

FAUNA OF SHELL-BEARING MOLLUSKS IN MUTSU BAY
LAMELLIBRANCHIA (2)¹⁾

By

GOTARÔ YAMAMOTO and TADASHIGE HABE

(山本護太郎・波部忠重)

*Biological Institute, Tôhoku University, Sendai; Amakusa Marine
Biological Laboratory, Kyushu University,
Tomioka, Kumamoto Prefecture, Japan*

(With 9 plates)

Subclass TELEODESMACEA

Order HETERODONTA

Superfamily CARDITACEA

Family CARDITIDAE

41. *Cardita leana* Dunker (Pl. XII, Fig. 20)

Japanese name: Tomaya-gai

Cardita leana Dunker 1860, p. 223; Is. Taki 1951, Pl. 24, Fig. 2; Kira 1954, Pl. 52,
Fig. 16.

Cardita cumingiana Dunker 1860, p. 223; Nomura et Hatai 1932, p. 4.

This species is characterized by the carinate and fimbriate radial ribs on the surface maculated by dully blackish brown spots. The nearest ally *C. nodulosa* Lamarck (Pl. XIII, Fig. 1) of the deep seas around Japan differs from this species in having spiny serration on the ribs, on the top of which no carina appears. The inner margin dentates corresponding to ribs.

Locality: Asamushi.

Distribution: Formosa to Honshu (at whose northernmost end lies this bay) and Korea.

Habitat: This species attaches itself by the byssus to rocks or gravels in intertidal zones. The writers have never collected any specimen from this bay.

42. *Cyclocardia ferruginea* (Clessin) (Pl. XIV, Fig. 19)

Japanese name: Kuro-marufumi-gai

Cardita ferruginea Clessin 1888, p. 17, Pl. 6, Fig. 11.

The circular, inflated shell is small in size and with about 20 rounded ribs on

1) Contributions from the Marine Biological Station of Asamushi, Aomori Ken, No. 246.

the surface covered with a velvety periostracum in the fresh specimens. Ovoviviparous. *Cyclocardia paucicostata* (Krause) (Pl. VI, Figs. 22, 23) from Hokkaido has a larger and more compressed shell with a smaller number of ribs compared with this one.

Locality: The entrance of Mutsu Bay: Sts. 12 and 13, and off Noheji.

Distribution: Japan Sea, the Pacific coast of Northern Honshu, Southern Hokkaido and Korea.

Habitat: Rather deep sea species dwelling on the muddy bottom.

Family CARDITELLIDAE

43. *Carditellopsis toneana* (Yokoyama) (Pl. VI, Fig. 5)

Japanese name: Keshi-fumi-gai

Venericardia toneana Yokoyama 1922, p. 163, Pl. 13, Figs. 17, 18.

This has a small, thick and triangularly ovate shell, on the surface of which about thirteen ribs separated by narrow interspaces radiate from the beak to the margin. This species may be the young stage of a certain species of *Venericardia* or *Cyclocardia*.

Locality: The mouth of this bay.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Collected together with the preceding species.

Superfamily GLOSSACEA

Family KELLYELLIDAE

44. *Alvenius ojanus* (Yokoyama) (Pl. XIII, Figs. 10, 11)

Japanese name: Keshi-tori-gai

Kellia(?) ojana Yokoyama 1927, p. 432, pl. 50, Figs. 7, 8.

This is a minute species, whose shell is ovate, inflated and purplish brown.

Locality: This species dwells in the bay but we are not aware of its exact locality.

Distribution: Kyushu, Shikoku, Honshu and Southern Hokkaido.

Habitat: Common on sandy-mud bottom in bays.

Superfamily TRAPEZIACEA

Family TRAPEZIIDAE

45. *Trapezium (Neotrapezium) liratum* (Reeve) (Pl. VII, Figs. 1, 2)

Japanese name: Unenashi-tomaya-gai

Cypricardia lirata Reeve 1843, sp. 1.

Trapezium japonicum Pilsbry 1905, p. 119, Pl. 5, Figs. 34-36; Is. Taki 1951, Pl. 21, Fig. 1; Kira 1954, Pl. 52, Fig. 29.

Trapezium japonicum delicatum Pilsbry 1905, p. 119.

The shell oblong, rather solid and purplish brown at the hinder part. The surface marks rough growth lines. The umbo is situated at the anterior end. The external ligament present behind it. The cardinal teeth lie under the umbo horizontally, and this is characteristic of this species.

Locality: Moura and Noheji.

Distribution: China, Formosa, Korea, Japan, Maritime Prov. of Siberia.

Habitat: Commonly found in crevices on rocks and among gravels in the tidal zone, attaching to them by the byssus.

Superfamily CYAMIACEA

Family SPORTELLIDAE

46. *Anisodonta reclusii* (A. Adams) (Pl. XIII, Fig. 3)

Japanese name: Hama-kaze

Eucharis reclusii A. Adams 1864, p. 309.

Basterotia trapezia Yokoyama 1920, p. 108, Pl. 7, Figs. 8, 9.

This has a thin, flattened and squarish shell. Minute granulations cover all over the surface which bears concentric undulations along the growth lines. Hinge tooth is very small, with a chondrophore behind it. *A. gouldi* (A. Adams) (Pl. VI, Figs. 20, 21) is ovate in shape and solid. Therefore this species is easily separable from it.

Locality: Moura.

Distribution: Kyushu and Honshu.

Habitat: A single valve has been collected on muddy bottom of shallow waters.

Family CYAMIIDAE

47. *Turtonia minuta* (Fabricius) (Pl. VI, Fig. 9)

Japanese name: Nomi-hamaguri

Venus minuta Fabricius 1780, p. 412.

Turtonia minuta Habe 1955, p. 9, Pl. 1, Fig. 16.

This is a minute species of purplish brown color. The surface is smooth. The sex separates. The gelatinous capsule in which the embryos develop attaches to the byssus of the female. Though this species is allocated in this family provisionally, the exact systematic position is still uncertain despite the critical observations by Oldfield (1955).

Locality: Tsuchiya.

Distribution: Northern Honshu, Hokkaido, Greenland and Norway.

Habitat: Found gregariously on the leaves of sea weeds in the laminarian zone.

Superfamily LUCINACEA

Family UNGULINIDAE

48. *Jouannisiella cumingii* (Hanley) (Pl. VI, Figs. 14, 15)

Japanese name: Shiogama

Cyrenoidea cumingii Hanley 1842, p. 353, Pl. 15, Fig. 5.*Diplodonta semiaspera* Yokoyama 1922 (non 1920), p. 160, Pl. 14, Fig. 2.*Jouannisiella cumingii* Is. Taki 1951, Pl. 28, Fig. 2; Kira 1954, Pl. 52, Fig. 32.

This has a thin, inflated and white shell covered by a pale, yellowish and smooth periostracum. The apex is oblique forwardly. The two cardinal teeth, one of which bifurcates, are present on the narrow cardinal plate.

Nomura and Hatai have reported two undetermined species from this bay; one of them may be this and the other the following species.

Locality: Off Ushirogata, Kugurizaka, Namiuchi, Inoh, Oshima, Higashitazawa, Kawauchi and St. 4.

Distribution: Formosa to Honshu and Korea.

Habitat: Muddy bottom in shallow waters.

49. *Jouannisiella lunaris* (Yokoyama)

Japanese name: Mangetsu-shiogama

Diplodonta lunaris Yokoyama 1927, p. 433, Pl. 50, Figs. 5, 6.

This has a circular, inflated and thin shell. The apex is scarcely oblique. The hinge plate is narrow and weak as in the preceding species.

Locality: Off Ushirogata.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Very common on the muddy bottom in bays.

Remarks: Together with this species, a new species, *Jouannisiella tsuchii*, (Pl. XIII, Figs. 7, 8) is frequently found in bays in Japan. The new species is easily separable in having a white and solid shell, whose beak is oblique anteriorly and the hinge plate is stout and broad. The type specimen of this new species from Yura Bay, Wakayama Prefecture, Honshu, measures 9.6 mm in length, 9.5 mm in height and 6.0 mm in breadth.

50. *Felaniella usta* (Gould) (Pl. VI, Figs. 3, 4)

Japanese name: Uso-shijimi

Mysia (Felania) usta Gould 1861, p. 32.*Felaniella olivacea* Bartsch 1929, p. 132, Pl. 1, Figs. 8-14.*Diplodonta usta* Nomura et Hatai 1932, p. 5.*Felaniella usta* Kira 1954, Pl. 52, Fig. 31.

The rather flat shell is covered with a smooth and olivaceous periostracum.

Locality: Off Kanita, Nonai, Kugurizaka, Oshima, Noheji, Ominato, Jogasawa

and Kawauchi.

Distribution: Northern Honshu, Hokkaido, Saghalien, Korea and Maritime Prov. of Siberia.

Habitat: Abundantly collected with the dredge from sandy bottom in shallow waters.

51. *Phlyctiderma japonicum* (Pilsbry) (Pl. VI, Figs. 10, 11)

Japanese name: Yae-ume

Diplodonta japonica Pilsbry 1895, p. 132, Pl. 3, Figs. 7, 8.*Phlyctiderma japonicum* Kira 1954, Pl. 52, Fig. 30.

The shell is circular, quite inflated, white and solid. The surface is sculptured with concentric rows of small and elongate pimples, especially in the anterior half.

Locality: Off Kawauchi.

Distribution: Kyushu, Shikoku, Honshu, Southern Hokkaido and Korea.

Habitat: Coral stone or shale. Uncommon in this bay.

Family THYASIRIDAE

52. *Thyasira tokunagai* Kuroda et Habe (Pl. VI, Figs. 1, 2)

Japanese name: Hanashi-gai

Thyasira tokunagai Kuroda et Habe 1951, p. 127, Figs. 266-268.

This small, white thyasirid species had been confused with the Atlantic *Thyasira gouldi* (Philippi) until the new name *T. tokunagai* was proposed for this species by Kuroda and Habe by reason of the smaller size of the shell, which is larger in the height than in the length and has a distinct flexure. The cardinal tooth absent.

Locality: Off Ushirogata, Nonai, Kugurizaka, Moura, Noheji, Ominato, Kawauchi and Kozawa.

Distribution: Northern Honshu and Hokkaido.

Habitat: Rather common on muddy bottom in shallow waters.

53. *Axinopsida subquadrata* (A. Adams) (Pl. VI, Figs. 12, 13)

Japanese name: Yuki-yanagi-gai

Cryptodon (Clausina) subquadrata A. Adams 1862, p. 227.*Axinopsis subquadrata* Habe 1955, p. 10, Pl. 1, Figs. 8, 9.

This has a small, thin, fragile, flattish, suborbicular and white shell without any flexure on the dorsal area.

Locality: Off Futago and Kawauchi, and Sts. 20, 21 and 24.

Distribution: Northern Honshu, Hokkaido, Saghalien and Maritime Prov. of Siberia.

Habitat: Very common on fine sandy bottom in shallow waters.

Family LUCINIDAE

54. *Anodontia stearnsiana* (Oyama) (Pl. XIV, Fig. 1)

Japanese name: Ise-shira-gai

Loripes bialata Pilsbry 1895, p. 133, Pl. 3, Figs. 13, 14 (non Seguenza).*Lucina bialata* Nomura et Hatai 1932, p. 4.*Lucina stearnsiana* Oyama 1954, p. 52; Is. Taki 1951, Pl. 26, Fig. 5 (name only); Kira 1954, Pl. 53, Fig. 7.

The shell is circular, inflated and chalky white. The hinge is without teeth. The surface marks rather rough growth lines in the fully grown specimen. The anterior muscle scar is elongate and the mantle line is simple.

