5 specimens.

Cordylodus? sp. nov. Lee, 1975

pl. 2, fig. 2, 3, text-fig. 3 G

1975 *Cordylodus?* sp. nov. Lee, p. 171, pl. 2, fig. 2.

Description: Unit compound and symmetrical form. Main cusp stout, long and uniformly recurved, tapering towards apex slowly. Anterior and posterior margins rounded or bluntly keeled with darkly coloured blunt edges. Lateral faces equally convexed transversely with longitudinal, darkly-coloured median carinae through out entire length. Basal sheath nearly not expanded. Basal cavity shallow and subcircular-shaped in aboral view. One to three laterally compressed small denticles cultivated on oral margin of base.

Remarks: As noted in the writer's previous work(Lee, 1975a), the species at hand is distinguished from other described species of the form genus *Cordylodus* through the nearly unexpanded basal sheath with one to three small denticles on its oral margin and the characteristic dark-coloured four carinae; anterior, posterior and both lateral.

Occurrence: Maggol Formation(No. 36, 38, 245).

Material: 22 specimens.

Cordylodus sp. A.

pl. 2, fig. 5, text-fig. 3 E

1941 *Oistodus vulgaris* Graves and Ellison, p. 5, pl. 2, fig. 14.

1962 "*Cordylodus*" sp. Sweet and Bergström, p. 1249, pl. 169, fig. 16, (non pl. 169, fig. 1).

Remarks: The Maggol specimen at hand is characterized by the antero-posteriorly sharply edged cusp and the unexpanded basal sheath with two or three blade-like denticles on its oral margin. The surface is longitudinally finely striated. The specimen at hand is closely similar to "*Cordylodus*" sp. which was described from the Pratt Ferry Formation (Sweet & Bergström 1962, pl. 169, fig. 16) in its general morphology and the ornaments of striation on the surface of unit. But the latter is fibrous form whereas the present specimen is obscure on the inner structure owing to pyritization. The Maggol specimen resembles also the specimens described as *Oistodus vulgaris* from the Fort Pena Formation (Graves & Ellison, 1941) in having the narrow basal sheath and a small number of denticles on the oral margin. Owing to deficiency of materials and vagueness of inner structure, it is not assigned to a distinct taxa in a specific level.

Occurrence: Maggol Formation (No. 36, 38).

Material: 3 specimens.

Cordylodus sp. B

pl. 2, fig. 4, text-fig. 3 H

Remark: The single specimen at hand is similar to the specimens described as *Ptiloconus gracilis* by Sweet and Bergström (1962, pl. 169, fig. 15) and by Webers (1966, pl. 5, fig. 8) in general morphology. It can not be ascertained, however, whether the present Korean specimen is conspecific with them owing to lack of a

detailed description about the specimens. According to the original description and the illustration of the species *Ptiloconus gracilis*(Branson & Mehl, 1933, p. 111, pl. 8, 30, 32, 35), it has one or two short sharp denticles pointing inward and forward. The Korean specimen does not bear any denticles on the antero-basal side of cusp. It resembles also the form genus *Cordylodus delicatus* or its synonymous form *C. elongata* in general morphology, but it differs from the latter through the sharp curvature of cusp and short posterior process. The cusp of the latter is distinctly proclined or suberect and the posterior process is more elongate than the former.

Occurrence: Maggol Formation (No. 34, 36).
Material: 5 specimens.

Genus *Drepanodus* Pander, 1856

***Drepanodus altipes* Henningsmoen, 1948**

pl. 1, fig. 7, text-fig. 2 G

1948 *Drepanodus altipes* Henningsmoen, p. 420, pl. 25, fig. 14.
1967 *Drepanodus altipes* Henningsmoen; Igo and Koike, p. 17~18, pl. 2, fig. 8, text-fig. 4 m.
1968 *Drepanodus? altipes* Henningsmoen; Manara and Vai, p. 481.
1970 *Drepanodus altipes* Henningsmoen; Lee, p. 318, pl. 7, fig. 20.
1973 *Drepanodus?* sp. A. s.f.,-Barnes and Poplawski, p. 774, pl. 3, fig. 13.
Further synonyms, see Lee(1970)

Remarks: The Maggol specimens conform well to the illustrated figures and the original descriptions of the species from Gelli-grin and Pen-Y-garnedd Limestone, South Wales (Rhodes, 1953). The present specimens do not show any carinae or grooves on both lateral faces.

Occurrence: Maggol Formation (No. 30).
Material: 2 specimens.

***Drepanodus arcuatus* Pander, 1856**

1856 *Drepanodus arcuatus* Pander, p. 27, pl. 2, fig. 37.
1975 *Drepanodus arcuatus* Pander; Lee, p. 84, pl. 1, fig. 13, text-fig. 3-L.
Further synonyms, see Lee (1975 b).

Occurrence: Maggol Formation (No. 20). *Material:* 3 specimens.

***Drepanodus homocurvatus* Lindström, 1955**

pl. 1, fig. 10, text-fig. 2 J

1955 *Drepanodus homocurvatus* Lindström, p. 563, pl. 2, fig. 23, 24, 39, text-fig. 4 d.
1975 *Drepanodus homocurvatus* Lindström; Lee, p. 85, pl. 2 fig.1, text-fig. 4-A.
Further synonyms, see Lee(1975 b)

Occurrence: Maggol Formation (No. 34, 172, 173). *Meterial:* 5 specimens.

***Drepanodus suberectus* (Branson & Mehl, 1933)**

1933 *Oistodus suberectus* Branson & Mehl, p. 111, pl. 9, fig. 7.
1975 *Drepanodus suberectus* (Branson & Mehl); Lee, p. 86—87, pl. 2, fig. 8, text-fig. 4-F.
Further synonyms, see Lee (1975 b).

Occurrence: Maggol Formation (No.30, 36). *Material:* 3 specimens.

***Drepanodus toomeyi* Ethington & Clark, 1964**

pl. 1, fig. 8, text-fig. 2 H

1964 *Drepanodus toomeyi* Ethington & Clark, p. 690, pl. 113, fig. 17, pl. 114, fig. 22, text-fig. 2, H.

1969 *Drepanodus* sp. Bradshaw, p. 1150, pl. 131, figs. 1, 2.
1970 *Drepanodus toomeyi* Ethington & Clark; Barnes and Tuke, pl. 19, figs. 9—11, text-fig. 6 I.
1973 *Drepanodus toomeyi* Ethington & Clark; Barnes and Poplawski, p. 773, pl. 2, fig. 10.

Remarks: The specimens at hand conform well to the type figure and the original description of the species from the El Paso Formation.

As noted by Ethington and Clark (1964), in the Korean specimens the basal cavity is opened somewhat to the side owing to the lateral flexion of the cusp.

Occurrence: Maggol Formation (No. 31, 32)
Material: 2 specimens.

***Drepanodus* sp. A**

pl. 1, fig. 9, text-fig. 2 I

Remarks: The present specimens are characterized by the sub-circular conical basal cavity and the antero-basaly somewhat extended basal sheath.

Occurrence: Maggol Formation (No. 20, 32).
Materials: 4 specimens.

***Drepanodus* sp. B**

pl. 1, fig. 13, pl. 2, fig. 12, text-fig. 3 B

Remarks: The two fragmentary Maggol specimens are characterized by the long and unexpected basal sheath. They resemble the form species *Drepanodus longibasis* Lindström, which was first described from the Upper Plani Limbata Limestone of South Central Sweden (Lindström, 1955) in having the long basal sheath. Owing to deficiency and poor preservation of materials, however, the specimens could not be assigned to a distinct species.

Occurrence: Maggol Formation (No. 30, 32).
Material: 3 specimens.

