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NEOGENE MOLLUSCAN FAUNA IN HOKKAIDO

Part I. Description of the Asahi fauna associated with *Mytilus tichanovitchi* MAKIYAMA, from Ikushunbetsu district, Central Hokkaido.

by

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Contribution from the Department of the Geology and Mineralogy, Faculty of Science, Hokkaido University, Sapporo. No. 969

In 1937, Dr. Jiro MAKIYAMA described the so-called Asagaian fauna (Oligocene), based on the molluscan fossils collected from Yotukura, Jo-ban coal-field, Northeast Japan and Matchgar, North Saghalin. In that occasion he also described *Mytilus tichanovitchi* as a Miocene element brought from the marl beds which cover the Asagaian fine sandstone formation in Matchgar.

The species above mentioned is quite distinct in shell form, from the all other known species belonging to the genus *Mytilus*. Since then, it has been, however, long remained unknown what kinds of molluscan fossils are associated with this unique form of *Mytilus*. Also no one knew correctly on the stratigraphical relation between the formation with the so-called Asagai fauna or its equivalents and the formation with *Mytilus tichanovitchi*.

In 1953 and 1954, the present writer engaged in geological investigation in the Ikushunbetsu district in Central Hokkaido, especially near the Asahi coal-mine, and he unexpectedly found the same species of *Mytilus* as was first described by MAKIYAMA from the lower part of the Neogene deposits there. Therefore he tried to widely trace the base of the formation in which the mentioned *Mytilus tichanovitchi* was found and he came to the conclusion that the formation now in question to be unconformably covering the Poronai formation in this district. Further, certain molluscan species are being in association with this singular form of *Mytilus*.

Now, the deposits with *Mytilus tichanovitchi* MAKIYAMA is the same formation having been called the Asahi formation in this district. The formation may be perhaps included in the Takinoue formation in wide sense, as was once stated by the present writer in 1962. The lower part of the Asahi formation is composed of tuff and tuffaceous sandstone, besides conglomerate in its lowest part, some 80 m in whole thickness. The lower part of the Asahi formation gradually tends upwards into more or less silty or shaly facies which forms the upper part of the Asahi formation, some 100 m in thickness.

In turn, the upper part of the Asahi formation mainly consisting in shale and siltstone as above is confomably covered by the so-called Kawabata formation, which is generally composed of heavy bedded conglomerate, sandstone and mudstone in alternation.

Thus, in the Ikushunbetsu district, the observed stratigraphical sequence of the Tertiary deposits can be enumerated below in descending order:

Kawabata formation
——— conformity ———
Asahi formation — Upper: silty part
Lower: sandy part
——— unconformity ———
Poronai formation

Of them, the Poronai formation has been studied rather in detail in respect to the molluscan or foraminiferal fossils. Namely, the late Dr. M. YOKOYAMA first described certain molluscs and foraminiferas from this formation as early as 1890. Then, Dr. K. Kanehara also described a several species of molluscs as elements of the Poronai fauna in 1937. Further, Dr. H. TAKEDA studied the molluscs more in detail. The result of his was printed in 1955. Furthermore, Dr. K. ASANO studied the foraminiferas of the Poronai formation in detail (1952, 1954). As a result, it becomes a current view that the Poronai fauna can be correlated with Eocene to Oilgocene in age.

In the meantime, the Asahi fauna once designated by the present writer in cooperation with Dr. T. FUJIE in 1957, and characterizes the Asahi formation seems to be composed of two different associations of species. Namely, the lower part of the Asahi formation bears the following species which will be listed below:

Yoldia (*Yoldia*) *biremis* UOZUMI
Mytilus tichanovitchi MIKIYAMA
Peronidia elongata UOZUMI n.sp.
Spisula onnechiuria (OTUKA)
Thracia asahiensis UOZUMI n.sp.
Siliqua elliptica UOZUMI n.sp.
Tectonatica cf. *janthostoma* (DESHAYES)

All the species above enumerated are actually found only in the sandstone included in the lower part of the Asahi formation as before stated. Among them, *Mytilus tichanovitchi*, the principal element of this association, can be found at nearly every locality, where the fossils were found from the Asahi formation, as shown in Text-Figure 1.

Further, this species is quite interesting, since everywhere it may be found, it

Fig. 1
Showing the geographic positions of the fossil localities.

forms a large cluster in a bed, besides every one of them keeps the both left and right valves together, without exception. It may be also worthy of note that the association of fossils can be regarded to include rather few in species but very rich in individuals at any locality where the writer could find fossils.

The overlying shaly and silty members, the upper part of the Asahi formation bears somewhat different species in association in comparison with that of the lower part. The species in this part will be listed below:

Acila (*Acila*) *elongata* NAGAO et HUZIOKA
Portlandia (*Hataiyoldia*) *hayasakai* UOZUMI
Portlandia (*Portlandella*) *watasei* (KANEHARA)
Solemya (*Archarax*) *tokunagai* YOKOYAMA
Macoma tokyoensis MAKIYAMA
Trominina sp.

In this case, a similar relation between number of species and individuals as observed in the lower part is perceived with certainty. In all probability, the difference found in the association between the lower and the upper part of the formation may have been resulted not only by the the reason of the stratigraphical difference but also by the different environmental conditions under which the molluscs listed above were inhabitated in those days.

At any case, the Asahi fauna (included sandy facies association and muddly facies one) is quite distinct from the Poronai fauna.