For this species group the generic name *Lucina* Lamarck 1799 is replaced by *Anodontia* Link 1807, because *Lucina* Bruguiere 1797 is the earlier name than *Lucina* Lamarck, synonymizing *Linga* Gregorio. Therefore *Lucina* Lamarck is an invalid name.

Locality: Entrance of the bay, Kanita, Yomogida, Naminuchi, Inoh, Futago, Kozawa and Sts. 4 and 8.

Distribution: Ryukyu to Honshu.

Habitat: Very common on muddy bottom in this bay.

55. *Lucinoma annulata* (Reeve) (Pl. VI, Figs. 24, 25)

Japanese name: Tsuki-gai-modoki

Lucina annulata Reeve 1850, sp. 17.*Phacoides annulatus* Nomura et Hatai 1932, p. 4.*Lucinoma annulata* Kira 1954, Pl. 53, Fig. 2.

This is very characteristic in having concentric and lamellate growth lines on the surface of the circular, rather flattened shell covered with a thin and light yellowish periostracum. The anterior muscle scar is as elongate as in other species of this group. The cardinal teeth are two; one of them bifurcates and the anterior lateral tooth is very small. This species has been confused with the American tertiary fossil species, *L. acutilineata* (Conrad), by some Japanese paleontologists.

Locality: Aburakawa, Kugurizaka, Asamushi, Yunoshima, Mouro, Oshima, Asadokoro, Karibasawa, Noheji, Ominato and Kawauchi.

Distribution: Kyushu to Honshu, Alaska to Southern California (after Abbott).

Habitat: Very common in bays of muddy bottom.

56. *Pillucina pisidium* (Dunker) (Pl. VI, Figs. 26, 27)

Japanese name: Umeno-hana-gai

Lucina pisidium Dunker 1860, p. 28, Pl. 3, Fig. 9, p. 227.*Lucina (Codakia) parvula* Gould 1861, p. 36.*Phacoides pisidium* Nomura et Hatai 1932, p. 5.*Loripes pisidium* Is. Taki 1951, Pl. 26, Fig. 8.

The small, inflated and white shell is easily recognized by the divaricate sculpture on its surface. The living shell is soiled in brown color at the point from which the siphon is extruded. *Sydlorina yamakawai* (Yokoyama) (Pl. VI, Figs. 18, 19) is a closely related species but has only radial sculpture on the surface.

Locality: Nonai, Kugurizaka, Yunoshima, Asamushi, Mouro, Futagojima, Kominato and Noheji.

Distribution: Formosa, Kyushu, Shikoku, Honshu, Southern Hokkaido and Korea.

Habitat: Tidal zones and also muddy bottom of shallow waters.

57. *Wollucina lamyi* Chavan (Pl. VI, Figs. 28, 29)

Japanese name: Chijimi-ume

Lucina contraria Dunker 1882, p. 215, Pl. 13, Figs. 12-14 (non 1846).*Wollucina lamyi* Chavan 1938, p. 227.

The small, inflated and white shell is close to that of the preceding species but has distinct growth lines and very weak radial stripes all over the surface.

Locality: Asamushi, Futago, Noheji and Kawauchi.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Gravel and muddy bottom in shallow waters.

Superfamily CHAMIACEA

Family CHAMIDAE

58. *Chama reflexa* Reeve (Pl. VI, Figs. 16, 17)

Japanese name: Kiku-zaru

Chama reflexa Reeve 1846, sp. 16; Is. Taki 1951, Pl. 26, Fig. 3; Kira 1954, Pl. 53, Fig. 10.

This is a sessile bivalve. The attached left valve is deep and the right is circular and flattish like the operculum of the opposite valve. The apex turns from left to right. On the outer surface many spiny foliations develop. The outer surface is usually orange to red in coloration. Nomura and Hatai (1932) have reported *Ch. semipurpurata* Lischke with doubt from this bay, but it seems to be identical with this.

Locality: St. 11 and off Kanita, Gomejima, Futago and Oshima.

Distribution: Formosa to Honshu.

Habitat: This species attaches itself by the left valve to rocks in shallow waters.

Superfamily ERYCINACEA

Family ERYCINIDAE (LEPTONIDAE, KELLIIDAE)

59. *Lasaea undulata* (Gould) (Pl. VII, Figs. 3, 4)

Japanese name: Chirihagi

Kellia undulata Gould 1861, p. 34.*Lasaea nipponica* Keen 1938, p. 26, Textfigs. A, B.

This has a small, inflated and reddish shell, whose surface has distantly placed undulations in the fully grown specimens. This is known to be hermaphrodite and embryos are incubated within the suprabranchial chamber.

Locality: Asamushi and Futagojima.

Distribution: Kyushu and Honshu.

Habitat: Found gregariously on the byssus of mytilid species attached to rocks in lower tidal zones.

60. *Kellia subrotunda* (Dunker) (Pl. VI, Figs. 6-8)

Japanese name: Dobu-shijimi-modoki

Kellia subrotunda Dunker 1882, p. 219, Pl. 14, Figs. 12, 13.*Kellia japonica* Pilsbry 1895, pp. 132, 139, Pl. 3, Figs. 18, 19; Nomura et Hatai 1932, p. 5.

The shell is thin, semitranslucent and inflated. *K. porculus* is the nearest ally, whose shell is much more inflated.

Locality: Gomejima, Karibasawa and Noheji.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Collected from shallow waters and washed ashore.

61. *Fronsella fujitaniana* (Yokoyama) (Pl. XIII, Fig. 4)

Japanese name: Fujitani-kohakuno-tsuyu

Kellia fujitaniana Yokoyama 1927, p. 431, Pl. 48, Figs. 17, 18.

The shell is elongate, thin and inflated, the anterior and posterior ends are nearly equally rounded, and the apex is situated on one third of the dorsal margin from the anterior end. The surface is sculptured with very weak radial stripes.

Locality: Off Ushirogata, Gomejima and Noheji.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Common in muddy bottom in bays.

Family MONTACUTIDAE

62. *Nipponomysella* (gen. nov.) *oblongata* (Yokoyama) (Pl. XII, Fig. 19)

Japanese name: Maru-henaji-gai

Montacuta oblongata Yokoyama 1922, p. 157, Pl. 13, Figs. 9, 10.

The shell is very elongate and compressed, and rounded at both the anterior and posterior ends, and the dorsal margin runs parallel with the ventral. The

surface is smooth. The umbo is situated near the anterior end of the dorsal margin.

Genus *Nipponomysella* nov.Type species: *Montacuta oblongata* Yokoyama

Shell small, white, rather thin, and oblong ovate; surface sculptured with fine growth lines alone; hinge with two cardinal teeth in the left valve, the anterior one is short but strong and the posterior is elongate and solid; the dorsal margin nearly parallel to the ventral; the right valve without teeth, and the dorsal margin infolds on both sides of the umbo to be fitted into the socket on the hinge plate of the left valve; mantle line simple.

This new genus is very characteristic in having an oblong shell which is strongly elongate posteriorly. The European genus *Montacuta* is allied to this new genus, but *M. substriata*, the type species of that genus, has radial stripes on the surface of the shell which is oval in shape. The Australian genus *Mysella* is referred to *Nipponomysella oblongata* by some Japanese authors, but this species is quite different from species of that genus in the shape of shell and in the hinge armature.

Locality: Sts. 5, 18, 19, 20, 21, 23 and 24.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Rather common on muddy bottom in shallow waters.

63. *Montacutona mutsuwanensis* gen. et sp. nov. (Pl. XII, Figs. 21, 22)

Japanese name: Maru-yadori-gai

Shell is small, suborbicular, compressed and milky white. The surface is covered with a yellowish brown periostracum on the marginal area. The umbo is small and a little elevated. The interior is white. The dorsal margin on the both sides of the umbo of the right valve is infolded and fixed into the solid cardinal teeth of the left. The resilium lies between those two cardinals.

Length 4.3 mm, height 4.6 mm, breadth 1.8 mm. (type specimen).

Type locality: Off Ushirogata and Asamushi.

Remarks: This species is somewhat related to *Mysella subtruncata* (Yokoyama), but the shell of the former is much more symmetrical and has a different hinge armature showing only two cardinal teeth in the left valve. This new genus is characterized by the suborbicular shell, whose surface is smooth.

Superfamily CARDICAEA

Family CARDIIDAE

64. *Clinocardium californiense* (Deshayes) (Pl. VII, Fig. 21)

Japanese name: Ezo-ishikage-gai

Cardium californiense Deshayes 1839, p. 360; Takatsuki 1927, p. 25; Nomura et Hatai 1932, p. 5.*Clinocardium californiense* Kira 1954, Pl. 55, Fig. 4.

This has a large but rather thin shell covered with a dully brownish periostracum. The radial ribs are rounded on the top and about 35 to 45 in number. The southern form of this genus, *Cl. bilowi* (Rolle), may be a small variety of this species. The surface shows distantly placed and prominent undulations caused by the resting of growth in this species. This is a characteristic feature of this species. *Cl. uchidai* Habe (Pl. VII, Figs. 18, 19) had been confused with this species for a long time. That species is easily separable in having more than 45 radial ribs which are separated by narrow and deep grooves between them.

Locality: Kugurizaka, Yunoshima, Moura, Namiuchi, Futago, Inoh, Noheji and Sts. 8 and 9.

Distribution: Northern Honshu, Hokkaido, Kuriles, Saghalien and Kamtchatka. This species does not occur in California.

Habitat: Sandy-mud bottom in shallow waters.

65. *Fulvia mutica* (Reeve) (Pl. VII, Figs. 11, 20; Pl. XIV, Fig. 21)

Japanese name: Tori-gai

Cardium muticum Reeve 1844, sp. 32; Nomura et Hatai 1932, p. 5; Is. Taki 1951, Pl. 30, Fig. 2.

Cardium japonicum Dunker 1860, p. 223.

Cardium annae Pilsbry 1904, p. 557, Pl. 40, Fig. 20.

This is one of the edible mussels in Japan. The shell is thin and inflated, and rose in color. The surface radiates numerous erect hirsute series corresponding to the linear grooves. This is a distinct character of this species distinguishing it from other allied species in Japan.

Locality: Off Aburakawa, Nonai, Kugurizaka, Urata, Asadokoro and Noheji.

Distribution: China, Korea, Kyushu, Shikoku and Honshu.

Habitat: Muddy bottom in bays, but not so much in the bay.

Family VENERIDAE

66. *Callista brevisiphonata* (Carpenter) (Pl. VIII, Figs. 8, 9)

Japanese name: Ezo-wasure

Saxidomus brevisiphonata Carpenter 1865, p. 203.

Macrocallista chishimana Pilsbry 1905, p. 118.

Macrocallista brevisiphonata Nomura et Hatai 1932, p. 5.

Callista brevisiphonata Is. Taki 1951, Pl. 34, Fig. 4.

Ezocallista brevisiphonata Kira 1954, Pl. 56, Fig. 4.

This has a large shell exceeding 15 cm in length in fully grown specimens. The surface marks rough growth lines and radiates light purplish rays irregularly arranged and is covered with a vernicose yellowish brown periostracum in the young specimens.

Locality: Off Noheji and St. 12.

Distribution: Northern Honshu, Hokkaido, Kuriles, Saghalien and Maritime Prov. of Siberia.

Habitat: Sandy bottom in shallow waters.

67. *Saxidomus purpuratus* (Sowerby) (Pl. VII, Figs. 7, 8)

Japanese name: Uchi-murasaki or Hashidate-gai

Tapes purpuratus Sowerby 1852, p. 692, Pl. 150, Figs. 124, 125.