Genus *Gothodus* Lindström, 1955

***Gothodus* sp. nov.**

pl. 2, fig. 6

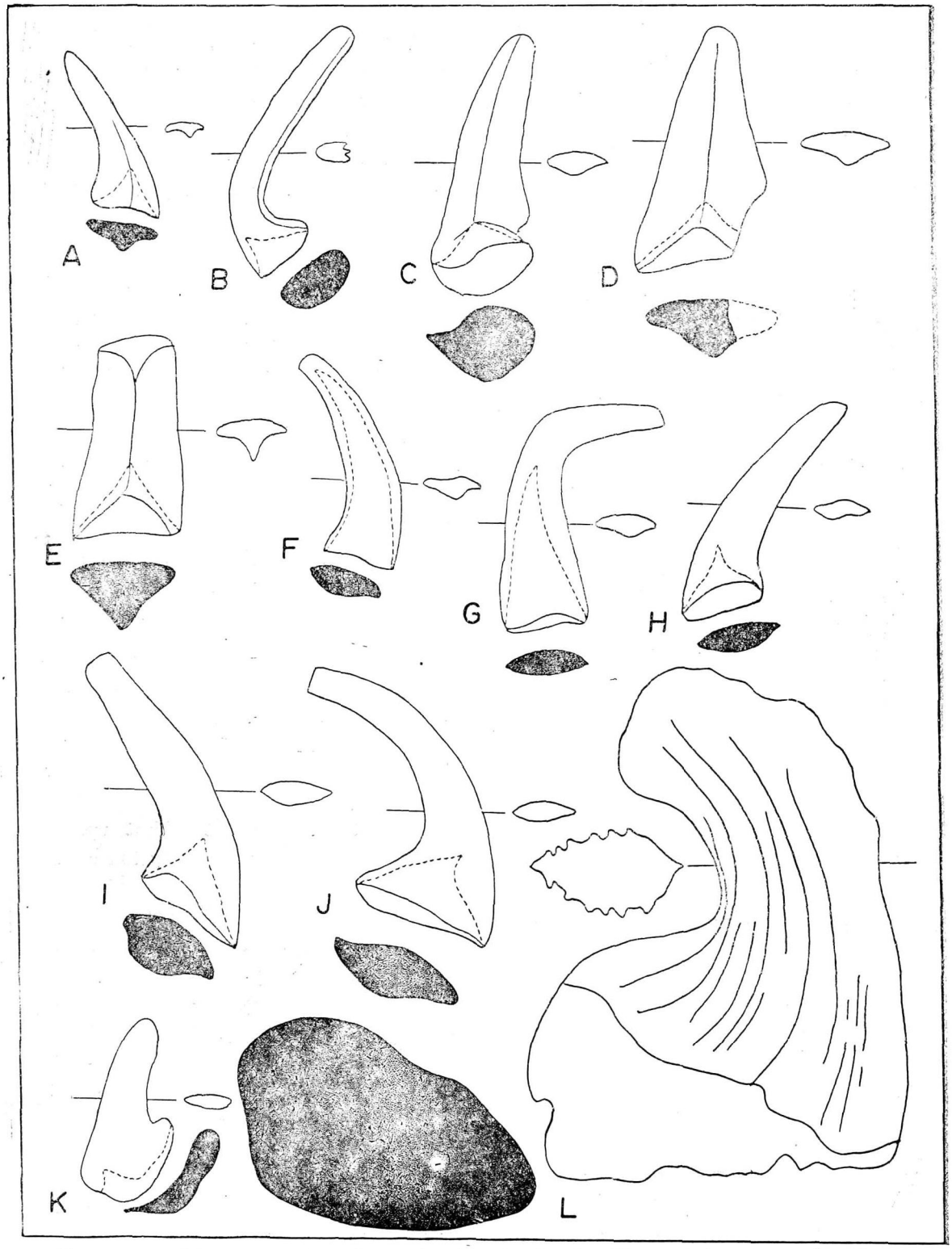
Description: Unit compound, subsymmetrical form. Main cusp long and nearly upright, tapering towards apex slowly.

Both anterior and posterior sides sharply edged and lateral faces broadly convexed transversely with asymmetrically developed lateral costae: One costa prominently carinated throughout entire length, the other weakly keeled to only one third of unit above base. Basal sheath not expanded but highly projected and pointed antero-basally.

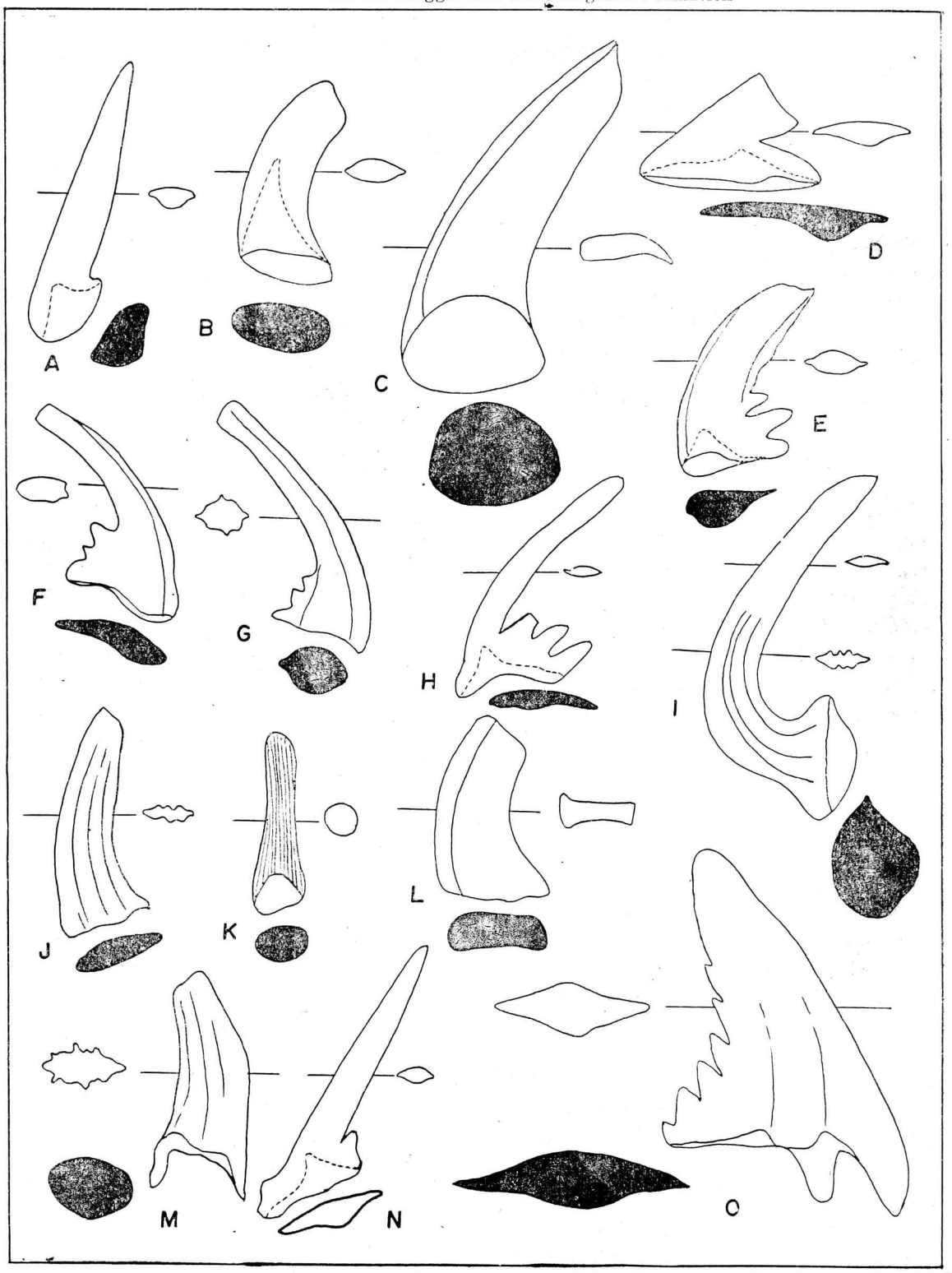
Posterior process relatively long, extended aborally and highly compressed laterally with six or more small, blade-like, closely confluent denticles on its oral margin. Basal cavity shallow but widest under main cusp and excavated thinly to end of posterior process.