Incidentally, in the Momijiyama district, some 48 km south of the Ikushunbetsu district, there also develops the Miocene and Palaeogene formations. The stratigraphical sequence of those formations there will be given in descending order:

Kawabata formation
——— conformity ———
Takinoue formation
——— unconformity ———
Momijiyama formation
——— disconformity ———
Poronai formation

As to the Momijiyama fauna characterizing the Momijiyama formation, its aspect was already described in detail by HAYASAKA and UOZUMI in 1952, especially in its molluscan fossils. According to HAYASAKA and the present author, the Momijiyama fauna may be rather akin to the Poronai fauna as a whole, although a few younger elements can be found in association of species of the Momijiyama formation. Anyhow, the Asahi fauna now in problem, is also quite distinct from the Momijiyama fauna and the Poronai fauna in the association of species.

While the Takinoue fauna is also remarkably different in tha association of species from the Asahi fauna, in spite of its apparently similar stratigraphical position of those two formations, the Takinoue and Asahi formations.

In this regard, various interpretations have been proposed by many geologists in Japan, and the stratigraphical position of the Asahi fauna has been long debated.

Drs. T. SHIMOGAWARA and J. TESHIMA (1961), for instance, held a view that the Momijiyama formation is conformably covered by the Takinoue formation in the Momijiyama district. Further the lower part of the Asahi formation is apparently similar to the sandstone mainly constituting the Momijiyama formation, and they concluded that those two formations may be perhaps synchronous with each other. The upper part of the Asahi formation may be accordingly perhaps correlatable with the Takinoue formation.

In conclusion, according to Drs. SHIMOGAWARA and TESHIMA the Momijiyama, Takinoue and Asahi fauna can be grouped altogether as a single unit representing the Early Neogene.

Their conclusion can be, however, by no means accepted. They did not correctly trace the boundary between the Momijiyama and Takinoue formations in field. They failed unfortunately to distinguish correctly these two formations from place to place. Namely, they misunderstood the Takinoue formation as the Momijiyama formation at places, owing to a superficial observation on rock facies of those two formations. As a result, they confused the fossils of the Momijiyama formation with that of the Takinoue formation in many places. And they finally concluded, that there is no principal difference between the Momijiyama and the Takinoue formation. The matter is however quite different. The facts that the Takinoue formation unconfomably covers the Momijiyama formation and these two represent the independant stratigraphical units are doubtless. Further, it is far from doubtful that the Momijiyama fauna is quite distinct from the Takinoue, and the former is stratigraphically situated much lower than the latter.

Dr. S. KANNO and H. OGAWA were of the same view with Drs. SHIMOGAWARA and TESHIMA. According to them (1962, 1963) the Mojmiiyama formation may be gradually and horizontally replaced by the Takinoue formation from place to place, besides no principal difference can be perceived between the faunas of these two formations. However, this is also not true at all.

Based on the writer's own stratigraphical investigation, the Momijiyama formation unconformably covers the Poronai formation in the Momijiyama district, besides the Momijiyama fauna is rather akin to the Poronai fauna, although the former includes somewhat younger elements than the latter. Further the present writer wishes to specially emphasize, that the Takinoue fauna is remarkably distinct from the Momijiyama fauna, the former of which gives much younger aspect than the latter in the association of species.

Also, the Asahi fauna does not show any intimate relation with the Takinoue fauna, as stated in the foregoing pages. It is quite true, that the co-existing species can be seldom found between these two faunas above stated. They may be accordingly not easily correlatable with each other in their stratigraphical position.

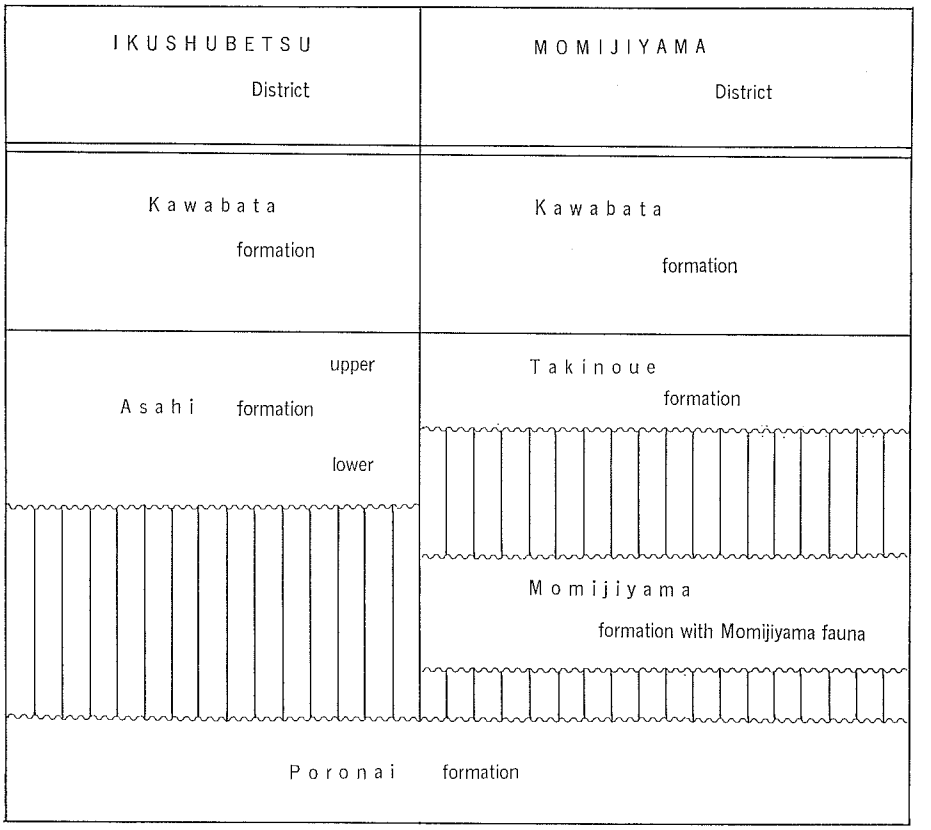
The difference between these two faunas can not be regarded to have been resulted from the difference in sediments in which the molluscan fossils now in problem are found, because both the Takinoue formation and at least the lower part of the Asahi formation are mainly composed of apparently similar sandstones. However, it may be somewhat noteworthy that the Asahi fauna, especially its older representative, (of the lower part of the Asahi formation) seems to be belong to the colder sea water inhabitants as a whole, in comparison to that of the Takinoue fauna.