Saxidomus purpuratus Takatsuki 1927, p. 25; Nomura et Hatai 1932, p. 6; Is. Taki 1951, Pl. 37, Fig. 1; Kira 1954, Pl. 56, Fig. 9.

This is recognized at a glance by the deeply purplish interior of the shell. The surface is ashy white, with ribs coarsely radiating. But in the young specimens the interior of the shell is white and its surface shows brownish radial rays. The cardinal teeth are four in number so that this is easily distinguished from other venerid species even in the young stage.

Locality: Off Aburakawa, Kugurizaka, Asamushi, Gomejima, Moura, Futagojima, Itanozaki, Oshima and Noheji.

Distribution: Kyushu, Shikoku, Honshu, Southern Hokkaido and Korea.

Habitat: Very common in this bay, living on muddy bottom in shallow waters. Collected by the inhabitants for food.

68. *Meretrix lusoria* (Röding) (Pl. VII, Fig. 15, Pl. XIV, Fig. 3)

Japanese name: Hamaguri

Venus lusoria Röding 1798, p. 180.

Meretrix meretrix Nomura et Hatai 1932, p. 5.

Meretrix lusoria Is. Taki 1951, Pl. 34, Fig. 8.

Meretrix meretrix lusoria Kira 1954, Pl. 56, Fig. 1.

This is one of the economically important edible clams in Japan. Therefore this is a well-known species and no explanation is desired on it. This has been confused with the Philippine species *Meretrix meretrix* (Linné), but the former has a trigonal shell which elongates posteriorly while the latter has a more inflat and more trigonal shell. *M. lamarcki* Deshayes (Pl. XIV, Fig. 4) resembles this species, but has a thicker shell with a shallower sinus of the mantle line.

Locality: Aburakawa, Asamushi, Asadokoro, Noheji, Ominato and St. 8.

Distribution: Kyushu, Shikoku, Honshu, Korea and China.

Habitat: Waters of low salinity in bays from the lower intertidal zone to a depth of about ten meters.

69. *Dosinia (Dosinella) angulosa* (Philippi) (Pl. VII, Fig. 17)

Japanese name: Ura-kagami

Cytherea (Artemis) angulosa Philippi 1847, p. 229, Pl. 6, Fig. 1.

Dosinia angulosa Nomura et Hatai 1932, p. 5.

This has a circular, rather flat and white shell, on the surface of which the concentric growth ridges are weakened in the middle part and the flat escutcheon is not distinctly marked by the dorsal edge.

Locality: Off Kugurizaka and Yunoshima.

Distribution: Kyushu, Shikoku, Honshu and Korea.

Habitat: A muddy bottom dweller in shallow bays.

70. *Dosinia (Phacosoma) japonica* (Reeve) (Pl. VIII, Figs. 5, 6)

Japanese name: Kagami-gai

Artemis japonica Reeve 1850, sp. 17.

Dosinia japonica Takatsuki 1927, p. 24; Nomura et Hatai 1932, p. 5; Is. Taki 1951, Pl. 31, Fig. 4.

This has a white, solid and orbicular shell on which the concentric ridges mark all over. The posterior end of the postero-dorsal margin forms an angulation. The escutcheon on the dorsal edge is narrow but long and flat.

Locality: Aburakawa, Kugurizaka, Asamushi, Asadokoro, Noheji.

Distribution: Kyushu, Shikoku, Honshu, Southern Hokkaido and Korea.

Habitat: Fine sandy bottom in shallow waters several meters deep.

71. *Cyclina sinensis* (Gmelin) (Pl. VIII, Figs. 7, 14)

Japanese name: Oki-shijimi

Venus sinensis Gmelin 1791, p. 3285.

Artemis chinensis Reeve 1850, sp. 6.

Cyclina chinensis Takatsuki 1927, p. 24.

Cyclina sinensis Nomura et Hatai 1932, p. 5; Kira 1954, Pl. 56, Fig. 5.

Cyclina orientalis Is. Taki 1951, Pl. 32, Fig. 5.

This has a quite circular, moderately inflated shell, whose surface is covered with a vernicose, yellowish brown periostracum except the purplish marginal area and radiates many very weak striae. The hinge plate is rather broad. The margin of the interior is crenulated, corresponding to the outer radial striae.

Locality: Asadokoro, Ominato and off Yunoshima.

Distribution: China, Formosa, Korea, Kyushu, Shikoku and Honshu.

Habitat: Muddy bottom in the tidal zone. For the specimens from Japan the name *C. orientalis* Sowerby has been applied by Oyama but it seems to be only a form of this species.

72. *Gomphina (Macridiscus) melanaegis* Roemer (Pl. VIII, Figs. 15, 16)

Japanese name: Kotama-gai

Gomphina melanaegis Roemer 1861, p. 157; Nomura et Hatai 1932, p. 6; Is. Taki 1951, Pl. 37, Fig. 8.

Gomphina (Macridiscus) melanaegis Kira 1954, Pl. 56, Fig. 21.

This has a very solid and flat shell. The surface is rather smooth and polished. The hinge teeth are only three cardinals without laterals. This is a character distinct from other venerid species of Japan. *G. (M.) veneriformis* (Lamarck) is an allied species, but has a more trigonal shell with less curved ventral margin.

Locality: Off Noheji and Ominato.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: A sandy bottom dweller in shallow waters several meters deep. Collected by the inhabitants for food.

73. *Protothaca jedoensis* (Lischke) (Pl. VIII, Figs. 3, 4)

Japanese name: Oni-asari

Venus jedoensis Lischke 1874, p. 57.

Venus hirasei Pilsbry 1901, pp. 205, 400, Pl. 10, Fig. 1, Pl. 20, Fig. 20.

Paphia jedoensis Takatsuki 1927, p. 25; Nomura et Hatai 1932, p. 6.

Protothaca jedoensis Kira 1954, Pl. 56, Fig. 18.

This has a solid and inflated shell, on which distinct thick radial ribs are present. This is a distinguished character of this species. The interior is white and is minutely crenulated at the ventral margin. *P. schrencki* Nomura is the closely related species from the Pacific coast of Japan and has narrow radial ribs on the surface except the postero-dorsal area. According to Hertlein and Strong (1948), this is a member of his *Notochione* from Mexico, but the writers still retain this species in the genus *Protothaca*.

Locality: Nonai, Kugurizaka, Asamushi, Yunoshima, Tsuchiya, Gomejima, Futago, Namiuchi, Moura and Oshima.

Distribution: Kyushu, Shikoku, Honshu, Hokkaido and Korea.

Habitat: Sandy-mud bottom in shallow waters in bays.

74. *Protothaca (Novathaca) euglypta* (Sowerby) (Pl. VII, Figs. 9, 10)

Japanese name: Nunome-asari

Chione euglypta Sowerby 1914, p. 9.

Protothaca staminea euglypta Is. Taki 1951, Pl. 41, Fig. 1.

The very inflated, solid shell is provided with distinctly and closely set and lamellate growth lines which are strongly disposed on the postero-dorsal area, crossing the numerous radial riblets as strong as concentric lamellae. This and *P. staminea* are distinct species.

Locality: Off Asamushi and Asadokoro.

Distribution: Northern Honshu and Hokkaido.

Habitat: Found in the borings of the pholadid species.

75. *Callithaca* (*Protocallithaca*) *adamsi* (Reeve) (Pl. VII, Fig. 16)

Japanese name: Ezo-nunome

Venus adamsi Reeve 1863, sp. 77.*Paphia adamsi* Nomura et Hatai 1932, p. 6.*Protocallithaca adamsi* Nomura 1937, p. 10, Pl. 3, Figs. 4a, b.*Protothaca adamsi* Is. Taki 1951, Pl. 41, Fig. 2.*Callithaca* (*Protocallithaca*) *adamsi* Kira 1954, Pl. 56, Fig. 19.

This has a large, chalky and moderately inflated shell, whose surface is sculptured with distantly placed and lamellate radial ridges, and with numerous fine radial riblets. The interior is white and is crenulated minutely at the ventral margin.

Locality: Off Ushirogata, Gomejima, Moura, Futago, Noheji, Kawauchi and Sts. 8 and 9.

Distribution: Northern Honshu, Hokkaido, Saghalien, Korea and Maritime Prov. of Siberia.

Habitat: Very common in the cold waters in sandy-mud bottom several meters deep.

76. *Tapes* (*Amygdala*) *japonica* (Deshayes) (Pl. VIII, Figs. 1, 2)

Japanese name: Asari

Tapes japonica Deshayes 1853, p. 18.*Tapes semidecussata* Reeve 1864, sp. 64.*Paphia philippinarum* Takatsuki 1927, p. 24; Nomura et Hatai 1932, p. 6.*Venerupis semidecussata* Is. Taki 1951, Pl. 40, Fig. 5.*Venerupis* (*Amygdala*) *japonica* Kira 1954, Pl. 56, Fig. 23.

This is one of the economically important edible clams in Japan. The shell is somewhat elongate and moderately inflated and is maculated with various bluish blotches which are not frequently provided with the same pattern in both valves. The surface sculpture consists of radial riblets somewhat decussated by weaker concentric growth lines. The interior is tinged with purple at the posterior area. The ventral margin is simple.

This species has been confused with *Tapes philippinarum* (Adams et Reeve) by the close resemblance of the surface sculpture, but the latter species is subquadrate in shape and has a more elongate lunule on the antero-dorsal margin and a broader but shallower sinus at the hinder part of the mantle line.

Locality: Aburakawa, Aomori, Nonai, Asamushi, Yunoshima, Gomejima, Tsuchiya, Namiuchi, Moura, Futago, Inoh, Oshima, Asadokoro, Noheji and Ominato.

Distribution: China, Korea, Japan and Saghalien.

Habitat: Found abundantly in bays of sandy-mud bottom, in waters of low salinity from the intertidal zone to a depth of several meters.

77. *Clementia* *vatheleti* Mabilie (Pl. VII, Fig. 14)

Japanese name: Fusuma-gai

Clementia vatheleti Mabilie 1901, p. 57; Nomura et Hatai 1932, p. 5; Is. Taki 1951, Pl. 32, Fig. 6.

This has a subtriangular, thin, white and inflated shell. The surface is obtusely undulated and covered with a thin and brown periostracum. The interior white.

Locality: Yunoshima.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Muddy bottom of shallow waters.

78. *Irus* *metis* (Deshayes) (Pl. VII, Figs. 5, 6)

Japanese name: Matsukaze

Venerupis metis Deshayes 1854, p. 5; Nomura et Hatai 1932, p. 6.*Venerupis semipurpurea* Dunker 1882, p. 208.*Irus metis* Is. Taki 1951, Pl. 41, Fig. 5; Kira 1954, Pl. 57, Fig. 26.

This has an elongate squarish, solid and white shell. The surface is sculptured with distantly set and strongly lamellate growth lines crossed by weaker radial riblets. The interior white, but sometimes purplish brown in the posterior area.

Locality: Asamushi, Yunoshima, Tsuchiya and Futago.

Distribution: Formosa, Kyushu, Honshu and Korea.

Habitat: Occasionally found in the holes on the mud-stone bed of the tidal zone bored by the pholadid species.

Family PETRICOLIDAE

79. *Claudiconcha* *japonica* (Dunker) (Pl. VII, Fig. 13, Pl. VIII, Figs. 12, 13)

Japanese name: Semi-asari

Petricola japonica Dunker 1882, p. 209, Pl. 9, Figs. 4-9; Is. Taki 1951, Pl. 41, Fig. 7.*Petricola japonica circumdata* Lamy 1923, p. 356.*Petricola monstrosa* Nomura et Hatai 1932, p. 6.*Claudiconcha japonica* Kira 1954, Pl. 57, Fig. 29.