Remarks: According to definition of the form genus *Gothodus*(Lindström, 1955), it is characterized by two undenticulate costae or processes, that is, one anterior and one lateral, and a posterior denticulate process. The Maggol specimens have another lateral costa which runs to only one third of unit from base except for the above-mentioned costae. The Korean specimens may be a new species.

Occurrence: Maggol Formation (No. 38).
Material: 3 specimens.



Text—fig. 2 The Illustrated specimens showing the aboral outline and the cross section of cusps.



Text—fig. 3 The Illustrated specimens showing the aboral outline and the cross section of cusps.

Genus *Gyrognathus* Stauffer, 1935

***Gyrognathus* sp.**

pl. 2, fig. 21

Remarks: The single, fragmental Maggol specimen is similar to the form-species *Gyrognathus? superbus* Rhodes (Syn. *Trichonodella superba* by Bergström, 1964) in having the knob-like projection on the basal sheath of the main cusp.

The Korean specimen differs from the latter, however, through the unequal length of both anterior and posterior processes and the closely fused denticles on the oral margin of the processes. In the figured specimen from Wales both processes are more or less equally stretched and the small denticles on oral margin are more discretely attached.

Occurrence: Maggol Formation (No. 38).

Material: 1 specimen.

Genus *Lonchodus* Pander, 1856

***Lonchodus* sp.**

pl. 2, fig. 16

Description: Unit compound and blade-like form. Process straight with five, equal-sized, laterally compressed, posteriorly inclined and proximally fused small denticles on its oral margin. Aboral side straight and thinly and shallowly excavated through length of process.

Remarks: It is not possible to assign the single, imperfect specimen at hand to a distinct species owing to poor preservation of the material. The Korean specimen may be approximately compared with *L. spinuliferus* in the general outline of unit, but the denticles of the former are more tightly fused than those of the latter.

Occurrence: Maggol Formation (No. 38).

Material: 1 specimen.

Genus *Oepikodus* Lindström, 1955

***Oepikodus maggolensis* sp. nov.**

pl. 2, fig. 7, text-fig. 3, O

Derivatio nominis: After the formation name from which the conodont is procured.

Holotypus: Pl. 2, fig. 7, YSUG 00196

Locus typicus: The same as the collecting-locality of sample No. 38.

Stratum typicum: The same as occurrence.

Stratigraphical distribution: The upper part of the maggol Formation.

Diagnosis: An *Oepikodus* having a stout, large, and upright main cusp with both lateral projection and a short posterior denticulated process or oral edge.

Description: Unit compound, bilaterally symmetrical form. Main cusp stout, large and upright, tapering towards apex rapidly. Both anterior and posterior margins of cusp sharply edged and both lateral faces highly compressed with broadly vaulted median carinae which grade, making prominent wing-like lateral flares or projections on both lateral faces of the basal sheath. Basal sheath highly projected and pointed antero-basally and expanded posteriorly with sharply pointed, short posterior process or oral margin on which five, laterally compressed, equal-sized, closely fused, upright and pointed denticles are set. Basal cavity shallow under main cusp and excavated through all length of proccess.

Remarks: Although the specimens at hand are only two in number, one perfect and

the other fragmental, those features are sufficiently distinct to separate them from previously described species of the form-genus *Oepikodus* through the stout and large main cusp with the short wing-like lateral flare and short denticulate posterior process. The Korean species is somewhat similar to the specimen, which was described by Sweet et al(1971, p. 166, pl. 1, fig. 20) as *Oepikodus quadratus* (Graves and Ellison) but the former is distinguished from the latter through the aborally more projected antero-basal end of the basal sheath and more stout main cusp.

Occurrence: Maggol Formation (No. 38).

Material: 2 specimens.

***Oepikodus* sp. nov.**

pl. 2, fig. 15

Diagnosis: An *Oepikodus* having a long, slender and slightly recurved main cusp with a denticle-like small projection on antero-basal part.

Description: Main cusp long, slender and slightly recurved backwards, tapering towards apex gradually. Anterior and posterior margins rounded with no keels. Lateral faces broadly convexed transversely, but distinctly carinated from basal margin to midheight, particularly highly flared posteriorly under one third of cusp. Oral margin (or posterior process) laterally compressed and set by two or three blade-like, posteriorly inclined discrete denticles. Basal cavity under main cusp relatively shallow and excavated to end of posterior process.

Remarks: The specimen at hand resembles the form species *Tetraprioniodus* sp. from the Lehman Formation, Millard Country, North America (Sweet and et al., 1971, pl. 1, fig. 30) in its general morphology; the former differs from the latter, however, through the denticle-like small projection on the antero-basal part of cusp and the undenticulated lateral costae. The specimen from the Lehman Formation does not bear such projection and its lateral costae are denticulated.

Occurrence: Maggol Formation (No. 38).

Material: 2 specimens.

Genus *Oistodus* Pander, 1856

***Oistodus contractus* Lindström, 1955**

pl. 1, fig. 11, tert-fig. 2 K

1955 *Oistodus contractus* Lindström, p. 573, pl. 4. figs. 45, 46, text-fig. 3 H.
1965 *Oistodus contractus* Lindström; Mound, p. 27, pl. 3, figs. 27, 28.
1970 *Oistodus contractus* Lindström; Lee, p. 325, pl. 7, fig. 28.
1975 *Oistodus contractus* Lindström; Lee, p. 175.
Further synonyms, see Lee (1970, 1975a)

Remarks: The species is characterized by a relatively long straight cusp and a rectangular-shaped basal sheath with a very short oral edge.

The Maggol specimens conform well to the type specimens from South Central Sweden in above mentioned features.

Occurrence: Maggol Formation (No. 20,30,33)

Material: 9 specimens.

***Oistodus inaequalis* Pander, 1856**

pl. 1, fig. 12, text-fig. 3 D

1856 *Oistodus inaequalis* Pander, p. 27, pl. 2, fig. 37.
1975 *Oistodus inaequalis* Lindström; Lee, p. 87, pl. 2, fig. 2-3, text-fig. 4-B, C.
Further synonyms, see (Lee, 1975 b)

Remarks: The Maggol specimens is well in agreement with the type figures and the original description of the species from the Baltic region (Pander 1856 and Lindström, 1955)

Occurrence: Maggol Formation (No. 20, 30).

Material: 9 specimens.

Oistodus inclinatus Branson & Mehl, 1933

pl. 1, fig. 14, text-fig. 3 A

1933 *Oistodus inclinatus* Branson & Mehl, p. 110, pl. 9, fig. 8.
1975 *Oistodus inclinatus* Branson & Mehl; Lee, p. 175-176, pl. 1, fig. 10, 11.
Further synonyms, see Lee(1975)

Remarks: The Maggol specimens are in agreement with the type figure of *O. inclinatus* Branson & Mehl in having a long and straight, suberect to slightly reclined cusp, whose lateral faces are asymmetrically vaulted transversely. The Korean specimens differ somewhat from the latter, however, through the basal sheath, which is provided with a short oral edge and a straight aboral margin. The holotype from the Plattin Formation bears a moderately posteriorly expanded base and a downwards convexed aboral margin. But this difference may fall within the scope of the variability of the species. The present specimens are closely in agreement with the specimen from the Mandal-Formation.(Lee, 1975 a).

Occurrence: Maggol Formation (No. 37, 38, 245).

Material: 9 specimens.

Genus _Paltodus_ Pander, 1856

Paltodus inconstans Lindström, 1955

1955 *Paltodus inconstans* Lindström, p. 583-584, pl. 4, figs. 3-8.
1975 *Paltodus inconstans* Lindström; Lee, p. 88, pl. 2, figs. 5,7, 10, text-fig. 4-E, J.
Further synonyms, description and figures, see Lee (1975 a,b)

Occurrence: Maggol Formation (No. 20, 30). *Material:* 5 specimens.

Genus _Polycaulodus_ Branson & Mehl, 1933

Polycaulodus resupinatus Branson & Mehl, 1933

pl. 2, fig. 17

1933 *Polycaulodus resupinatus* Branson & Mehl, p. 86-87, pl. 6, fig. 18.
1967 *Polycaulodus inclinatus* Branson & Mehl; Andrew, p. 898. pl. 114, fig. 11, (non pl. 113, fig. 24).
1970 *Polycaulodus tridentatus* Branson & Mehl; Moskalenko, p. 83, pl. 11, fig. 2.