Besides, the younger representatives of the Asahi fauna (of the upper part of

the Asahi fauna) is characterized by the silty or shaly facies of the Asahi formation. The distinction observed between the younger Asahi and the Takinoue fauna can be perhaps plausibly interpreted with the different enviromental conditions at least in respect to the lithologic facies of the bottom deposits of those days. However, the distinction in the fauna between the lower part of the Asahi formation in which *Mytilus tichonovitchi* is the leading species and the Takinoue formation can be only interpreted as the former is stratigraphically lower than the Takinoue formation. In all probability, the upper part of the Asahi formation may be perhaps synchronous with the Takinoue formation but may be heterofacies both in concern to the fauna and sediments.

Thus, the Asahi formation may be roughly correlatable with the Takinoue formation. To state more in detail, at least the lower part of the former, *viz.* the *Mytilus tichanovitchi* horizon is stratigraphically lower than the Takinoue forma-

Table 1.
Correlation of the lower part of Neogene formations in the Ikushunbetsu and Momijiyama districts.



tion but still younger than the Momijiyama formation.

Before going into the description of the Asahi fauna, the present writer wishes to express his sincere thanks to Professor Masao MINATO, Department of Geology and Mineralogy, Hokkaido University, for his kind guidance through the course of the present study and reading of this manuscript. He is also indebted to Dr. Hidezo AIMONO (former TAKEDA), Japan Petroleum Exploration Co. Ltd., who kindly arranged him to make field survey in the Ikushunbetsu distridt. To Drs. Masaru MATSUI and Tsutomu FUJIE, Hokkaido University, the writer should like to thank for their fruitful discussion in respect to the stratigraphical and paleontological problems concerning to the Momijiyama and Takinoue formations. Thanks are due to Dr. Makoto KATO and Mr. Sumio KUMANO for their kind assistance in preperation of this note.

Systematic Description

Family SOLEMYIDAE

Genus ***Solemya*** LAMARCK, 1818

Subgenus ***Acharax*** DALL, 1908

Solemya (Acharax) tokunagai YOKOYAMA

1925. *Solemya tokunagai* YOKOYAMA, Jour. Coll. Sci. Imp. Univ. Tokyo, Vol. 45, art. 5, p. 31, pl. 6, figs. 1–3: ibid., Vol. 45, art. 7, p. 11, pl. 1, figs. 20, 21.
1934. *Solemya tokunagai* OTUKA, Bull. Earthq. Res. Inst. Vol. 12, pt. 3, p. 607, pl. 47, fig. 10.
1937. *Solemya tokunagai* KANEHARA, Jour. Geol. Soc. Japan, Vol. 44, no. 526, p. 704.
1937. *Solemya (Acharax) tokunagai* KANEHARA, Japanese Jour. Geol. Geogr. Vol. 14, nos. 3–4, p. 156, pl. 15, figs. 10, 11.
1954. *Solemya tokunagai elongata* AOKI, Sci. Rep. Tokyo Kyoiku Daigaku, Sec. C, Vol. 3, no. 17, p. 30, pl. 1, fig. 15.
1959. *Solemya (Acharax) tokunagai* KAMADA and HAYASAKA, Saito Ho-on Kai Mus. Res. Bull. No. 28, p. 20, pl. 2, figs. 3, 4.
1960. *Solemya (Acharax) tokunagai* KAMADA, Palaeont. Soc. Japan, Spec. Paper, No. 8, pp. 37–38, pl. 1, figs. 1–3.

Two specimens at hand are ill-preserved, yet they are possibly identical with the type specimen of the present species first described from Joban Coal-field, Northeast Honshu, Japan.

Dimensions (in mm):

Length	Height	Thickness
70+	35.6	21+

Repository: U.H. Reg. No. 11218, 11219.

Occurrence: Upper stream of the Ichikishiri-gawa, one of the southern branch of Horonai-gawa, Iwamizawa-City, Ishikari Province. (Loc. B*).

Family NUCULIDAE

Genus ***Acila*** H. et A. ADAMS, 1858

Subgenus ***Acila*** s.s.

Acila (Acila) elongata NAGAO and HUZIOKA

Pl. 10, Figs. 7a-b.

1941. *Acila (Acila) vigilia* var. *elongata* NAGAO and HUZIOKA, Jour. Fac. Sci. Hokkaido Imp. Univ. Ser. 4, Vol. 5, no. 2, pp. 133–135, pl. 31, figs. 1–4.
1954. *Acila (Acila) elongata* HAYASAKA and UOZUMI, Jour. Fac. Sci. Hokkaido Univ. Ser. 4, Vol. 8, no. 4, p. 398, pl. 25, fig. 7.
1960. *Acila (Acila) elongata* OYAMA, MIZUNO and SAKAMOTO, Illust. Handbook of Japanese Paleogene Moll. pp. 104–105, pl. 21, figs. 6a-c.

This species has been known as one of the characteristic elements of the lower part of the Neogene deposits in Hokkaido.

Dimensions (in mm):

Length	Height	Thickness
42.0	25.8	23.4

Repository: U.H. Reg. No. 11229.