The shell is solid, chalky white and misshapen owing to the boring life. The right valve is larger than the left and embraces the latter by the overlapping, thick, calcareous incrustation. Though Nomura and Hatai have reported *Cl. monstrosa* (Gmelin) (Pl. VII, Fig. 12) from this bay, it may be a misidentification of this species which has only lamellate concentric growth lines on the surface.

Locality: Asamushi (Hadakajima) and Gomejima.

Distribution: Formosa, Kyushu, Shikoku and Honshu.

Habitat: Found attaching to rocks and coral rocks or oyster shells at the intertidal zone and also in bored holes.

Superfamily TELLINACEA

Family GARIIDAE

80. *Psammocola hazusensis* (Yokoyama) (Pl. X, Figs. 3, 4)

Japanese name: Ezo-masuo

Psammobia hazusensis Yokoyama 1922, p. 136, Pl. 9, Fig. 4; Takatsuki 1927, p. 26.*Psammobia californica* Nomura et Hatai 1932, p. 7.*Gari californica* Is. Taki 1951, Pl. 46, Fig. 6.*Psammocola californica* Kira 1954, Pl. 59, Fig. 5.

This species is confused with the American *P. californica* (Conrad) (Pl. XIV, Fig. 23) until to-day. Compared with the specimens of various stages of *P. californica*, it is revealed that the Japanese species differs from that species in having the shell more elongate and more rounded at the anterior margin and with no radial ray on the surface. Therefore they are distinct species. This is a white rather flattish shell covered with a thin periostracum on the surface. The posterior end is obliquely truncated and is narrowly gaped.

Locality: Futago, off Yunoshima, Noheji and Ominato.

Distribution: Northern Honshu and Hokkaido.

Habitat: Muddy bottom in shallow waters.

81. *Nuttallia olivacea* (Jay) (Pl. XIV, Fig. 18)

Japanese name: Iso-shijimi

Psammobia olivacea Jay 1857, p. 292, Pl. 1, Figs. 8, 9.*Sanguinolaria nuttalli* Takatsuki 1927, p. 26.*Sanguinolaria olivacea* Nomura et Hatai 1932, p. 7; Is. Taki 1951, Pl. 47, Fig. 4.*Nuttallia olivacea* Kira 1954, Pl. 59, Fig. 9.

This has a circular shell with a distinct external ligament behind the beak. The surface is covered with a smooth, vernicose and olivaceous periostracum. The right valve is flatter than the left. This species is frequently confused with *Nuttallia ezonis* Kuroda et Habe (Pl. XIII, Fig. 13, Pl. XIV, Fig. 17), which was formerly known as the American *N. nuttalli* (Conrad) by misidentification, but is smaller in size even in fully grown specimens and has a very deeper mantle sinus.

Locality: Aburakawa, Nonai, Kugurizaka, Moura, Asadokoro, Noheji and Ominato.

Distribution: Kyushu to Honshu.

Habitat: A mud dweller in shallow waters.

82. *Nuttallia japonica* (Reeve) (Pl. XIV, Fig. 16)

Japanese name: Wasure-iso-shijimi

Soletellina japonica Reeve 1857, Conch. Icon., sp. 16.

This species was confused with the preceding species until Kira pointed out

the distinctions between them. The shell of this species is subequivalve, the right valve being slightly less convex than the left, rather thick; the periostracum is rather thick and less glossy. The mantle sinus is not so deep as that of the preceding species, but is broader.

Locality: Noheji and Ominato.

Distribution: Korea, Kyushu, Shikoku and Honshu.

Habitat: This dwells on the muddy bottom of lower tidal zones in bays associated with *Tapes (Amygdala) japonica* and *Laternula limicola*.

Family SEMELIDAE

83. *Theora lubrica* Gould (Pl. XIII, Fig. 15)

Japanese name: Shizuku-gai

Theora lubrica Gould 1861, p. 24.

The shell is thin, fragile, semitranslucent and iridescent when living, rounded anteriorly and attenuated posteriorly. In some specimens, an internal ridge runs from the beak toward the antero-ventral margin. The mantle line shows a deep sinus.

Locality: Ushirogata, Gomejima and Ominato.

Distribution: Kyushu, Shikoku, Honshu and Southern Hokkaido.

Habitat: Very common in muddy bottom of bays as an indicator of stagnant bottom waters.

Family TELLINIDAE

84. *Cadella delta* (Yokoyama) (Pl. IX, Figs. 15, 16)

Japanese name: Kusabi-zara

Tellina delta Yokoyama 1922, p. 141, Pl. 10, Figs. 8-10; Nomura et Hatai 1932, p. 7.

This is a small, trigonal tellinid species; the shell is solid and marks distinct growth lines. The color is light yellow. The antero-dorsal margin is very longer than the posterior. *C. lubrica* (Gould) (Pl. XIII, Fig. 2) is the nearest ally to this species but attains a larger size in fully grown specimens and is colored orange rose.

Locality: Kugurizaka.

Distribution: Kyushu and Honshu.

Habitat: Commonly found in fine sandy bottom in shallow waters.

85. *Arcopagia (Merisca) diaphana* (Deshayes) (Pl. X, Fig. 13, Pl. XIV, Fig. 12)

Japanese name: Icho-shiratori

Tellina diaphana Deshayes 1855, p. 364; Kira 1955, Pl. 60, Fig. 25.*Merisca diaphana* Is. Taki 1951, Pl. 44, Fig. 2.

The shell is very flat, solid, chalky white and marks the concentric sculpture of delicate and slightly lamellate ridges. The anterior margin is round and the postero-dorsal margin is straight.

Locality: This species was collected from this bay but the exact locality is not known.

Distribution: Formosa, Korea, Kyushu, Shikoku and Honshu.

Habitat: An intertidal bivalve of muddy bottom.

86. *Arcopagia (Merisca) margaritina* (Lamarck) (Pl. XIV, Fig. 24)

Japanese name: Akoya-zara

Tellina margaritina Lamarck 1818, p. 525.

Tellina serricostata Tokunaga 1905, p. 43, Pl. 2, Fig. 32a, b.

Tellina diaphana serricostata Nomura et Hatai 1932, p. 6.

Arcopagia (Merisca) serricostata Kira 1954, Pl. 59, Fig. 14.

This species is close to the preceding species in general appearance, but has a more elongate shell colored light orange at the umbonal area. *A. (M.) tokunagai* Ikebe (Pl. XIV, Fig. 20) is an allied species, but is easily distinguished from this species in having an elongate shell colored light yellow and with weak growth lines.

Locality: Nonai.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Muddy bottom more than 10 m deep.

87. *Arcopagia (Merisca) subtruncata* (Hanley) (Pl. XIV, Fig. 13)

Japanese name: Yûhi-zakura

Tellina subtruncata Hanley 1844, p. 149.

Tellina ojiensis Tokunaga 1906, p. 44, Pl. 2, Fig. 34; Nomura et Hatai 1932, p. 6.

This species also resembles *A. (M.) diaphana* (Deshayes) in shape, but the posterior rostration is very short and concentric growth lines are densely set on the surface. Moreover the shell is thick and rather inflated in the right valve. The color is yellowish white except the orange umbonal area.

Locality: Off Asadokoro and Noheji.

Distribution: Formosa, Kyushu, Shikoku and Honshu.

Habitat: This species is also collected with the dredge from the muddy bottom more than several meters deep. Very common in this bay.

88. *Sinomacoma* (gen. nov.) *yantaiensis* (Crosse et Debeaux) (Pl. IX, Figs. 4, 5)

Japanese name: Shiratori-modoki

Fragilia yantaiensis Crosse et Debeaux 1863, pp. 78, 255, Pl. 9, Fig. 2.

Gastrana yantaiensis Nomura et Hatai 1932, p. 6.

Heteromacoma yantaiensis Kira 1954, Pl. 59, Fig. 22.

This is a very solid tellinid species which is characterized by the deeply sunk ligamental area between the conjoined valves and the rough growth lines. The interior light yellow.

Genus *Sinomacoma* nov.

Type species: *Fragilia yantaiensis* Crosse et Debeaux

Shell solid, moderately compressed and generally ovate in shape, rounded anteriorly and narrowed posteriorly, white to yellowish white; surface marks coarsely set growth lines with an obtuse keel which runs from the umbo to the posterior end, forming a flat but narrow postero-dorsal area; umbo rather anterior or in the middle, slightly raised; a small but deeply excavated lunule in front of the umbo, the left valve being larger than the right, and the ligament lies between the deeply sunk escutcheons; hinge plate rather broad and hinge teeth stout; in the left valve the anterior cardinal tooth very large and trigonal in shape but the posterior very thin and narrow; in the right valve the posterior cardinal slightly larger than the anterior; no lateral teeth present; the anterior muscle scar elongate but the posterior ovate; the mantle line connects two scars forming a large posterior situation.

Gastrana yantaiensis was confused with *Macoma irus* (Deshayes) which is the type species of *Heteromacoma* and common in the north-west coast of America, but differs from the latter in having a deeply excavated and steeply sunk lunule and an escutcheon and in having the same figure of mantle line on both right and left valves. Another species of this genus is *Sinomacoma oyamai* (Kira), which is distributed in the Northern Honshu too, but has never been found in this bay.

Locality: Kanita, Asamushi (in Kaichu-suiso, sea-water pool in rocks, and before the boathouse), Futago and Noheji.

Distribution: China, Korea, Kyushu, Shikoku and Honshu.

Habitat: An inhabitant of muddy-gravel bottom in intertidal zones.

89. *Macoma (Heteromacoma) contabulata* (Deshayes) (Pl. XIV, Figs. 7, 8, 22)

Japanese name: Sabi-shiratori

Tellina contabulata Deshayes 1855 (1854), p. 356; Kira 1954, Pl. 59, Fig. 20.

Macoma anser Oyama 1950, p. 227.

Macoma contabulata Kira 1954, Pl. 59, Fig. 20.

This species was confused with the American *M. irus* (Hanley) (Pl. XIV, Figs. 14, 15) by the close resemblance of shell appearance. But the pallial sinus of these two species are quite different from each other. In this species it does not reach to the anterior muscle scar, but meets the lower line in its middle.

The subgeneric name *Heteromacoma* was proposed for *Macoma irus* (Hanley) and this species is also included in the subgenus because of the non-twisted posterior area.

Locality: Ominato.

Distribution: China, Korea, Kyushu, Shikoku and Honshu.

Habitat: A mud bottom dweller in shallow waters.

90. *Macoma nipponica* (Tokunaga) (Pl. IX, Figs. 12, 13)

Japanese name: Nippon-chigai

Tellina nipponica Tokunaga 1906, p. 44, Pl. 2, Figs. 36a, b.

Macoma nipponica Nomura et Hatai 1932, p. 7.

This has a thin, white shell which a pale yellowish periostracum covers. The antero-dorsal margin is longer than the postero-dorsal owing to the well developed anterior part of shell. The mantle sinus is very deep, approaching to the anterior scar in the left valve.

Locality: Nonai and Noheji.

Distribution: Kyushu, Honshu and Southern Hokkaido.

Habitat: Rather common on muddy bottom in shallow and deep waters.

91. *Macoma tokyoensis* Makiyama (Pl. XIV, Figs. 9-11)

Japanese name: Goisagi

Tellina dissimilis Martens 1865, p. 430 (non Deshayes 1854).

Macoma dissimilis Takatsuki 1927, p. 23; Nomura et Hatai 1932, p. 7.

Macoma tokyoensis Makiyama 1927, p. 50; Is. Taki 1951, Pl. 45, Fig. 1; Kira 1954, Pl. 59, Fig. 19.