Remarks: The specimens at hand conform to the type figure and the description of the original specimen from the Joachim Formation, North America (Branson & Mehl, 1933). The denticles of the Maggol specimens are all sub-equal in size and inclined posteriorly, whereas the anterior denticle of the holotype is shorter in length and upright. But this minor discrepancy may not justify the taxonomic separation. The figured spescimens, which were described by Andrew (1967) as *Polycaulodus inclinatus* Branson & Mehl and by Moskalenko (1970) as *P. tridentatus* respectively, may be conspecific with the present form.

Occurrence: Maggol Formation (No. 36, 38)

Material: 4 specimens.

Genus *Prioniodina* Ulrich & Bassler, 1926

***Prioniodina macrodentata*(Graves & Ellison, 1941)**

pl. 2, fig. 19, 20

1941 *Ozarkodina macrodentata* Graves & Ellison, p. 14, pl. 2, figs. 33, 35, 36,
1957 *Prioniodina*? n. sp. 1 Lindström; p. 175, pl. 1, fig. 23, text-fig. 2.
1957 *Prioniodina* n. sp. 2 Lindström; p. 175–176, pl. 1, fig. 22, text-fig. 2.
1959 *Ozarkodina macrodentata* (Graves & Ellison); Ethington, p. 284, pl. 41, fig. 14.
1962 *Prioniodina macrodentata* (Graves & Ellison); Sweet and Bergström, p. 1240, pl. 71, figs. 7, 8.
1964 *Prioniodina macrodentata* (Graves & Ellison); Hamar, p. 278, pl. 3, fig. 28, textfig. 4, no. 19.
1970 *Prioniodina macrodentata* (Graves & Ellison); Uyeno and Barnes, p. 113, pl. 23, figs. 12, 16, (for other synonym lists before 1970 see Uyeno and Barnes).
1970 *Prioniodina macrodentata*(Graves & Ellison); Fahraeus, p. 2068, 2071, fig. 2.

Remarks: In the Maggol specimens at hand, like those type figures of the species from the Fort Pena Formation(Graves & Ellison, 1941) the antero-posterial process is slightly arched downwards and broadly flexed laterally, with a conspicuously strong main cusp, whose lateral faces are asymmetrically swelled.

Occurrence: Maggol Formation(No. 36).

Material: 2 specimens.

Genus *Ptiloconus*(Branson & Mehl, 1933)

***Ptiloconus* sp.**

pl. 2, fig. 14, text-fig. 3 N

Description: Unit compound and bilaterally symmetrical. Main cusp long, slender, and reclined with subcircular cross setion on distal portion, but sharply edged antero-posteriorly to mid-height from base. Lateral faces smooth and broadly convexed throughout entire length. Basal sheath highly projected and pointed antero-basally with a small triangular-shaped denticle on the extension, and expanded posteriorly, making sharp bend to posterior margin of cusp. One lateral face of base slightly flared, whereas the other is smooth. Oral margin short with two small, laterally compressed, posteriorly inclined denticles. Basal cavity shallow with apex pointed anteriorly and grooved to extremities of both extensions.

Remarks: The specimens at hand are characterized by the straight main cusp and the aborally projected anticusp. But they could not be assigned to a distinct taxon at the specific level owing to deficiency and poor preservation of the material.

Occurrence: Maggol Formation (No. 38)

Material: 2 specimens.

Genus *Scandodus* Lindström,1955

***Scandodus furnishi* Lindström, 1955**

1955 *Scandodus furnishi* Lindström, p. 592, pl. 5, fig. 3.
1967 *Scandodus* cf. *furnishi* Lindström; Moskalenko, p. 113, pl. 25, fig. 1-2.
1970 *Scandodus furnishi* Lindström; Lee, p. 332, pl. 8, fig. 3, 4.
1971 *Scandodus furnishi* Lindström; Clark and Babcock, p. 13
1971 *Scandodus furnishi* Lindström; Clark and Miller, p. 14.
1971 *Scandodus furnishi* Lindström; Ethington and Clark, p. 67 pl. 2, fig. 27.
1972 *Scandodus furnishi* Lindström; Ethington, p. 20, pl. 1, fig. 6.

Remarks: The Maggol specimens are well in agreement with the type figure and the original description of the species from South Central Sweden (Lindström, 1955).

Occurrence: Maggol Formation (No. 30).

Material: 3 specimens.

***Scandodus* sp.**

pl. 1, fig. 15, text-fig. 3 C

Remarks: The single Maggol specimen is similar to *S. nevadensis* Ethington & Schumacher in the shape of cusp cross section. Both the specimens bear a broadly rounded anterior margin and a blunt or sharp posterior edge with subcircular basal outlines. But the Korean specimen is not ornamented by narrow longitudinal striae. In the species *S. nevadensis* the whole surface of the unit is longitudinally striated.

Occurrence: Maggol Formation (No. 175).

Material: 1 specimen.

Genus *Scolopodus* Pander, 1856

***Scolopodus alatus* Bradshaw, 1969**

pl. 2, fig. 13, text-fig. 3 M

1969 *Scolopodus alatus* Bradshaw, p. 1162, pl. 132, figs. 1—4.

Remarks: The species is characterized by the triangular basal extension and the wing-like lateral keels (Bradshaw, 1969). The single Jeongseon specimen is well in agreement with these feature. One lateral extension was broken in the present material.

Occurrence: Jeongson Formation (No. 291).

Material: 1 specimen.

***Scolopodus cornutiformis* Branson & Mehl, 1933**

pl. 2, fig. 18, text-fig. 3 I

1933 *Scolopodus cornutiformis* Branson & Mehl, p.62, pl. 4. fig. 23
1964 *Scolopodus cornutiformis* Branson & Mehl; Ethington & Clark, p. 698—699, pl. 114, figs. 16,23
1965 *Scolopodus cornutiformis* Branson & Mehl; Ethington & Clark, p. 200, pl. 1, figs. 10,12
1967 *Scolopodus cornutiformis* Branson & Mehl; Longwell and Mound, pl. 1.
1968 *Scolopodus cornutiformis* Branson & Mehl; Mound, p. 418, pl. 5, figs. 14—15, 17—19, 22—24, 26—27, 32, 66—67, 69—70.
1970 *Scolopodus cornutiformis* Branson & Mehl; Barnes and Tuke, p. 91, pl. 18, figs. 1,4, fig. 6 B.
1971 *Scolopodus cornutiformis* Branson & Mehl; Clark and Miller, p. 14.
1973 *Scolopodus* aff. *S. cornutiformis* Branson & Mehl; Barnes and Poplawski, p. 786, pl. 1, figs. 9, 10.

Remarks: The species is characterized by the costae which run to only mid-height of cusp from the basal margin and its subcircular aboral outline. The single specimen at hand conforms well to the type figure and the original description of the species from the Jefferson City Formation (Branson & Mehl, 1933) except for the length and curvature of the cusp. The Maggol specimen is rather longer and more highly recurved than the original specimen. As Branson and Mehl stated, however, the shortness and minor curvature of cusp in the holotype owes to its rejuvenation.

Occurrence: Maggol Formation (No. 38)

Material: 1 specimen.

***Scolopodus filosus* Ethington & Clark, 1964**

pl. 2, figs. 9, 10, text-fig. 3 K

1964 *Scolopodus filosus* Ethington & Clark, p. 699, pl. 114, figs. 12, 17, 18, 19, text-fig. 2, E.
1965 *Scolopodus filosus* Ethington & Clark; Mound, p. 34, pl. 4, figs. 27, 32.
1965 *Scolopodus filosus* Ethington & Clark; Ethington and Clark, p. 200.
1967 *Scolopodus filosus* Ethington & Clark; Longwell and Mound, pl. 1.