Occurrence: Upper stream of the Ichikishiri-gawa, one of the southen branch of the Horonai-gawa, Iwamizawa-City, Ishikari Province (Loc. B); Upper stream of the northern branch of the Horomui-gawa, near the Asahi coal-mine, Iwamizawa-City, Ishikari Province (Loc. D); Middle stream of the Horomui-gawa, near Asahi, Iwamizawa City, Ishikari Province (Loc. E).

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* Abbreviation for the fossil locality in Text-Figure 1. This abbreviation will be used throughout in this paper.

Family NUCULANIDAE

Genus *Portlania* MÖRCH, 1857

Subgenus *Portlandella* STEWART, 1930

Portlandia (*Portlandella*) *watasei* (KANEHARA)

1887. *Yoldia* sp. YABE, Jour. Geol. Soc. Tokyo, Vol. 5, p. 604, Text-Fig. i.
1937. *Yoldia* (*Yoldia*) *watasei* KANEHARA, Japanese Jour. Geol Geogr. Vol. 14, nos. 3–4, p. 158, pl. 15, figs. 5–9.
1951. *Yoldia watasei* MINATO and UOZUMI, Cenozoic Res. No. 8, pp. 10–11, figs. 92a-b, 95.
1953. *Yoldia watasei* TAKEDA, Assoc. Geol. Mining. Tech., Geol. Sec. No. 3, p. 71, pl. 6, figs. 3–6.
1954. *Portlandia watasei* MIZUNO, Cenozoic Res. No. 20, p. 2, pl. 1, figs. 3a-b, 5.
1955. *Portlandia* (*Portlandella*) *watasei* UOZUMI, Cenozoic Res. No. 22, p. 30 pl. 23, figs. 184a-b.
1957. *Portlandia* (*Portlandella*) *watasei* UOZUMI, Jour. Fac. Sci. Hokkaido Univ., Ser. 4, Vol. 9, no. 4, p. 563, figs. 4, 4a, 6, 6a, 7, 7a, 8, 12.
1960. *Portlandia* (*Portlandella*) *watasei* OYAMA, MIZUNO and SAKAMOTO, Illust. Handbook of Japanese Paleogene Moll. pp. 94–95, pl. 20, figs. 1a-c; pl. 71, figs. 5a-b.

Few imperfect specimens are now disposal for study, which are entirely conspecific with the topotype specimens of the present species, obtained from the Poronai formation typically developing in the Ikushunbetsu district.

This species was first described by KANEHARA as a member of the subgenus *Yoldia* but this species has a shallow condrophore which is slightly downwards from the hinge plate. Accordingly, this species should be regarded as belonging to genus *Portlandia*. Similar feature can also recognized in *Portlandia* (*Portlandella*) *japonica*, and these two species seem to closely related with each other. The key to species already published by the present writer has proved usueful in separating *watasei* from the other species of *Portlandia*.

Dimensions (in mm):

Length	Height	Thickness
37.2	22.0	17.6

Repository: U.H. Reg. No. 11237.

Occurrence: Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa-City, Ishikari Province. (Loc. D).

Subgenus *Hataiyoldia* KAMADA, 1962
Portlandia (*Hataiyoldia*) *hayasakai* UOZUMI
Pl. 10, Figs. 8, 9, 10.

?1937. *Yoldia tokunagai* KANEHARA, Jour. Geol. Soc. Japan, Vol. 14, no. 527, pp. 793–794, pl. 25, figs. 6, 7. (non YOKOYAMA 1925).
1957. *Portlandia* (*Portlandella*) *tokunagai* var. *hayasakai* UOZUMI, Jour. Fac. Sci. Hokkaido Univ. Ser. 4, Vol. 9, no. 4, pp. 570–572, pl. 2, figs. 6–9, 15, 15a.

It was the present writer (1957) who established this species on the basis of the specimens collected from the district, now in problem.

As already pointed by him, the Miocene representatives of this group of *Portlandia* are characteristic in having shells ornamented by the peculiar minute complicated sculpture: they are *P. tokunagai* (YOKOYMA) and the present species.

Hataiyoldia was established by KAMADA in 1962 and is represented by these species stated above. This subgenus is distinguished from subgenus *Portlandella* STEWART (1930) by only the minute complicated ornamentation on the surface except for the incremental lines.

Dimensions (in mm):

Length	Height	Thickness
33.0	20.2	13.5
32.1	19.0	13.1
34.5	22.0	14.2
39.7	22.1	15.0

Repository: U.H. Reg. No. 12253 (holotype); 12257, 12250, 12207, 12234.

Occurrence: Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa City, Ishikari Province (Loc. D); Middle stream of the Horomui-gawa, Iwamizawa City, Ishikari Province (Loc. E).

Genus *Yoldia* MÖLLER, 1842
Subgenus *Yoldia* s.s.
Yoldia (*Yoldia*) *biremis* UOZUMI
Pl. 10, Figs. 4, 5.

1929. *Yoldia sagittaria* YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, Ser. 2, Vol. 2, p. 203, pl. 51, fig. 8. (non YOKOYAMA 1925)
1957. *Yoldia* (*Yoldia*) *biremis* UOZUMI, Jour. Fac. Sci. Hokkaido Univ. Ser. 4, Vol. 9, no. 4, pp. 552–553, pl. 4, figs. 4–6, 12.

YOKOYAMA once described and illustrated a shell from Haboro coal-field, for

which he named *Yoldia sagittaria*, but his view in this regard cannot be accepted. The YOKOYMA's specimen from Haboro seems to belong to the present species.

Now, the present species seems to nearly akin to *Yoldia* (*Yoldia*) *longissima* SLODKEWITCH (1936), but it is still specifically distinguishable from the latter as the present author stated in 1957.