This has a somewhat elongate shell with a straight postero-dorsal margin. The mantle sinus almost reaches to the anterior scar in the left valve and meets the lower line at a distance of two thirds of it. The American *Macoma nasuta* Conrad (Pl. XIV, Figs. 5, 6) is the nearest ally but can be easily distinguished from this species by the pallial sinus in the left which reaches the anterior muscle scar.

Locality: Off Kugurizaka, Yunoshima and Noheji.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Very common in muddy bottom in shallow waters of bays.

92. *Macoma incongrua* (v. Martens) (Pl. IX, Fig. 3, Pl. XIV, Figs. 25, 26)

Japanese name: Hime-shiratori

Tellina incongrua Martens 1865, p. 430.

Macoma incongrua Nomura et Hatai 1932, p. 7; Is. Taki 1951, Pl. 45, Fig. 3; Kira 1954, Pl. 59, Fig. 18.

This species resembles the preceding species, but may be distinguished from the latter in having an ovate shell, whose umbonal area is colored orange. It is the characteristic feature of this species distinct from other Japanese macomas.

Locality: Nonai, Yunoshima, Asamushi, Futago, Noheji, Ominato and

Kawauchi.

Distribution: Korea, Japan and Alaska to Washington.

Habitat: Common in muddy bottom at the intertidal zones and shallow waters.

* *Macoma calcarea* (Gmelin) (Pl. IX, Figs. 17, 19, Pl. XIV, Fig. 2)

Japanese name: Keshô-shiratori

Tellina calcarea Gmelin 1791, p. 3236.

Macoma calcarea Habe 1955, p. 18, Pl. 1, Figs. 14, 15.

This shell attains a rather large size in fully grown specimens, measuring about 50 mm in length, and is rather flat, chalky white, and ovate in shape. The surface is slightly concave in the middle part of the right valve due to the weakly twisted posterior end. The pallial sinus quite approaches to the anterior muscle scar, but it is shallower in the left than in the right.

Distribution: Northern Honshu to California through Bering Sea.

* *Macoma takahokoensis* sp. nov. (Pl. IX, Figs. 6, 7)

Japanese name: Takahoko-shiratori

This small, rose macoma was considered as *Macoma inconspicua* (Broderip et Sowerby) which is a synonym of the European *Macoma baltica* (Linné) by some authors. Compared with the specimens of *M. inconspicua* from Monterey, California, this species has an ovate shell with a more strongly narrowed posterior end. Moreover, the pallial sinus is quite different from that of the above species. In the right valve of this species, it is very deep but narrow, meeting at the midway of the ventral line, and in the left valve it is also deep but narrow. Therefore this species is a distinct species apart from *M. baltica* and *M. inconspicua*.

Shell is small, thin, fragile, somewhat inflated, light rose in color and ovate in shape, rounded anteriorly and tapered toward the posterior end. The surface marks rather weak growth lines. The umbo is slightly elevated beyond the dorsal margin in the middle. The antero-dorsal margin is weakly curved and the postero-dorsal is straight. The small two cardinal teeth are under the umbo, but the lateral is missing. A mantle line in the right valve is deeply and widely sinuated and meets the lower line in the middle, and in the left valve it is narrow and deep.

Length 15.0 mm, height 11.1 mm, breadth 5.7 mm (type specimen)

Length 14.5 mm, height 11.2 mm, breadth 5.7 mm (paratype specimen)

Length 14.0 mm, height 10.5 mm, breadth 5.3 mm (paratype specimen)

Type locality: Takahoko-numa, Shimokita Peninsula, Aomori Prefecture, Honshu. This species has been collected by G. Yamamoto from this lagoon.

* not present in this bay.

93. *Macoma (Rexithaerus) sector* Oyama (Pl. IX, Figs. 1, 2)

Japanese name: Sagi-gai

Macoma sector Oyama 1950, p. 227; Is. Taki 1951, Pl. 45, Fig. 4; Kira 1954, Pl. 60, Fig. 26.*Macoma secta* Nomura et Hatai 1932, p. 7 (non Conrad).

This species has been confused with the American *Macoma (R.) secta* (Conrad), but is a different species in having a shell more elongated posteriorly and with a wider pallial sinus in the right valve. The shell is thin, white, and winged at the postero-dorsal margin; this feature is characteristic.

Macoma (Pseudometis) praeupta (Salisbury) (Pl. X, Figs. 1, 2) is common in bays, but has never been found in this bay.

Locality: Nonai and Ominato.

Distribution: Formosa, Korea and Japan.

Habitat: Muddy bottom in shallow waters. This macoma grew in small concrete tanks together with the scallop spats taking decayed plankton as food in Ominato, 1952.

94. *Moerella juvenilis* (Hanley) (Pl. X, Fig. 8)

Japanese name: Yūshio-gai

Tellina juvenilis Hanley 1844, p. 140; Is. Taki 1951, Pl. 44, Fig. 7.*Tellina rutila* Dunker 1860, p. 236; Nomura et Hatai 1932, p. 6.*Moerella juvenilis* Kira 1954, Pl. 60, Fig. 9.

This has a small tellinid shell colored orange yellow to white, and rounded anteriorly and narrowed posteriorly. This species is very close to *M. iridescens* (Benson), but has a triangular shell. The allied species *M. jedoensis* (Lischke) (Pl. IX, Figs. 9, 10) differs from this species in having a flat shell colored rose.

Locality: Tsuchiya, Moura and Asadokoro.

Distribution: China, Formosa, Korea, Kyushu, Shikoku and Honshu.

Habitat: Muddy bottom of shallow waters of low salinity.

95. *Moerella iridescens* (Benson) (Pl. X, Fig. 7)

Japanese name: Teri-zakura

Sanguinolaria iridescens Benson 1842, p. 490.*Tellina iridescens* Takatsuki 1927, p. 23; Is. Taki 1951, Pl. 44, Fig. 4.*Fabulina iridescens* Kira 1954, Pl. 60, Fig. 6.

This species approaches to *Fabulina minuta* but may be easily distinguished from the latter in having a less elongate shell. This species reported by Takatsuki may be a misidentification with *Fabulina minuta* Lischke, because no specimens of the latter were collected from this bay by us.

Locality: Yunoshima.

Distribution: China, Formosa, Kyushu, Shikoku and Honshu.

Habitat: Found ashore on sandy bottom.

96. *Fabulina minuta* (Lischke) (Pl. IX, Fig. 11)

Japanese name: Uzu-zakura

Tellina minuta Lischke 1872, p. 106.*Fabulina minuta* Kira 1954, Pl. 60, Fig. 4.

This has also a small, compressed tellinid shell which is tinged light orange-rose with a pale zone on the posterior flexure. The anterior margin is rounded and the posterior is somewhat narrowed. *Fabulina iridella* has been reported from this bay by Nomura and Hatai, but may be a misidentification with this species.

Locality: Ushirogata, Kugurizaka, Yunoshima, Moura and Noheji.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: A dweller of fine sandy bottom in shallow waters. Very common in this bay, though it has never been reported before.

97. *Fabulina nitidula* (Dunker) (Pl. IX, Fig. 14)

Japanese name: Sakura-gai

Tellina nitidula Dunker 1860, p. 236; Takatsuki 1927, p. 23; Nomura et Hatai 1932, p. 6; Is. Taki 1951, Pl. 44, Fig. 5.*Fabulina nitidula* Kira 1954, Pl. 60, Fig. 7.

This has a very flat shell which is rounded at both ends and is colored rose.

Locality: Off Kanita, Ushirogata, Okunai, Aomori, Kugurizaka, Asamushi, Moura (all over Aomori Bay) and Noheji.

Distribution: Formosa, Korea, Kyushu, Shikoku and Honshu.

Habitat: Sandy-mud bottom of shallow waters in bays.

98. *Fabulina pallidula* (Lischke)

Japanese name: Hatsu-zakura

Tellina pallidula Lischke 1871, p. 42; Nomura et Hatai 1932, p. 6.*Fabulina pallidula* Kira 1954, Pl. 60, Fig. 8.

This small tellinid species is a little inflated and is colored orange to rose. This differs from the preceding species in having a shell more elongated and more inflated. The writers have never collected this species from this bay.

Locality: Kugurizaka.

Distribution: China, Korea, Kyushu, Shikoku and Honshu.

Habitat: A muddy bottom dweller in bays.

Remarks: *Jactellina (Loxoglypta) lauta* (Gould) (Pl. IX, Fig. 8) has been reported from this bay by Nomura and Hatai as *Macoma rhomboides* (Quoy et

Gaimard), but it is apparently a misidentification of a certain tellinid species. Therefore this species must be rejected from the molluscan fauna of this bay.

99. *Peronidia venulosa* (Schrenck) (Pl. IX, Figs. 18, 20)

Japanese name: Sara-gai

Tellina venulosa Schrenck 1861, p. 412.; Is. Taki 1951, Pl. 44, Fig. 10.

Tellina alternata chibana Yokoyama 1922, p. 140., Pl. 10, Fig. 5 (only).

Tellina lutea venulosa Nomura et Hatai 1932, p. 6.

Peronidia venulosa Is. Taki 1951, Pl. 60, Fig. 29.

The solid, compressed and white shell attains a large size exceeding 10 cm in length. The outer surface marks growth lines of moderate strength. The interior is brightly orange in color. This species was considered as a subspecies of *P. lutea* (Wood) (Pl. X, Fig. 16), but the latter has a thin shell covered with a greenish periostracum, and is colored rose within. *P. zyomoensis* (Hatai et Nisiyama) (Pl. XIII, Fig. 14) is also an allied species, but may be distinguished from this species in having a strong, elevated, concentric sculpture on the surface.

Locality: Kugurizaka.

Distribution: Northern Honshu, Hokkaido, Kuriles, Saghaline, Korea, Maritime Prov. of Siberia and Bering Sea.

Habitat: Common in fine sandy bottom in shallow waters offshore. Not common in this bay, but abundant off Hachinohe on the Pacific coast, and taken for food.

100. *Pharaonella perrieri* (Bertin) (Pl. VIII, Fig. 10)

Japanese name: Beni-gai

Tellina perrieri Bertin 1878, p. 255, Pl. 8, Figs. 8a, b; Is. Taki 1951, Pl. 43, Fig. 2.

Tellina consanguinea Sowerby 1903, p. 500; Nomura et Hatai 1932, p. 6.

Pharaonella perrieri Kira 1954, Pl. 60, Fig. 14.

This is an elongate, compressed, reddish rose tellinid species. The shell is rounded anteriorly and is rostrated posteriorly but is truncated at the posterior end obliquely. The surface is smooth and shining. The writers have never collected this species from this bay.

Locality: Nonai and Kugurizaka.

Distribution: Kyushu, Shikoku and Honshu (up to this bay).

Habitat: On sandy bottom of the lower tidal zone down to a deep of several meters.

Order ADAPEDONTA
Superfamily SOLENACEA
Family SOLENIDAE

101. *Solen strictus* Gould (Pl. XI, Fig. 7)

Japanese name: Mate-gai

Solen gracilis Gould 1861, p. 26, non Sowerby 1844.

Solen strictus Gould 1861, p. 26.

Solen gouldi Conrad 1867, app. p. 28; Takatsuki 1927, p. 26; Nomura et Hatai 1932, p. 7; Is. Taki 1951, Pl. 49, Fig. 1; Kira 1954, Pl. 61, Fig. 7.