1968 *Scolopodus filosus* Ethington & Clark; Mound, p. 418 pl. 5, figs. 16, 20, 25, 28, 33, 39, 45—46, 59.
1970 *Scolopodus filosus* Ethington & Clark; Fahraeus, p. 2609, 2071, fig. 2.
1971 *Scolopodus filosus* Ethington & Clark; Jones, p. 63, pl. 5, figs. 9a-c, 10a-c, 11a-c, pl. 6, figs. 1a-c.

Remarks: The species is characterized by the fine longitudinal striation on the overall surface of the cone with a circular or subcircular transversal cross section. The Maggol specimens at hand agree closely with the type figures and description of the original specimens from the El Paso Formation (Ethington & Clark, 1964) in this feature.

Two of the Korean specimens are slightly compressed laterally, so that both anterior and posterior edges are bluntly edged.

Occurrence: Maggol Formation(No. 20, 30, 31, 33, 34, 453)

Material: 12 specimens

Scolopodus giganteus Sweet & Bergström, 1962

pl. 1, fig. 16, 17, text-fig. 2 L

1962 *Scolopodus giganteus* Sweet & Bergeström, p. 1247, pl. 169, fig. 14, text-fig. 1 J.
1967 *Scolopodus giganteus* Sweet & Bergström; Igo and Koike, p.23, pl.2, figs.1—3, text-figs. 5E, F.
1969 *Scolopodus giganteus* Sweet & Bergström; Bradshaw, p. 1162—1163, pl.132, fig. 7.
1973 *Protopanderodus* cf. *P. giganteus* (Sweet & Bergström); Barnes and Poplawski, p.782, pl.1, fig.4.

Remarks: The specimens at hand conform well to the type figure and the original description of the species from the Pratt Ferry Formation(Sweet & Bergström, 1962). One of the figured specimens (pl. 2, fig. 16) is faintly carinated also in the anterior half of the lateral faces. The figured specimen (pl. 1, fig. 17) is the greatest of the conodont materials described in this work.

Occurrence: Maggol Formation (No. 169,), Jeongseon Formation (No. 292, No. 468).

Material: 10 specimens.

Scolopodus rex paltodiformis Lindström, 1955

pl. 2, fig. 8, text-fig. 3 J

1955 *Scolopodus rex paltodiformis* Lindström, p. 596, pl. 3, figs. 33, 34.
1972 *Scolopodus rex paltodiformis* Lindström; Ethington, p. 20.

Remarks: According to the original description of the subspecies (Lindström, 1955), it is distinguished from *S. rex rex* through the flatness of lateral faces and the twisting of the cusp. The Maggol specimens at hand resemble *S. rex* in general morphology, but as they are laterally compressed and bear sharp anterior and posterior edges, the specimens herein are assigned to the subspecies. The Korean specimens are not twisted.

Occurrence: Maggol Formation (No. 20,30,32, 470).

Material: 15 specimens.

Genus *Trapezognathus* Lindström, 1955

Trapezognathus? sp.

pl. 2, fig. 11, text-fig. 3 L

1969 *Trapezognathus?* sp. Bradshaw, p. 1164, pl. 132, figs. 5, 6.

Remarks: The two fragmental specimens at hand agree with the figure and description of the conodont, which was described by Bradshaw(1969) from the Fort Pena Formation as *Trapezognathus?* sp. The Maggol specimens do not bear any denticles on each costa located at each of four angles; two anterial and two postero-

lateral corners.

Occurrence: Maggol Formation(No. 172).

Material: 2 specimens.

Genus *Tricladiodus* Mound, 1965

***Tricladiodus? aurilobus* Lee, 1975**

1975 *Tricladiodus? aurilobus* Lee, p. 181, fig. 14, 15, 16.
Description and figures, see Lee(1975 a)

Remarks: The Maggol specimens at hand agree well with the specimens of *Cordylodus*-element of the species from North Korea (Lee, 1975, pl. 2, fig. 16)

Occurrence: Maggol Formation (No. 38).

Material: 2 specimens.

6. Acknowledgment

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References

Amsden, T.W. & Miller, A.K., 1942, Ordovician conodonts from the Bighorn Mountains, Wyoming; Jour. Paleont., v.16, p.301—306, 1 pl., 2 text-figs.

Andrews, H.E., 1967, Middle Ordovician conodonts from the Joachim Dolomite of eastern Missouri; Jour. Paleont., v. 41, p.881—901, 3 pls. 3 text-figs.

Barnes, C.R. and Poplawski, M.L.S., 1973, Lower and Middle Ordovician conodonts from the Mystic Formation, Quebec, Canada; Jour. Paleont., v. 47, p. 760—790, 5 pls. 1 text-fig., 3 tables.

—— and Tuke, M.F., 1970, Conodonts from the St. George Formation (Ordovician), Northern Newfoundland; Geol. Surv. Canada, Bull., v. 187, p. 79—97, 3 pls. 2 text-figs, 1 tables, Ottawa.

Bergström, S.M., 1971, Conodont biostratigraphy of the Middle and Upper Ordovician of Europe and Eastern North America; Geol. Soc. Amer. Mem., v.127, p. 83—157, 2 pls. 14 text-figs.

—— & Sweet, W.C., 1966, Conodonts from the Lexington Limestone (Middle Ordovician) of Kentucky and its lateral equivalents in Ohio and Indiana; Bull. Amer. Paleont., v.50, 8 pls. 13 text-figs.

Branson, E.B. & Mehl, M.G., 1933, Conodont studies; Univ. Misso. Stud., v. 8. p. 1—167, 12 pls.

Bradshaw, L.E., 1969, Conodonts from the Fort Pena Formation (Middle Ordovician), Marathon Basin, Texas; Jour. Paleont., v. 43, p. 1137-1168, 6 pls. 4 text-figs.

Clark, D.L. & Babcock, L.C., 1971, Conodonts and Biostratigraphy of the Wisconsin Paleozoic (Galena Dolomite); Wisconsin Univ. Inform. Circ., No. 19, p. 38-41.

—— & Miller, J.E., 1971, Conodonts and Biostratigraphy of the Wisconsin Paleozoic (St. Peter Sandstons); idem, p. 14.

Ethington, R.L., 1959, Conodonts of the Ordovician Galena Formation; Jour. Paleont., v. 33,

p. 257-292, 3 pls. 2 Text-figs.

—— 1972, Lower Ordovician (Arenigian) conodonts from the Pogonip Group, Central Nevada, Geol. et Palaeont., SB. 1, p. 17-28, 1 pl. 3 text-figs. 1 table, Marburg.

—— & Clark, D.L., 1964, Conodonts from the El Paso Formation (Ordovician) of Texas and Arizona; Jour. Paleont., v. 38, p. 685-704, 3 pls. 2 text-figs., Menasha.

—— & —— 1965, Lower Ordovician conodonts and other microfossils from the Columbia Ice Fields Section, Alberta, Canada; Brigham Young Univ. Geol. Stud., v. 12, p. 185-205, 2 pls.

—— & —— 1971, Lower Ordovician conodonts in North America; Geol. Soc. Amer. Mem., v.127, p. 63-82, 2 pls. 2 text-figs., Boulder.

—— & Schumacher, D., 1969, Conodonts of the Copenhagen Formation (Middle Ordovician) in Central Nevada; Jour. Paleont., v. 43, p. 440-484, 3 pls. 5 text-figs. 1 tabs.

Fahraeus, L.E., 1970, Conodont-based correlations of Lower and Middle Ordovician Strata in Western Newfoundland; Geol. Soc. Amer. Bull., v. 81, p. 2061-2076, 4 text-figs. 2 tabs.

Furnish, W.M. & Barragy, E.J. & Miller, A.K., 1936, Ordovician Fossils from upperpart of type section of Deadwood Formation, South Dakota; Bull, Amer. Asso. Petro. Geol., v. 20, p. 1329-1341, 2 pls. 1 text-fig.

Geol. Soc. Korea, 1962, Geological Atlas of Taebaegsan Region; The geologic investigation corps of Taebaegsan region, 17 Geologic maps. Seoul.