Dimensions (in mm):

Length	Height	Thickness
51.1	20.7	23.8
44.1	18.1	20.4
42.5	18.0	22.5

Repository: U.H. Reg. No. 12291, 12210.

Occurrence: Upper stream of the western branch of the Horonai-gawa, Mikasa City, Ishikari Province (Loc. A); Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa City, Ishikari Province (Loc. D).

Family MYTILIDAE

Genus ***Mytilus*** LINNE, 1758

Mytilus tichanovitchi MAKIYAMA

Pl. 9, Figs. 2–4, 8.

1937. *Mytilus tichanovitchi* MAKIYAMA, Mem. Coll. Sci. Kyoto Univ. Vol. 10, no. 2, p. 134, pl. 4, figs. 11, 12.

Mytilus tichanovitchi was established by MAKIYAMA based on a specimen from the Neogene deposits of Matchgar, North Saghalin.

The original description was as follows " Shell medium size, triangular, heavy, gibbous. Base slightly concave; dorsal margin arcuate in front; dorsal angle very obtuse, a little anterior; posterior margin behind the angle straightish. Posterior end narrowly round, not much broader than the umbonal end. Umbonal ridge persistent, posteriorly rather more prominent, inclined toward the dorsal side; posterior slope of the ridge overhanging. Surface concentrically undulated ".

In the next, description will be given below, based on the newly found specimens from Asahi:

Shell medium in size; elongate ventricose; test, moderately thick; the dorsal margin subarcuate, with a pronounced angle; ventral margin nearly straight, or slightly concave. A very pronounced umbonal ridge extends from the beak to the posterior extremity through the central or slightly posterior position of shells. Dorsal area narrow, more or less sloping and forming a posteriorly expanded wing. Slope between dorsal area and maximal inflation very steep, forming obliquely running depression and overhanging in the posterior of shell. Surface is orna-

mented by periodic, coarse undualtions and fine growth lines. Hinge plate located at just under the beak is thin and bears two narrow small teeth in each valve. Ligamental groove is long, fairly deep and heavy.

Dimensions (in mm):

Length	Height	Thickness
84.0	33.0	53.9
78.1	36.0	56.4
68.6	30.4	35.8
64.0	33.5	40.5

Repository: U.H. Reg. No. 11224–11228.

The present species appears to be quite unique in form and is clearly distinguishable form any other known species of *Mytilus* found in Japan. Only *Mytilus k-sakurai* NOMURA and HATAI (1936) from the Isomatsu bed, Tsugaru Peninsula, Northeast Honshu, seems to be closely related with the present species, but the former is still distinguishable from the latter by the proportion of Height / Length and having much finer concentric sculpture.

This species is evidently found from the lower part of the Asahi formation.

Occurrence: Upper stream of the western branch of the Horonai-gawa, Mikasa City, Ishikari Province (Loc. A); Upper stream of the Ichikishiri-gawa, one of the southern branch of the Horonai-gawa, Iwamizawa-City, Ishikari Province (Loc. B); Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa-City (Loc. D); Middle stream of the Horomui-gawa, near Asahi, Iwamizawa-City, Ishikari Province (Loc. F).

Family MACTRIDAE

Genus ***Spisula*** GRAY, 1838

Spisula onnechiuria (OTUKA)

Pl. 10, Figs. 1, 6.

1937. *Mactra* (*Mactrotoma*) *californica onnechiuria* OTUKA, Japanese Jour. Geol. Geogr. Vol. 14, nos. 2–4, p. 168, pl. 16, fig. 2.
1940. *Mactra* (*Spisula*) *onnechiuria* OTUKA Japanese Jour. Geol. Geogr. Vol. 17, nos. 1–2, p. 94, pl. 11, fig. 2.
1960. *Spisula onnechiuria* KANNO, Jour. Geol. Soc. Japan, Vol. 66, no. 772, p. 44, pl. 4, fig. 7.

After the observation on fourteen specimens from this field, the writer is aware of three points to be described below: 1) outline of shell and position of beak are rather variable; 2) some specimens show to possess shell, being more or less elongate or short in the anterior side than the type specimen and 3) in certain

specimens, shell is rather trigonal in outline and proportinally rather equilateral. However, all of them may be identified to the present species because they are similarly elongated and compressed in shell form as a whole and they show same hinge as was shown in the OTUKA's figure.

Demensions (in mm):

Length	Height	Thickness	
69.0	46.4	11.7	Left valve
62.6	45.8	8.1	,,
85.6	58.2	9.1	Right valve
87.5	57.7	9.5	,,
70.8	46.2	8.9	,,

Repository: U.H. Reg. No. 11211–11217.

Occurrence: Upper stream of the western branch of the Horonai-gawa, Mikasa-City, Ishikari Province (Loc. A); Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa-City, Ishikari Province (Loc. D); Middle stream of the Horomui-gawa, near Asahi, Iwamizawa-City, Ishikari Province (Loc. F.)

Family TELLINIDAE

Genus ***Peronidia*** DALL, 1900

Peronidia elongata UOZUMI n.sp.

Pl. 10, Figs. 2, 3.

Shell elongate, compressed, inequivalve, and inequilateral; rostrated posteriorly; posterior end narrow and subtruncate; beak low and situated anteriorly to the middle of the shell; valve slightly flexed to the right near the posterior end; left valve slightly convex than right valve; anterior end regularly rounded; ventral margin nearly straight; dorsal margin gently descending but anterior one slightly arcuate and posterior one nearly straight. Surface ornamentation not well preserved but showing many concentric lines with irregular interval and occasional growth lines. Ligament strong but shorther than the half of posterior side. Internal umbonal radial rib distinct. Nature of hinge unknown.