This edible razor shell is well-known as *Solen gouldi* Conrad which is a substitute name of *Solen gracilis* Gould 1861 (not Sowerby 1844). In 1861 two species, viz. *S. gracilis* and *S. strictus* have been described by Gould from Hakodate in Hokkaido. But it seems to the writers that they are the same species after the conchometrical analysis. Thus *S. strictus* is in use as an earlier name than *S. gouldi*. The shell is very long, with an obliquely truncated anterior margin and a straight dorsal margin.

Locality: Kugurizaka and Moura.

Distribution: Kyushu, Shikoku, Honshu, Southern Hokkaido and Korea.

Habitat: This species burrows obliquely into the sand flats at about a right angle to the lower tide mark.

102. *Solen (Solenarius) krusenstermi* Schrenck (Pl. VIII, Fig. 11)

Japanese name: Ezo-mate

Solen krusenstermi Schrenck 1867, p. 594, Pl. 25, Figs. 9-12; Nomura et Hatai 1932, p. 7; Is. Taki 1951, Pl. 49, Fig. 5; Kira 1954, Pl. 61, Fig. 3.

This species differs from the preceding species in having a shell, whose dorsal margin is curved dorsally and the anterior margin is not truncated obliquely.

Locality: Nonai.

Distribution: Honshu, Hokkaido, Korea and Saghalien.

Habitat: This burrows into the sand flats in shallow waters.

Remarks: *Siliqua alta* (Broderip et Sowerby) (Pl. XIII, Figs. 5, 6) is very common in Hokkaido, but has never been collected in this bay.

Superfamily MACTRACEA

Family MESODESMATIDAE (AMPHIDESMATIDAE)

103. *Caecella chinensis* Deshayes (Pl. X, Figs. 14, 15)

Japanese name: Kuchiba-gai

Caecella chinensis Deshayes 1855, p. 334; Takatsuki 1927, p. 26; Nomura et Hatai 1932, p. 8; Is. Taki 1951, Pl. 52, Fig. 6; Kira 1954, Pl. 57, Fig. 32.

Ervilia otsuensis Yokoyama 1920, p. 109, Pl. 17, Figs. 21, 22.

The shell is covered with a yellowish periostracum. The internal ligament is situated on the chondrophore between the two large cardinal teeth.

Locality: Nonai, Kugurizaka, Asamushi, Yunoshima, Futago, Oshima and

Ominato.

Distribution: Cochin-China, China, Formosa, Japan and Korea.

Habitat: Among sandy gravels at the upper intertidal zone in bays.

Family MACTRIDAE

104. *Mactra sulcataria* Reeve (Pl. X, Figs. 5, 6)

Japanese name: Baka-gai

Mactra sulcataria Reeve 1854, sp. 5; Nomura et Hatai 1932, p. 7; Is. Taki 1951, Pl. 5, Fig. 7; Kira 1954, Pl. 58, Fig. 10.

Mactra carneopicta Pilsbry 1904, p. 550, Pl. 39, Figs. 1-3; Takatsuki 1927, p. 24.

This is one of the important edible mussels in Japan. The shell is rather thin and its undulated suriace is covered with a yellowish periostracum. In the young stage, radial rays run from the umbo to the ventral margin. The internal resilium set on the chondrophore, is divided from the ligament by the shell plate. *Mactra carneopicta* Pilsbry seems to be only a northern form of this species because of the existence of transitional forms.

Locality: Kugurizaka, Moura and Asadokoro.

Distribution: China, Korea, Japan, Saghalien and Kuriles.

Habitat: Sandy bottom in shallow waters.

105. *Spisula (Pseudocardium) sachalinensis* (Schrenck)

(Pl. X, Figs. 11, 12)

Japanese name: Uba-gai or Hokki-gai

Mactra sachalinensis Schrenck 1862, p. 575, Pl. 23, Figs. 3-7.

Mactra lühdorfi Dunker 1870, p. 60, Pl. 20, Figs. a, c.

Trigonella straminea Dunker 1882, p. 183, Pl. 7, Figs. 5, 6.

Mactra dunkevi Yokoyama 1922, p. 126, Pl. 7, Figs. 7, 8.

Mactra sachalinensis imperialis Yokoyama 1922, p. 129, Pl. 7, Figs. 9, 10.

Spisula sachalinensis Nomura et Hatai 1932, p. 7; Is. Taki 1951, Pl. 51, Fig. 1.

This is an important edible mussel in Northern Japan. The shell is large and solid, and is covered with a rough and yellowish brown periostracum on the surface in the fully grown specimens which exceed 10 cm in length. But in the young stage, the periostracum is smooth and light yellow.

Locality: Off Nonai and Kugurizaka.

Distribution: Northern Honshu, Hokkaido and Saghalien.

Habitat: Sandy bottom in shallow waters.

Remarks: *Spisula (Mactromeris) voyi* Gabb (Pl. XIII, Fig. 8) is also commonly found in Northern Japan, but has never been collected in this bay.

106. *Schizothaerus keenae* Kuroda et Habe (Pl. XI, Figs. 12, 13)

Japanese name: Mirukui

Schizothaerus nuttalli Nomura et Hatai 1932, p. 8 (non Conrad).

Schizothaerus keenae Kuroda et Habe 1950, p. 30; Is. Taki 1951, Pl. 51, Fig. 6; Kira 1954, Pl. 58, Fig. 9.

This species has been confused with the American *Sch. nuttalli* (Conrad.) but the Japanese species has a higher shell with a broader, posterior truncation. The shell attains a large size, exceeding 15 cm in length and is covered with a rough and thick periostracum.

Locality: Moura and Noheji.

Distribution: Kyushu, Shikoku and Honshu.

Habitat: Muddy bottom in shallow waters.

107. *Raeta (Raetellops) pulchella* (A. Adams et Reeve) (Pl. X, Figs. 9, 10)

Japanese name: Chiyono-hana-gai

Poromya pulchella A. Adams et Reeve 1850, p. 83, Pl. 23, Fig. 1.

Mactra rostralis Reeve 1864, sp. 119.

Raeta yokohamaensis Pilsbry 1895, p. 127, Pl. 4, Fig. 24.

Raeta elliptica Yokoyama 1922, p. 131, Pl. 8, Fig. 7.

Raeta pulchella Takatsuki 1927, p. 23; Is. Taki 1951, Pl. 51, Fig. 4; Kira 1954, Pl. 58, Fig. 1.

Anatina pulchella Nomura et Hatai 1932, p. 7.

This is a thin, fragile, white shell; the surface is undulate. The anterior margin is rounded and the posterior tapers toward the end and is somewhat rostrated and gaped.

Locality: Off Yunoshima, Noheji and Ominato.

Distribution: Siam, Borneo, China, Korea, Japan and Maritime Prov. of Siberia.

Habitat: This lives on muddy bottom in bays, and indicates the stagnant bottom water during the summer.

Superfamily HIATELLACEA

Family HIATELLIDAE

108. *Hiatella orientalis* (Yokoyama) (Pl. XII, Figs. 16, 17)

Japanese name: Kinu-matoi-gai

Saxicava orientalis Yokoyama 1920, p. 106, Pl. 7, Figs. 2, 3.

Trapezium nipponicum Yokoyama 1922, p. 170, Pl. 6, Figs. 2, 3.

Petricola awana Yokoyama 1924, p. 42, Pl. 3, Fig. 1.

Saxicava arctica Takatsuki 1927, p. 27; Nomura et Hatai 1932, p. 8.

Saxicava orientalis awana Is. Taki 1951, Pl. 53, Fig. 5.

Hiatella orientalis Kira 1954, Pl. 61, Fig. 15.

This closely approaches to and has been confused with the European *H. arctica* (Linné), but here a series of serration runs from the umbo to the postero-ventral corner and is weaker even in the young stages. The shell is very

variable in shape due to the burrowing habit and is covered with a yellowish periostracum. The hinge has a small tooth-like process under the umbo. The mantle line is discontinuous.

Locality: Ushirogata, Asamushi, Yunoshima, Tsuchiya, Futago, Oshima, Asadokoro, Noheji, Ominato and Jogasawa.

Distribution: Japan, Korea and Kuriles.

Habitat: Very common on the rhizoids of algae and in the crevices of rocks.

109. *Panomya ampla* Dall (Pl. XII, Figs. 3, 4)

Japanese name: Chishima-gai

Panomya ampla Dall 1898, p. 883; Kira 1954, Pl. 61, Fig. 17.

Panomya turgida Dall 1916, p. 416.

Panomya nipponica Nomura et Hatai 1935, p. 20, Pl. 1, Figs. 7a, b.

This species is characterized by the mantle line which is discontinuous as in the preceding species. It is close to *Panopea japonica* (A. Adams) (Pl. XII, Figs. 12, 13) in the outline of the shell, but the latter species has the continuous mantle line with a deep sinus. The shell is variable in shape, but generally squarish, thick but fragile and broadly truncated and gaped at the posterior margin. The surface is ashy white, concentrically roughened and covered with a thick, blackish brown periostracum. Nomura and Hatai have reported an undetermined species of this genus from this bay; it might be this species.

Locality: Off Asamushi and Yunoshima.

Distribution: Northern Honshu, Hokkaido, Kuriles to Puget Sound and Washington through Aleutians.

Habitat: Muddy bottom in shallow waters. Uncommon in this bay.

Superfamily MYACEA

Family CORBULIDAE

110. *Anisocorbula venusta* (Gould) (Pl. XII, Fig. 11)

Japanese name: Kuchibenide

Corbula venusta Gould 1861, p. 25; Nomura et Hatai 1932, p. 8.

Anisocorbula venusta Habe 1949, p. 3, Pl. 1, Fig. 16.

This has a rather small, but solid shell, the right valve is larger than the left and tightly embraces the latter by the overlapping ventral margin. The surface marks distantly placed concentric ridges and is truncated at the posterior end. The color is dully white to red.

Locality: Off Kugurizaka, Asamushi, Yunoshima, Futago and Noheji.

Distribution: Kyushu, Shikoku, Honshu and Southern Hokkaido.

Habitat: Commonly found on sandy bottom in shallow waters.

111. *Potamocorbula amurensis* (Schrenck) (Pl. XII, Figs. 14, 15)

Japanese name: Numa-kodaki-gai

Corbula amurensis Schrenck 1862, p. 412.

Corbula amplexa A. Adams 1862, p. 233.

Corbula frequens Yokoyama 1922, p. 123, Pl. 6, Figs. 16, 17.

Corbula pustulosa Yokoyama 1922, p. 123, Pl. 6, Fig. 18.

Corbula sematensis Yokoyama 1922, p. 124, Pl. 6, Fig. 19.

Corbula vladivostokensis Bartsch 1929, p. 133, Pl. 2, Figs. 1-7.

Potamocorbula amurensis Kira 1954, Pl. 61, Fig. 18.

This is a very interesting species which is widely distributed in Japan down to Hanshin District in the Pleistocene Period and now is restricted to Kugurizaka in this bay and Takahoko-numa of Aomori Prefecture, the northernmost part of Honshu, and several localities in Hokkaido. The shell is dully white, solid and covered with a thick and rough periostracum. The ventral margin of the right valve overlaps that of the left.

Locality: Off Kugurizaka.

Distribution: China, Korea, Siberia, Hokkaido and Northern Honshu.

Habitat: Muddy bottom of brackish waters.

Family MYIDAE (MYACIDAE)

112. *Mya (Arenomya) japonica* Jay (Pl. XII, Fig. 24)

Japanese name: Kitano-ono-gai (new name)

Mya japonica Jay 1857, p. 293, Pl. 1, Fig. 7; Habe 1955, p. 22, Pl. 7, Fig. 12.

Mya arenaria japonica Takatsuki 1927, p. 26.

Mya arenaria Nomura et Hatai 1932, p. 8.

Mya intermedia Nomura et Hatai 1932, p. 8.