Graves, R.N. Jr. & Ellison, S., 1941, Ordovician conodonts of the Marathon Basin, Texas; Missouri Univ., School Mines and Met. Bull., Techn. Ser., v. 14, p. 1-26, 3 pls.

Hamar, G., 1964, The Middle Ordovician of the Oslo region, Norway, 17 conodonts from the lower Middle Ordovician of Ringerike; Norsk Geol. T., v. 44, p. 243-292, 6 pls. 3 text-figs. Bergen.

Igo, H. & Koike, T., 1967, Ordovician and Silurian conodonts from the Lankawi Islands, Malaya; Geology and Paleontology of Southeast Asia, v. 3, p.1-29, 3 pls. 6 text-figs.

—— & —— 1968, Ordovician and Silurian conodonts from the Lankawi Islands, Malaya, pt. 2; idem, v. 4, p. 1-21, 3 pls.

Jones, P.J., 1971, Lower Ordovician conodonts from the Bonaparte Gulf Basin and the Daly River Basin, Northwestern Australia; Bur. Miner. Resour. Australia Bull., v. 117, p. 1-80, 9 pls, 16 text-figs. 2 tables, Moonah.

Kim, O.J. & Lee, H.Y., 1973, The Stratigraphy and geologic structure of the Great Limestone Series in Kangweon-Do, South Korea; Jour. Nat. Acad. Sci. Korea, v. 12, p. 139-170, 7 text-figs, 5 tables, Seoul.

Kobayashi, T., 1966, Stratigraphy of the Chosen Group in Korea and South Manchuria and its relation to the Cambro-Ordovician formations of other areas, Sect. A, The Chosen Group of South Korea; J. Fac. Sci., Univ. Tokyo, Sec. 2, v. 16, p. 1-73, Tokyo.

—— 1969, Stratigraphy of the Chosen Group in Korea and South Manchuria and its relation to the Combro-Ordovician formations of other areas, Sect. D, The Ordovician of Eastern Asia and other parts of the conitnent; J. Fac. Sci. Univ. Tokyo, Sec. 2, v. 17, p. 163-316, Tokyo.

Kohut, J.J., 1972, Conodont biostratigraphy of the Lower Ordovician Orthoceras and Stein Limestones(3c), Norway; Norsk Geol. T., v. 52, p. 427-445, 4 text-figs, Bergen.

Lamont, A & Lindström, M., 1957, Arenigian and Llandeilian cherts identified in the southern Uplands of Scotland by means of conodonts, etc.; Trans. Edin. Geol. Soc., v. 17, p. 60-70, 5 pls. 1 text-fig.

Lee, H.Y. 1970, Conodonten aus der Choson Gruppe (Unteres Ordovizium) von Korea; N.Jb. Geol. Geol. Paläont. Abh., v. 136, p. 303-344, 2 pls. 1 text-fig. 3 tabs. Stuttgart.

—— 1975a, Conodonten aus der unteren und mittleren Ordovizium von Nordkorea; Palaeontographica Abt. A; v. 150, p. 161-186, 2 pls. 3 textfigs. Stuttgart.

——, 1975b, Conodonts from the Dumugol Formation (Lower Ordovician), Kangweon-Do, South Korea; Jour. Geol. Soc. Korea; v. 11, p. 75-98, 2 pls. 3 text-figs. 2 tabs. Seoul,

——, 1975c, Conodonts from the Upper Cambrian formations, Kangweon-Do, South Korea; Yonsei Non-chong, No. 12, p. 71-89, 1 pl. 2 text-figs. 1 tabs.

——, & Lee, C.D., 1971, Conodont fauna from the Great Limestone Series in Dongjeom District, Samcheog-Gun Gangweon-Do and its stratigrapical significance; Jour. Geol. Soc. Korea, v. 7, p. 89-101, 2 text-figs, 4 tables, Seoul.

Lindström, M., 1955, Conodonts from the lowermost Ordovician strata of South-Central Sweden; Geol. Fören. Förh., v. 76, p. 517-604, 7 pls. 6 text-figs. Stockholm.

——, 1957, Two Ordovician conodont faunas found with zonal graptolites; Geol. Fören. Förh., v. 79, p. 161-178, 2 pls. 2 text-figs. Stockholm.

——, 1960, A Lower-Middle Ordovician succession of conodont faunas; Internat. Geol. Congr. 21 Sess., Norden 1960, Rept. Part 7. (Ordovician and Silurian Stratigraphy and Correlations); p. 88-96, 8 text-figs. Copenhagen.

——, 1971, Lower Ordovician conodonts of Europe; Geol. Soc. Amer. Mem., v. 127, p. 21-61, 1 pl. 20 text-figs. Boulder.

Longwell, C.R. & Mound, M.C., 1967, A new Ordovician Formation in Nevada dated by conodonts; Geol. Soc. Amer. Bull., v. 78, p. 405-412, 1 pl.

Moskalenko, T., 1967, Conodonts from the Chunya Stage (Lower Ordovician) of the Rivers Molero and Podkamennaia Tungeska; New data on the biostratigraphy of the Lower Paleozoic of the Siberian Platform; Acad. Sci. USSR, Siberian Div., p. 96-116, 2 pls. 16 text-figs.

——, 1970, Konodonti Krivoluzkogo Jarusa(Srednü Ordovik) Sibirskoi platformi; idem, v. 61, p. 5-116, 14 pls. 7 text-figs. 2 tabs.

——, 1973, Distribution of the Ordovician conodonts on Siberian platform, General Survey; Acad. Sci. USSR Siberian Div., Transactions from the Institute of Geology and Geophysics; v. 47, p. 87-107, 23 pls.

Mound, M.C., 1965, A Conodont fauna from the Joins Formation (Ordovician), Oklahoma; Tulane Stud. Geol., v. 4, p. 1-46, 4 pls. 1 text-fig. New Orleans.

——, 1968, Conodonts and biostratigraphy of the Lower Arbuckle Group (Ordovician), Arbuckle Mountains, Oklahoma; Micropaleontology, v. 14, p. 393-434, 6 pls.

Oberg, R., 1966, Winnipeg conodonts from Manitoba; Jour. Paleont., v. 40, p. 130-147, 2 pls. 1 text-fig. 1 tab.

Pander, C.H., 1856, Monographie der fossilen Fische des Silurischen Systems der russisch-baltischen Governments; Königl. Akad. Wiss., St. Petersburg, p. 1-91, 9 pls. 10 text-figs. Petersburg.

Stauffer, C.R., 1935a, Conodonts of the Glenwood Beds; Geol. Soc. Amer. Bull., v. 46, p. 125-168, 4 pls.

——, 1935b, The conodont fauna of the Decorach Shale (Ordovician); Jour. Paleont., v. 9, p. 596-620, 5 pls.

Sweet, W.C., 1955, Conodonts from the Harding Formation (Middle Ordovician) of Colorado; Jour. Paleont., v. 29, p. 226-262, 3 pls. 17 text-figs.

——, & Bergström, S.M., 1962, Conodonts from the Pratt Ferry Formation (Middle Ordivician) of Alabama; Jour. Paleont., v. 36, p. 1214-1252, 4 pls. 5 text-figs.

——, Ethington, R.L. & Barnes, C.R., 1971, North American Middle and Upper Ordovician conodont faunas; Geol. Soc. Amer. Mem., v. 127, p. 163-193, 2 pls. 3 text-figs.

Uyeno, T.T. & Barnes, C.R., 1970, Conodonts from the Lévis Formation, Quebec; Geol. Surv. Canda Bull., v. 187, p. 99-123, 4 pls. 1 text-fig. 1 tab.

Webers, C.F., 1966, The Middle and Upper Ordovician conodont faunas of Minnesota; Minnesota Geol. Sur., Spec. Pub., Ser. Sp-4, p. 1-74, 15 pls. 2 text-figs.