Dimensions (in mm):

Length	Height	Thickness
56.6	29.0	31.0
56.0	26.1	30.7
54.3	26.8	32.5

Proportion of H/L	P/L
0.51	0.55
0.47	0.55
0.50	0.60

(H: Height; L: Length; P: Posterior length)

Repository: U.H. Reg. No. 11203 (holotype); 11221, 11205, 11204 (paratype).

Occurrence: Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa-City, Ishikari Province (Loc. D); Middle stream of the Horomui-gawa, near Asahi, Iwamizawa-City, Ishikari Province (Loc. F; Type Locality).

This species may be closely to *Peronidia lutea* WOOD (DALL 1909) which is one of the common species living in the water around Hokkaido, *P. aragonia* DALL (1936), from the Empire formation, Coos bay, Oregon, and *P. pulchra* (SLODKEWITSCH) (1936) from the Kavrana series in Kamchatka. However, the latter three species may be distinguishable from the former in having more inequilateral shell.

Peronidia t-matumotoi (OTUKA) (1940) was reported from the Teshio province, Hokkaido and is also somewhat resembles *P. elongata*. But the former is more equilateral and has the dorsal marging sloping more obliquely downwards.

Family SOLENIDEA

Genus ***Siliqua*** MEGERLE von MÜHLFELDT, 1811

Siliqua elliptica UOZUMI n.sp.

Pl. 10, Fig. 11.

Shell small, rather thin and fragile, elongate, elliptical in outline; compressed, being twice as long as its height; dorsal and ventral margins straight, subparallel with each other; anterior margin regularly rounded but posterior one more sharply rounded. Umbo low, inconspicuous, located forward at the point far beyond one-quarter the length of the shell. Internal ridge vertically extending from umbo towards ventral margin.

Dimensions (in mm):

Length	Height	Thickness
33.0	13.7	7.6
17.0	7.9	3.7
18.6	9.2	5.5

proportion of	H/L	A/L
	0.41	0.23
	0.58	0.22

(H: Height; L: Length A: Anterior length)

Repository: U.H. Reg. No. 11220 (holotype); 11223 (paratype).

Occurrence: Upper stream of the western branch of the Horonai-gawa, Mikasa City, Ishikari Province (Loc. A); Upper stream of the northern branch of the Horomui-gawa, Asahi coal mine, Iwamizawa City, Ishikari Province (Loc. D. type locality).

This species is somewhat similar to *S. pulchella* DUNKER (1858) and *S. alta* OLDROYD (1924) in the young stage. But the present species is not so long as *S. pulchella* and differs from *S. alta* in having subtruncate posterior margin and more narrowly rounded anterior extremity. The dimensions of *S. pulchella* from Tokushima, Shikoku and *S. alta* in the younger stage, collected from Kiritappu near Nemuro in East Hokkaido will be given below:

Siliqua pulchella DUNKER

Length	Height	A.	H/L	A/L
23.3	7.8	6.3	0.33	0.27
26.6	9.7	6.3	0.36	0.27
29.0	9.8	8.0	0.34	0.28
24.6	8.1	6.5	0.33	0.27

Siliqua alta OLDROYD in the younger stage

32.4	14.8	8.5	0.46	0.26
24.6	11.2	5.0	0.41	0.20

Family THRACIIDAE

Genus ***Thracia*** BLAINVILLE, 1824

Thracia asahiensis UOZUMI n.sp.

Pl. 9, Figs. 1, 5–7.

Shell medium in size, more or less transverse rectanglar in outline, rather inflated; the pronounced portion of convexty lying obliquely from beaks to the anterior ventral corner; anterior dorsal margin convex and rounded and sloping downwards so as to merge smoothly with the brodaly arcuate anterior end; ventral margin regularly rounded; posterior dorsal margin very slightly concave just behind the beak but from that point to the posterior end it is nearly straight and horizontal, and makes a right angle with the vertically truncated posterior end; an obscure ridge extends from the beak towards the basal portion of the posterior trunca-

tion; the space between the margin and the ridge is not so strongly depressed. Beaks situated slightly behind the shell, small, incurved and directed posteriorly. Surface sculptured by fine concentric growth lines and 3–5 irregularly concentric undulationed lines. Pallial sinus wide and rather shallow. Hinge unknown.

Dimensions (in mm):

Length	Height	Thickness	
48.7	38.0		Right valve
47.0	37.5		,,
48.0	31.0		Left valve
38.7	26.1	6.0	,,
39.5	32.0	7.0	,,
27.6	18.0		,,

Reposotiory: U.H. Reg. No. 11205 (holottpe); 11206, 11200, 11201, 11202 (paratype).

Occurrence: Upper stream of the western branch of the Horonai-gawa, Mikasa-City, Ishikari Province (Loc. A); Upper stream of the northern branch of the Horomui-gawa, Asahi coal-mine, Iwamizawa-City, Ishikari Province (Loc. D, Type Locality).

This species can be specifically distinguished from *T. kamayasikiensis* HATAI (1940) from the Kamayasiki, Mutsu Province, north Honshu, by the horizontal posterior dorsal margin and very feeble ridge with runs from the beak to posterior ventral corner.

T. kakumana YOKOYAMA (1927) living in the waters around Hokkaido is also distinct from the present species through the different form of sinus.

The other species hitherto reported from the Neogene deposits in Japan are easily distinguishable from the outline of shells.

Family BUCCINIDAE

Genus ***Traminina*** OYAMA and MIZUNO, 1958

Trominina sp. indet.

Several poorly preserved specimens belonging to the genus *Trominina* were found in the siltstone members of the Asahi formation.

These specimens are characterized by the presence of strong shoulder keel and they are accordingly somewhat resembled the Oligocene species, *Trominina japonica* TAKEDA occured abundantly in the Poronai formation. However, the specimens now at the writer's disposal for study are composed of very imperfect broken shells, which prevent precise specific identification.