According to the critical observations of Fujie (1957), *Mya japonica* Jay and *Mya japonica oonogai* Makiyama (Pl. XII, Fig. 18) are to be reckoned as two varietal forms of one species based upon the feature of chondrophore. The real *japonica* has a thick shell with the obtusely truncated posterior end, while its variety *oonogai* has a thin shell which tapers toward the posterior end. The former form is found only in the Northern Japan and the latter is distributed widely all over Japan. *Mya truncata* Linné (Pl. XIII, Figs. 16, 17) populates the Northern Japan.

Locality: Aburakawa, Nonai, Kugurizaka, Yunoshima, Gomejima, Moura, Futago, Oshima, Noheji and St. 4.

Distribution: Japan, Kuriles, Saghalien and Korea.

Habitat: A mud dweller at the lower intertidal zone of bays.

113. *Cryptomya busoensis* Yokoyama (Pl. XI, Figs. 5, 6)

Japanese name: Hime-masuo

Cryptomya busoensis Yokoyama 1922, p. 126, Pl. 7, Figs. 1, 2; Nomura et Hatai 1932, p. 8.

The shell is small and dully white. The left valve has a projecting large chondrophore and is obliquely truncated at the posterior end. The mantle line without a sinus.

Locality: Off Ushirogata, Kugurizaka, Asamushi, Yunoshima, Gomejima, Futago and Kominato.

Distribution: Honshu and Hokkaido.

Habitat: Commonly dredged from muddy bottom of shallow waters.

Superfamily PHOLADACEA (ADESMACEA)

Family PHOLADIDAE

114. *Barnea (Anchomasa) manilensis inornata* (Pilsbry) (Pl. XII, Fig. 5)

Japanese name: Nio-gai

Pholas manilensis inornata Pilsbry 1895, p. 116.

Barnea fragilis Takatsuki 1927, p. 27; Nomura et Hatai 1932, p. 8.

Barnea inornata Is. Taki 1951, Pl. 54, Fig. 1.

Barnea (Anchomasa) manilensis inornata Habe 1955, p. 24, Pl. 7, Fig. 4.

This is a boring bivalve of mud-stone. The shell is elongate, thin, fragile and white and with scaly radial ribs on the anterior half of the surface. The anterior end of the conjoined valves is widely gaped and a shelly lanceolate accessory plate or protoplax is over the hinge area which is composed of the reflection of the antero-dorsal margin. The internal blade or apophysis under the beak is long and narrow as a toothpick. The varietal form *inornata* does not differ from the *manilensis* by the existence of all kinds of transitional forms found in many specimens from various localities in Japan, the size of shell decreasing gradually from Ryukyus to Hokkaido. The allied form *Zirfaea subconstricta* (Yokoyama) is characterized by a narrow radial indented groove which divides the surface into two areas. The anterior area has scaly growth lines and the posterior has only coarse growth lines.

Locality: Kanita, Asamushi and Tsuchiya.

Distribution: Kyushu to Hokkaido (*inornata*) and the Philippines to Ryukyus (*manilensis*).

Habitat: Common in intertidal zones, boring clay or soft rock.

115. *Pholadidea (Penitella) kamakurensis* (Yokoyama) (Pl. XII, Figs. 6, 7)

Japanese name: Kamome-gai

Jouannetia kamakurensis Yokoyama 1922, p. 120, Pl. 6, Fig. 10.

Pholadidea penita Nomura et Hatai 1932, p. 8; Is. Taki 1951, Pl. 54, Fig. 4.

Pholadidea kamakurensis Is. Taki 1951, Pl. 54, Fig. 4; Kira 1954, Pl. 62, Fig. 18.

This species has been confused with the American *Ph. (P.) penita* (Conrad)

by various authors in Japan, but differs from the latter in having the narrow anterior area of the surface and the protoplax rounded posteriorly. *Ph. (P.) chishimana* Habe (Pl. XIII, Fig. 12) is closer to *Ph. (P.) penita* than *Ph. (P.) kamakurensis* in having a protoplax which is broadly angulated posteriorly and a rough periostracum on the posterior area of the surface. In this species the anterior gape is commonly closed by a white globose callus.

Locality: Asamushi and Tsuchiya.

Distribution: Kyushu, Shikoku, Honshu and Hokkaido.

Habitat: Commonly found boring in rocks and shale.

Family TEREDINIDAE

116. *Teredo japonica* Clessin (Pl. XI, Figs. 2-4)

Japanese name: Funakui-mushi

Teredo japonica Clessin 1893, p. 78; Is. Taki 1951, Pl. 54, Fig. 8.

Teredo sinensis Roch 1929, p. 13, Pl. 2, Fig. 11.

This is one of the well-known shipworms of Japan, which are agents of the destruction of wooden ships. The shell is globular, fragile and white and is divided into three parts. The anterior part triangular; the median large whose anterior area is crowded by finely denticulated riblets; and the posterior wing-shaped. The apophysis under the beak is narrow and flat, considerably long. The posterior part overlaps the median, forming a shelf on the interior. The shell is highly specialized owing to the boring life, but cannot be used as a reliable diagnostic character of specific value. The animal is very long and quite soft, protected by a thin calcareous tube which is secreted from the mantle as the wall of the furrow. The couple of pallet appear at the posterior end of the worm-like animal closing the end of the furrow. The pallet is a single paddle-shaped calcareous piece, the blade of which is deeply excavated at the top and is covered with a yellowish brown chitinous epidermis on the distal half. The stalk of pallet is shorter than the blade in length.

Locality: Aomori Harbor, Asamushi and Ominato.

Distribution: China, Korea, Japan and Saghalien.

Habitat: This wood-boring bivalve attacks the submarine wooden structures in the area of low salinity in bays.

117. *Teredo (Lyrodus) yatsui* Moll (Pl. XI, Fig. 1)

Japanese name: Yatsu-funakui-mushi

Teredo yatsui Moll 1929, p. 10, Pl. 1, Fig. 5.

Teredo (Lyrodus) hibicola Kuronuma 1931, p. 300, Pl. 8, Fig. 4, Pl. 9, Figs. 20-22.

Kuphus (Idioteredo) kiiensis Iw. Taki et Habe 1945, p. 115.

This is also one of the common shipworms in Japan. The pallet of this species

differs from that of the preceding species in having a narrow stalk longer than the oval blade which is surmounted with a horn-colored and excavated cup on the distal half. This is ovoviviparous.

Locality: Asamushi and Ominato.

Distribution: Kyushu, Shikoku, Honshu and Southern Hokkaido.

Habitat: This species lives together with the preceding one.

Subclass ANOMALODESMACEA

Order ANOMALOBANCHIA

Superfamily PANDORACEA

Family LYONSIIDAE

118. *Lyonsia ventricosa* Gould (Pl. XII, Fig. 8)

Japanese name: Sazanami-gai or Obikui

Lyonsia ventricosa Gould 1861, p. 23; Takatsuki 1927, p. 27.

Lyonsia rostrata Lischke 1874, p. 102, Pl. 9, Fig. 13.

Lyonsia praetenuis Dunker 1882, p. 10, Pl. 7, Fig. 13.

Lyonsia arenaria ventricosa Is. Taki 1951, Pl. 20, Fig. 3.

The shell is very thin, fragile, pearly white, and elongate transversely. The left valve is larger than the right. The anterior margin is obtuse and the posterior end is tapering. The surface with numerous weak radials from the umbo to the ventral margin. The white lithodesma is present under the hinge, connecting the right valve with the left.

Locality: Off Yunoshima and Moura.

Distribution: Kyushu to Hokkaido.

Habitat: Common in sandy-mud bottom in shallow waters. In the living specimen the shell glues sand grains to itself.

119. *Entodesma (Agriodesma) naviculoides* Yokoyama (Pl. XI, Figs. 10, 11)

Japanese name: Futo-obikui

Entodesma naviculoides Yokoyama 1922, p. 170, Pl. 6, Fig. 11; Kira 1954, Pl. 61, Fig. 21.

This shell is covered with a thick, rough and brown periostracum which easily flakes off when dry. The interior is brownish white and pearly. The hinge without teeth but with a large white lithodesma under the ligament. This species attains a length of about 70 mm in the fully grown specimen.

Locality: Off Kanita.

Distribution: Northern Honshu and Hokkaido.

Habitat: This species attaches to the rhizoids of *Sargassum* in shallow waters.

Superfamily LATERNULACEA

Family THRACIIDAE

120. *Thracia kakumana* (Yokoyama) (Pl. XII, Figs. 1, 2)

Japanese name: Suemono-gai

Tellina kakumana Yokoyama 1927, pp. 11, 177, Pl. 47, Fig. 14.

Thracia kakumana Kira 1954, Pl. 61, Fig. 24.

The shell is large and chalky white. The hind margin is broadly truncated. The surface is covered with minute granules. The right valve is larger and more inflate than the left, embracing the latter tightly, and is notched at the beak by the left valve. The ligament is external and the hinge without teeth but with a thick but narrow chondrophore behind the beak. The specimens from this bay and Onagawa Bay, Miyagi Prefecture, have a more inflate and thinner shell than those from Nemuro in Hokkaido which are the typical form. The right valve from Onagawa Bay measures 65 mm in length, 43.5 mm in height and 16.3 mm in breadth, but the right valve from Nemuro 68.8 mm in length, 55.5 mm in height and 16.0 mm in breadth.

Locality: Off Kanita, Ushirogata and Urata.

Distribution: Northern Honshu, Hokkaido, Saghalien and Korea.

Habitat: Uncommon in the muddy bottom in shallow waters. Nomura and Hatai have reported an undetermined thracid species in 1932 which seems to be either this species or the following. The fossil *Thracia pubescens* from Japan was the same as this species.

121. *Thracia (Trigonothracia) nomurai* subgen. et sp. nov.

(Pl. XII, Figs. 9, 10)

Japanese name: Nomura-suemono-gai

Shell is small, thin, fragile, trigonal, semitranslucent and light yellow in the living specimens but dully white in the dead specimens. The anterior margin broadly rounded and the posterior narrowly truncated, showing the *cuspidaria*-appearance. The left valve is smaller and flatter than the right, being tightly embraced by the latter. The surface is covered with minute granules all over and marks somewhat undulated growth lines, and moreover runs at an obtuse angle to the antero-ventral corner from the umbo which is oblique posteriorly, and a keel lies from the umbo to the postero-ventral corner, dividing the shortly rostrated postero-dorsal area. A small trigonal chondrophore is protruded from the toothless hinge behind the umbo. The umbo of the left valve is scarcely notched by the opposite valve. The mantle sinus is U-shaped but not deep.

Length 10.1 mm, height 7.6 mm, breadth 5.0 mm (type specimen).

Length 7.3 mm, height 6.0 mm, breadth 4.2 mm (paratype specimen).

Type locality: Off Kugurizaka.

Subgenus *Trigonothracia* nov.

Type species: *Thracia nomurai* nov.

This new subgenus is only applied to this new species so that the diagnosis is the same as the above description. This is very characteristic by a small trigonal chondrophore directed ventrally, by which this quite differs from other species of this genus.

The writers take pleasure in naming this new species in honor of Dr. Shichiroku Nomura who was formerly the Director of the Marine Biological Station of Asamushi.

Family LATERNULIDAE

122. *Laternula limicola* (Reeve) (Pl. XII, Fig. 23)

Japanese name: Sotoori-gai.

Anatina limicola Reeve 1863, sp. 27.

Anatina kamakurana Pilsbry 1905, p. 138, Pl. 3, Figs. 2, 3; Takatsuki 1927, p. 28; Nomura et Hatai 1932, p. 4.