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南韓 江原道에 分布된 莫洞石灰岩과 旌善石灰岩(오오도비스紀)으로 부터 産出된 코노돈트 化石群

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<要 約>

江原道 三陟郡, 旌善郡 一帶에 分布된 朝鮮系의 莫洞石灰岩과 旌善石灰岩으로 부터 코노돈트 化石이 産出되었다. 莫洞石灰岩으로부터 産出된 코노돈트는 18屬 38種으로 分類되었으며 이중에 *Oepikodus maggolensis*와 2種의 命名되지 않은 코노돈트가 新種으로 제안된다. 莫洞化石群은 化石群의 特徵에 따라 下部와 上部로 나누어진다. 下部化石群은 오오도비스紀 下部인 유럽의 아레니지안(Arenigian)에 對比되며 上部化石群은 初期中部오오도비스紀 化石群과 類似하다. 特히 北아메리카의 Texas州에 分布된 Fort Pena層과 Alabama州에 발달된 Pratt Ferry層의 化石群과 密接한 관연성을 보여준다.

旌善石灰岩으로부터는 *Scolopodus*에 屬하는 2種의 코노돈트가 산출되었으며 이들은 北 아메리카의 中部오오도비스紀에서 이미 보고된 화석들이다. 그러므로 旌善石灰岩의 時代는 中部오오도비스紀로 생각된다.

Explanation of Plate 1

All figures x60, unless otherwise indicated. YSUG means that the figured specimens are deposited at "Department of Geology, Yonsei University" Seoul, Korea.

Fig. 1. *Acodus deltatus* Lindström, 1955. Lateral side, YSUG 00174, Sample No.20, Maggol Formation, The Gorge between the Dongjeom Primary School and the village of Myeonsan, Dongjeomri, Sangjang-Myeon, Samcheok-Gun, Kangweon-Do, South Korea.

Fig. 2. *Acontiodus rectus* Lindström, 1955. Lateral side, YSUG 00175, sample No. 167, Maggol Formation, Southern slope of Mt. Baekun, Sangdong, Sangdong-Myeon, Yeongweol-Gun, Kangweon-Do, South Korea.

Fig. 3. *Acontiodus* sp. A. Posterior side, YSUG 00176, Sample No. 30, Maggol Formation, The rail road side between Samkeori and the tunnel of Napal-Gogae(Hill), Dongjeom-ri, Sangjang-Myeon, Samcheok-Gun, Kangweon-Do, South Korea.

Fig. 4. *Acontiodus* sp. C. Posterior side, YSUG 00177, Sample No. 173, Formation and Locality; The same as Fig. 2.

Fig. 5. *Acontiodus* sp. B. Posterior side, YSUG 00178, Sample No. 33, Formation and Locality; The same as Fig. 3.

Fig. 6. *Coelocerodontus digonius* Sweet & Bergström, 1962. Lateral side, YSUG 00179, Sample No. 33, Formation and Locality: The same as fig. 3.

Fig. 7. *Drepanodus altipes* Henningsmoen, 1948. Lateral side, YSUG 00180, Sample No. 30, Formation and Locality; The same as Fig. 3.

Fig. 8. *Drepanodus toomeyi* Ethington & Clark, 1964. Lateral side, YSUG 00181, Sample No. 31, Formation and Locality; The same as Fig. 2.

Fig. 9. *Drepanodus* sp. A. Lateral side, YSUG 00182, Sample No. 20, Formation and Locality; The same as Fig. 1.

Fig. 10. *Drepanodus homocurvatus* Lindström, 1955. Lateral side, YSUG 00183, sample No. 173, Formation and Locality; The same as Fig. 2.

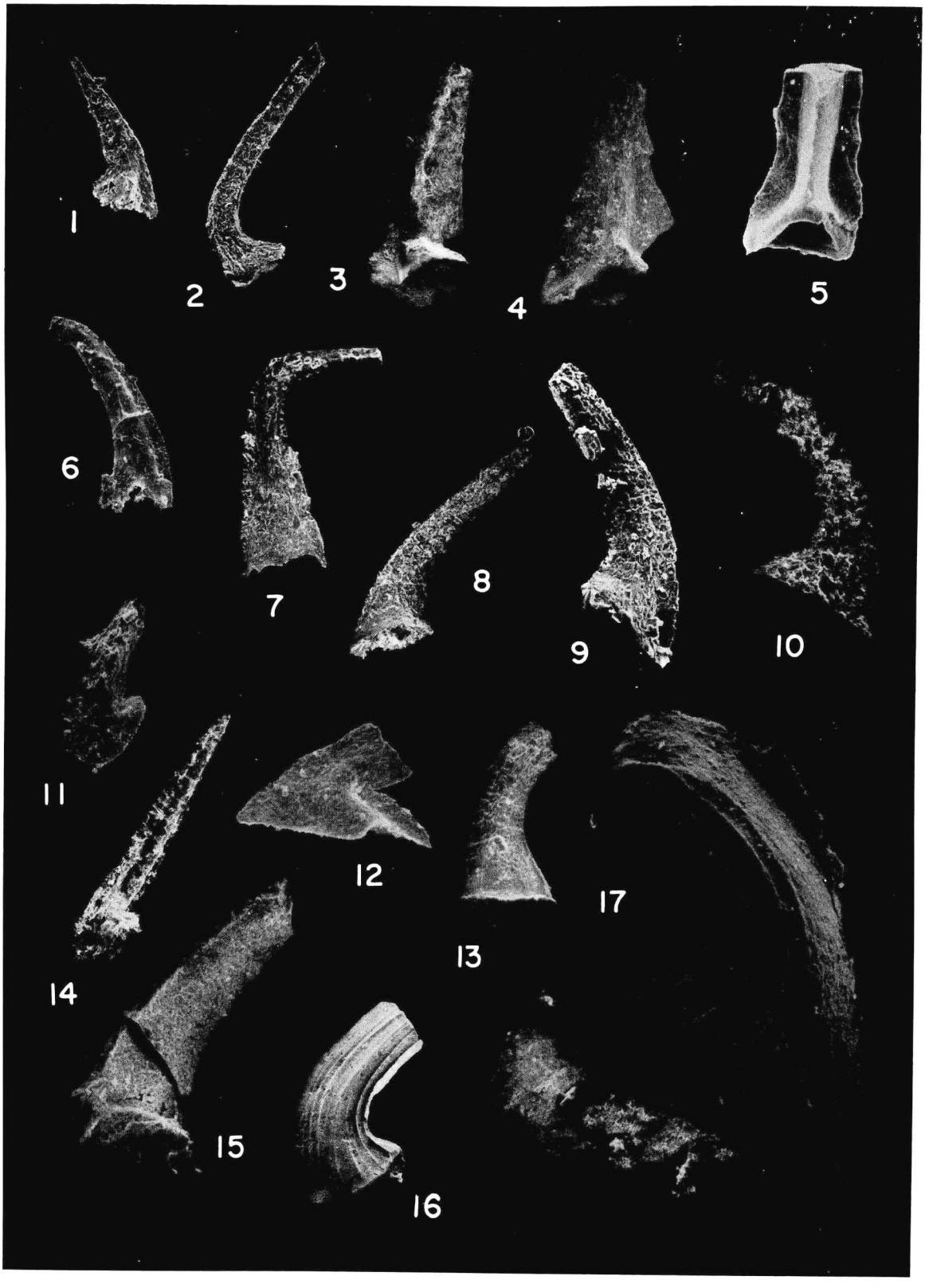
Fig. 11. *Oistodus contractus* Lindström, 1955. Lateral side, YSUG 00184, Sample No.30, Formation and Locality; The same as Fig. 3.