Dimensions (in mm):

Height	Diameter
35+	30+

Repository: U.H. Reg. No. 11239

Occurrence: Upper stream of the northern branch of the Horomui-gawa, Asahi coal mine, Iwamizawa City, Ishikari Province (Loc. D); Middle stream of the Horomui-gawa, near Asahi, Iwamizawa City, Ishikari Province (Loc. E).

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(Manuscript recived Sept. 15, 1965)

Explanation of Plate 9

Explanation of Plate 9

(All figures natural size)

Figs. 1, 5–7. *Thracia asahiensis* UOZUMI n. sp.

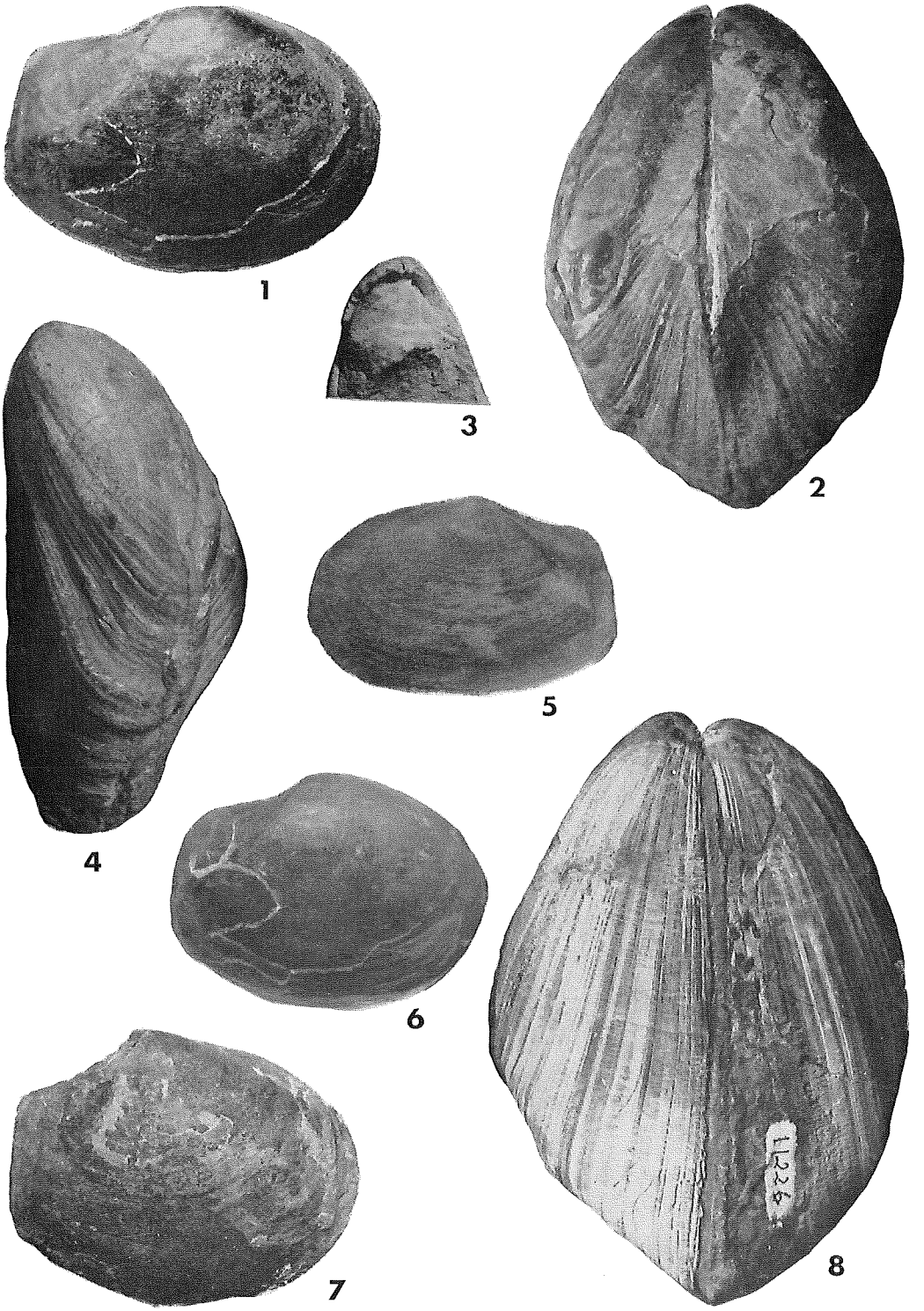
1 : U. H. Reg. No. 11205, side view of right valve (Holotype) ; 5 : U. H. Reg. No. 11206, side view of left valve ; 6 : U. H. Reg. No. 11200, side view of right valve ; 7 : U. H. Reg. No. 11201, side view of right valve.

Locality : Upper stream of the northern branch of the Horomui-gawa, Asahi Coal-Mine, Iwamizawa City, Ishikari Province.

Figs. 2–4, 8. *Mytilus tichanovithi* MAKIYAMA. 2 : U. H. Reg. No. 11224, dorsal view ; 3 : U. H. Reg. No. 11225, hinge view ; 4 : U. H. Reg. No. 11228, dorsal view ; 8 : U. H. Reg. No. 11226, ventral view.

Locality : Figures specimens, 2, 3, 8, same as above ; figured specimen 4, middle stream of the Horomui-gawa, near Asahi, Iwamizawa-City, Ishikari Province.