Anatina peichiliensis Grabau et King 1928, p. 193, Pl. 7, Fig. 58.

Laternula limicola Kira 1954, Pl. 62, Fig. 12.

The shell is thin, oblong and dully white. The posterior end is gaped and rounded. The surface is covered with minute granules all over, and marks rough growth lines. The interior is pearly. The umbo is fissured and supported internally by an oblique plate which runs postwards. The hinge with a spoon-shaped chondrophore in each valve ends in front of the transverse lithodesma.

Locality: Asadokoro, Ominato and Sumichigai.

Distribution: China, Japan, Saghalien and Korea.

Habitat: In sandy-mud bottom in shallow waters. Common in this bay.

123. *Laternula (Laternulina) flexuosa* (Reeve) (Pl. XI, Figs. 8, 9)

Japanese name: Okina-gai

Anatina flexuosa Reeve 1863, sp. 2

Anatina japonica Lischke 1872, p. 107; Takatsuki 1927, p. 28.

Laternula japonica Nomura et Hatai 1932, p. 4; Is. Taki 1951, Pl. 20, Fig. 1.

Laternula (Laternulina) flexuosa Kira 1954, Pl. 62, Fig. 11.

This species is very close to the preceding species in the shell appearance but the former has a thinner pearly shell, under whose hinge the transverse lithodesma is missing and the posterior area is rostrated.

Locality: Asadokoro and off Yunoshima.

Distribution: Kyushu, Shikoku, Honshu and Korea.

Habitat: In sandy mud bottom from the low water to a depth of several fathoms.

EXPLANATION OF PLATE VI

- Figs. 1, 2. *Thyasira tokunagai* Kuroda et Habe ×3
 Figs. 3, 4. *Felaniella usta* (Gould) ×0.8
 Fig. 5. *Carditellopsis toneana* (Yokoyama) ×5
 Figs. 6, 7, 8. *Kellia subrotundata* (Dunker) ×3
 Fig. 9. *Turtonia minuta* (Fabricius) ×4
 Figs. 10, 11. *Phlyctiderma japonica* (Pilsbry)
 Figs. 12, 13. *Axinopsida subquadrata* (A. Adams) ×4
 Figs. 14, 15. *Jouannisiella cumingii* (Hanley)
 Figs. 16, 17. *Chama reflexa* Reeve
 Figs. 18, 19. *Sydorina yamakawai* (Yokoyama) ×5
 Figs. 20, 21. *Anisodonta gouldi* (A. Adams) ×4
 Figs. 22, 23. *Cyclocardia paucicostata* (Krause)
 Figs. 24, 25. *Lucinoma annulata* (Reeve)
 Figs. 26, 27. *Pillucina pisidium* (Dunker) ×4
 Figs. 28, 29. *Wallucina lamyi* Chavan ×3

EXPLANATION OF PLATE VII

- Figs. 1, 2. *Trapezium (Neotrapezium) liratum* (Reeve)
 Figs. 3, 4. *Lasaea undulata* (Gould) ×6
 Figs. 5, 6. *Irus metis* (Deshayes) ×1.5
 Figs. 7, 8. *Saxidomus purpuratus* (Sowerby) ×0.8
 Figs. 9, 10. *Protothaca (Novathaca) euglypta* (Sowerby)
 Figs. 11, 20. *Fulvia mutica* (Reeve)
 Fig. 12. *Claudiconcha monstrosa* (Gmelin)
 Fig. 13. *Claudiconcha japonica* (Dunker)
 Fig. 14. *Clementia vatheleti* Mabilie ×0.8
 Fig. 15. *Meretrix lusoria* (Roeding) ×0.8
 Fig. 16. *Callithaca (Protocallithaca) adamsi* (Reeve)
 Fig. 17. *Dosinia (Dosinella) angulosa* (Philippi)
 Figs. 18, 19. *Clinocardium uchidaei* Habe
 Fig. 21. *Clinocardium californiense* (Deshayes)

EXPLANATION OF PLATE VIII

- Figs. 1, 2. *Tapes (Amygdala) japonica* Deshayes
 Figs. 3, 4. *Protothaca jedoensis* (Lischke)
 Figs. 5, 6. *Dosinia (Phacosoma) japonica* (Reeve) ×0.8
 Figs. 7, 14. *Cyclina sinensis* (Gmelin) ×0.8
 Figs. 8, 9. *Callista brevisiphonata* (Carpenter) ×0.8
 Fig. 10. *Pharaonella pervieri* (Bertin)
 Fig. 11. *Solen (Solenarius) krusensterni* Schrenck ×0.8
 Figs. 12, 13. *Claudiconcha japonica* (Dunker)
 Figs. 15, 16. *Gomphina (Macridiscus) melanaegis* Roemer

EXPLANATION OF PLATE IX

- Figs. 1, 2. *Macoma (Rexithaerus) sector* Oyama
 Fig. 3. *Macoma incongrua* (v. Martens) $\times 1.5$
 Figs. 4, 5. *Sinomacoma* (gen. nov.) *yantaiensis* (Crosse et Debeaux) $\times 0.8$
 Figs. 6, 7. *Macoma takahokoensis* sp. nov. $\times 2$
 Fig. 8. *Jactellina (Loxoglypta) lauta* (Gould) $\times 2$
 Figs. 9, 10. *Moerella jodoensis* (Lischke) $\times 2$
 Fig. 11. *Fabulina minuta* (Lischke) $\times 2$
 Figs. 12, 13. *Macoma nipponica* Tokunaga
 Fig. 14. *Fabulina nitidula* (Dunker)
 Figs. 15, 16. *Cadella delta* (Yokoyama) $\times 3$
 Figs. 17, 19. *Macoma calcarea* (Gmelin)
 Figs. 18, 20. *Peronidia venulosa* (Schrenck) $\times 0.8$

EXPLANATION OF PLATE X

- Figs. 1, 2. *Macoma (Pseudometis) praerupta* (Salisbury) $\times 0.8$
 Figs. 3, 4. *Psammodonta kazusensis* (Yokoyama) $\times 0.8$
 Figs. 5, 6. *Mactra sulcataria* Reeve $\times 0.8$
 Fig. 7. *Moerella iridescens* (Benson) $\times 3$
 Fig. 8. *Moerella juvenilis* (Hanley) $\times 2$
 Figs. 9, 10. *Raeta (Raetellops) pulchella* (A. Adams et Reeve) $\times 2$
 Figs. 11, 12. *Spisula (Pseudocardium) sachalinensis* (Schrenck) $\times 0.8$
 Fig. 13. *Arcopagia (Merisca) diaphana* (Deshayes)
 Figs. 14, 15. *Caecella chinensis* Deshayes
 Fig. 16. *Peronidia lutea* (Wood)

EXPLANATION OF PLATE XI

- Fig. 1. *Teredo (Lyrodus) yatsui* Moll $\times 4$
 Figs. 2, 3, 4. *Teredo japonica* Clessin Fig. 2, $\times 4$; Figs. 3, 4, $\times 2.5$
 Figs. 5, 6. *Cryptomya busoensis* Yokoyama $\times 2$
 Fig. 7. *Solen strictus* Gould
 Figs. 8, 9. *Laternula (Laternulina) flexuosa* (Reeve) $\times 1.2$
 Figs. 10, 11. *Entodesma (Agriodesma) naviculoides* Yokoyama
 Figs. 12, 13. *Schizothaerus keenae* Kuroda et Habe $\times 1.2$

EXPLANATION OF PLATE XII

- Figs. 1, 2. *Thracia kakumana* (Yokoyama) $\times 0.8$
 Figs. 3, 4. *Panomya ampla* Dall $\times 0.8$
 Fig. 5. *Barnea (Anchomasa) manilensis inornata* (Pilsbry)
 Figs. 6, 7. *Pholadidea (Penitella) kamakurawensis* (Yokoyama)
 Fig. 8. *Lyonsia ventricosa* Gould
 Figs. 9, 10. *Thracia (Trigonothracia) nomurai* subgen. et sp. nov. $\times 2$
 Fig. 11. *Anisocorbula venusta* (Gould) $\times 3$
 Figs. 12, 13. *Panopea japonica* (A. Adams) $\times 2$
 Figs. 14, 15. *Potamocorbula amurensis* (Schrenck) $\times 1.5$
 Figs. 16, 17. *Hiatella orientalis* (Yokoyama) $\times 2$
 Fig. 18. *Mya (Arenomya) japonica oonogai* Makiyama
 Fig. 19. *Nipponomysella* (gen. nov.) *oblongata* (Yokoyama) $\times 3$
 Fig. 20. *Cardita leana* Dunker $\times 1.5$
 Figs. 21, 22. *Montacutona mutsuwanensis* gen. et sp. nov. $\times 4$
 Fig. 23. *Laternula limicola* (Reeve) $\times 1.5$
 Fig. 24. *Mya (Arenomya) japonica* Jay $\times 0.8$

EXPLANATION OF PLATE XIII

- Fig. 1. *Cardita nodulosa* Lamarck $\times 1.5$
 Fig. 2. *Caecella lubrica* (Gould) $\times 1.5$
 Fig. 3. *Anisodonta reclusii* (A. Adams) $\times 1.5$
 Fig. 4. *Fronsella fujitaniiana* (Yokoyama) $\times 3$
 Figs. 5, 6. *Siliqua alta* (Broderip et Sowerby)
 Figs. 7, 8. *Jouanisiella tsuchii* sp. nov. $\times 2$
 Fig. 8. *Spisula (Mactromeris) voyi* Gabb
 Figs. 10, 11. *Alveolus ojanus* (Yokoyama) $\times 7$
 Fig. 12. *Pholadidea (Penitella) chishimana* Habe
 Fig. 13. *Nuttallia ezonis* Kuroda et Habe
 Fig. 14. *Peronidia zyonoensis* (Hatai et Nisiyama)
 Fig. 15. *Theora lubrica* Gould $\times 0.5$
 Figs. 16, 17. *Mya truncata* Linné

EXPLANATION OF PLATE XIV

- Fig. 1. *Anodontia stearnsiana* (Oyama) $\times 0.8$
 Fig. 2. *Macoma calcarea* (Gmelin) $\times 0.8$
 Fig. 3. *Meretrix lusoria* (Roeding) $\times 0.8$
 Fig. 4. *Meretrix lamarcki* Deshayes $\times 0.8$
 Figs. 5, 6. *Macoma nasuta* Conrad
 Figs. 7, 8, 22. *Macoma (Heteromacoma) contabulata* (Deshayes)
 Figs. 9, 10, 11. *Macoma tokyoensis* Makiyama
 Fig. 12. *Arcopagia (Merisca) diaphana* (Deshayes) $\times 0.8$
 Fig. 13. *Arcopagia (Merisca) subtruncata* (Hanley) $\times 0.8$
 Figs. 14, 15. *Macoma (Heteromacoma) irus* (Hanley)
 Fig. 16. *Nuttallia japonica* (Reeve) $\times 0.8$
 Fig. 17. *Nuttallia ezonis* Kuroda et Habe $\times 0.8$
 Fig. 18. *Nuttallia olivacea* (Jay) $\times 0.8$
 Fig. 19. *Cyclocardia ferruginea* (Clessin) $\times 0.8$
 Fig. 20. *Arcopagia (Merisca) tokunagai* Ikebe $\times 0.8$
 Fig. 21. *Fulvia mutica* (Reeve) $\times 0.8$
 Fig. 23. *Psammocola californica* (Conrad) $\times 0.8$
 Fig. 24. *Arcopagia (Merisca) margaritina* (Lamarck) $\times 0.8$
 Figs. 25, 26. *Macoma incongrua* (v. Martens) $\times 0.8$

