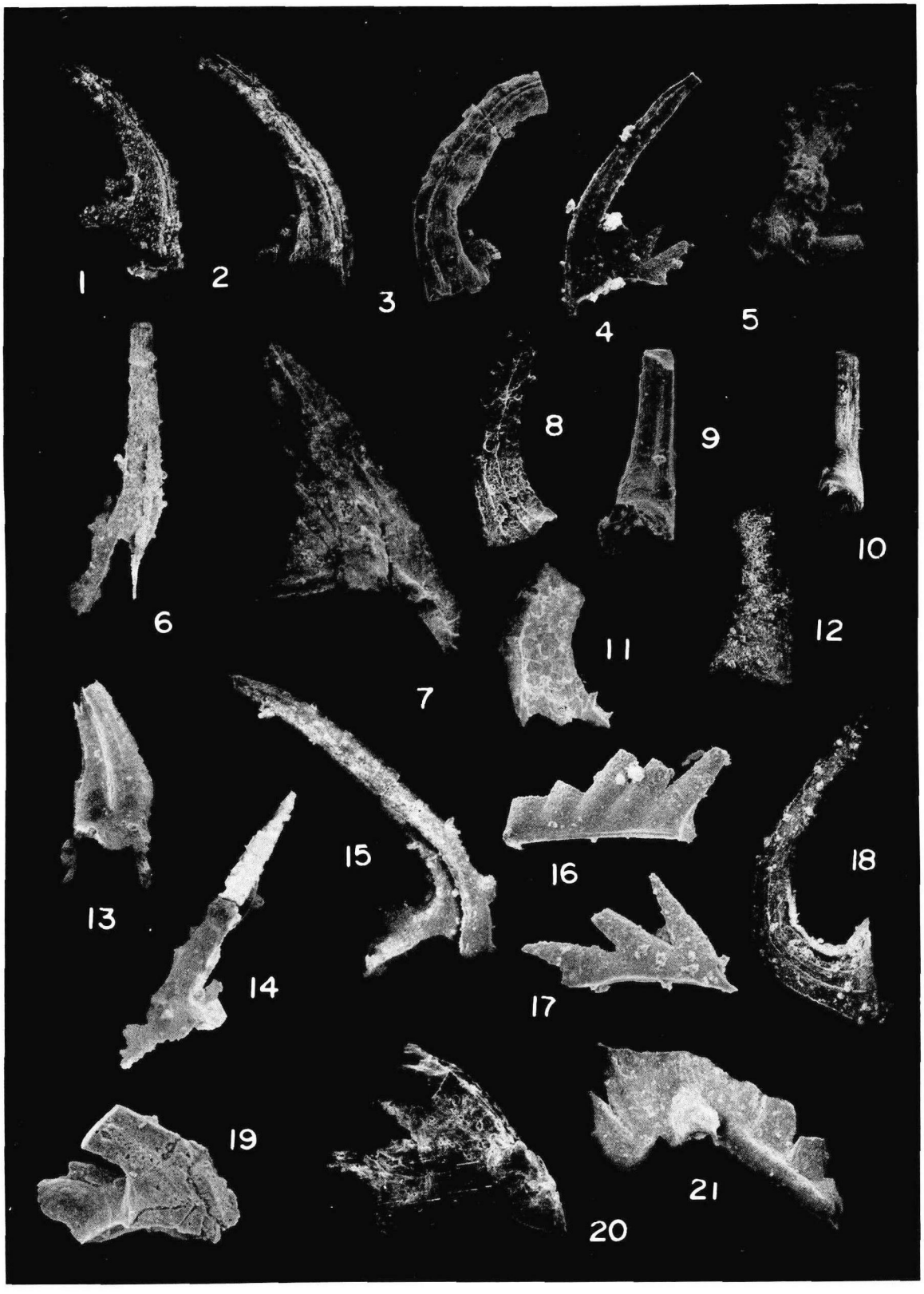
Fig. 12. *Oistodus inaequalis* Pander, 1856. Lateral side, x80, YSUG 00185, Sample No. 20, Formation and Locality; The same as Fig. 1.

Fig. 13. *Drepanodus* sp. B. Lateral side, YSUG 00186, Sample No. 30, Formation and Locality; The same as Fig. 3.

Fig. 14. *Oistodus inclinatus* Branson & Mehl, 1.33. Lateral side, YSUG 00187, Sample No. 245, Maggol Formation, Yemiri, Sindong-Myeon, Jeongseon-Gun, Kangweon-Do, South Korea.

Fig. 16-17. *Scolopodus giganteus* Sweet & Bergström 1962. Lateral sides, Fig.16; YSUG 00188, Sample No. 169, Formation and Locality; The same as Fig. 2. Fig. 17; x40 YSUG 00189, Sample No. 292, Jeongseon Formation, Hwaedongri, Jeongseon-Myeon, Jeongeon-Gun, Kangweon-Do, South Korea.





Explation of Plate 2

All figures x60, unless otherwise indicated.

Fig. 1. *Cordylodus concinnus* Branson & Mehl, 1933, Leteral side, YSUG 00190, Sample No. 38, Maggol Formation, The rail road side between Samkeori and the tunnel of Napal-Gogae (Hill), Dongjeomri, Sangjang-Myeon, Samcheok-Gun, Kangweon-Do, South Korea.

Fig. 2-3. *Cordylodus*(?) sp. nov. Lee, 1975. Lateral sides. Fig. 2, YSUG 00191, Sample No. 38, Maggol Formation, Locality; The same as Fig. 1. Fig. 3, YSUG 00192, Sample No. 245, Maggol Formation, Yemiri, Sindong-Myeon, Jeongseon-Gun, Kangweon-Do, South Korea.

Fig. 4. *Cordylodus* sp. B. Lateral side, YSUG 00193, Sample No. 34, Formation and locality; The same as Fig. 1.

Fig. 5. *Cordylodus* sp. A. Lateral side, YSUG 00194, Sample No. 38, Formation and Locality; The same as Fig. 1.

Fig. 6. *Gothodus* sp. nov. Lateral side, YSUG 00195, Sample No. 38, Formation and Locality; The same as Fig. 1.

Fig. 7. *Oepikodus maggolensis* Lee sp. nov. Lateral side x40, YSUG 00196, sample No. 38, Formation and Locality; The same as Fig. 1.

Fig. 8. *Scolopodus rex paltodiformis* Lindström, 1955. Lateral side, YSUG 00197, Sample No. 20, Maggol Formation, The Gorge between the Dongjeom Primary School and the village of Myeonsan, Dongjeomri, Sangjang-Myeon, Samcheok-Gun, Kangweon-Do, South Korea.

Fig. 9-10. *Scolopodus filosus* Ethington & Clark, 1964. Posterior sides, Fig. 9; YSUG 00198, Sample No. 20, Formation and Locality; The same as Fig. 8., Fig. 10; x80, YSUG 00199, Sample No. 34, Formation and Locality; The same as Fig. 1.

Fig. 11. *Trapezognathus*? sp. Lateral side, YSUG 00200, Sample No. 172, Maggol Formation, Southern slope of Mt. Baekun, Sangdong, Sangdong-Myeon, Yeongweol-Gun, Kangweon-Do, South Korea.

Fig. 12. *Drepanodus* sp. B. Lateral side, YSUG 00201, Sample No. 32. Formation and Locality; The same as Fig. 1.

Fig. 13. *Scolopodus alatus* Bradshaw, 1969. Lateral side, YSUG 00202, Sample No. 291, Jeongseon Formation, Hwaedongri, Jeongseon-Myeon, Jeongseon-Gun, Kangweon-Do, South Korea.

Fig. 14. *Ptiloconus* sp. Lateral side, YSUG 00203, Sample No. 38, Formation and Locality; The same as Fig. 1.

Fig. 15. *Oepeikodus* sp. nov. Lateral side, YSUG 00204, Sample No. 38, Fromation and Locality; The same as Fig. 1.

Fig. 16. *Lonchodus* sp. Lateral side, YSUG 00205, Sample No.38, Formation and Locality; The same as Fig. 1.

Fig. 17. *Polycaulodus resupinatus* Branson & Mehl, 1933. Lateral side, YSUG 00206, Sample No. 39, Formation and Locality; The same as Fig. 1.

Fig. 18. *Scolopodus cornutiformis* Branson & Mehl, 1933. Lateral side, YSUG 00207, Sample No. 38, Formation and Locality; The same as Fig. 1.

Fig. 19-20. *Prioniodina macrodentata*(Graves & Ellison, 1941). Lateral sides, Fig. 19; YSUG 00208, Fig. 20; YSUG 00209, Sample No. 38, Formation and Locality; The same as Fig. 1.

Fig. 21. *Gyrognathus* sp. Posterior side, YSUG 00210, Sample No.38, Formation and Locality; The same as Fig. 1.