Plate 9



UOZUMI and KUMANO Photo

Explanation of Plate 10

Explanation of Plate 10

(All figures natural size)

Figs. 1, 6. *Spisula onnechiuria* (OTUKA). 1 : U. H. Reg. No. 11212, side view of left valve. Locality : Middle stream of the Horomui-gawa, near Asahi, Iwamizawa City, Ishikari Province. 6 : U. H. Reg. No. 10719, hinge view.
Locality : Sugizawa, upper stream of the Sankebetsu-gawa, a branch of the Haboro-gawa, Tomamai-gun, Teshio Province.

Figt. 2, 3. *Peronidea elongata* UOZUMI n. sp. 2 : U. H. Reg. No. 11203, side view of left valve (Holotype) ; 3 : U. H. Reg. No. 11221, side view of right valve.
Locality : Middle strem of the Horomui-gawa, near Asahi, Iwamizawa-City, Ishikari Province.

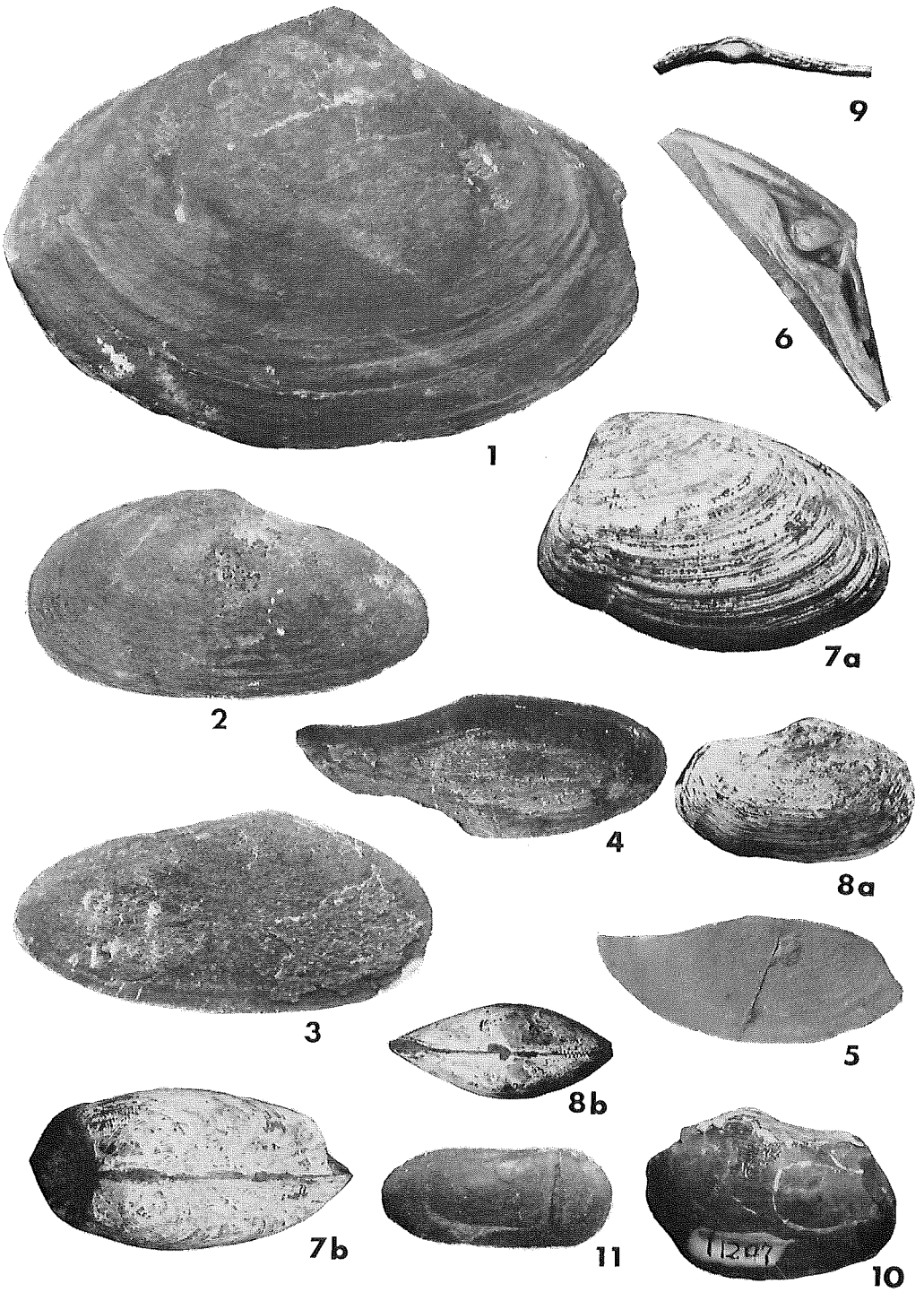
Figs. 4, 5. *Yoldia biremis* UOZUMI. 4, 5 : U. H. Reg. No. 12291, 12210, side view of right valve.
Locality : Upper stream of the northern branch of the Horomui-gawa, Asahi, Coal-Mine, Iwamizawa City, Ishikari Province.

Figs. 7a, b. *Acila elongata* NAGAO and HUZIOKA. U. H. Reg. No. 11229, a : side view of right valve ; b : dorsal view.
Locality : same as above.

Figs. 8, 9, 10. *Portlandia hayasakai* UOZUMI. 8 : U. H. Reg. No. 12253, a : side view of right valve ; b : dorsal view ; 9 : hinge plate view ; 10 : U. H. Reg. No. 12234, pallial sinus view of left valve.
Locality : same as above.

Fig. 11. *Siliqua elliptica* UOZUMI n. sp. U. H. Reg. No. 11220, external mold of right valve (Holotype).
Locality : Upper stream of the northern branch of the Horomui-gawa, Asahi Coal-Mine, Iwamizawa-City, Ishikari Province.

Plate 10



UOZUMI and KUMANO Photo.