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Jirô MAKIYAMA

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<i>Pododesmus (Monia) egregius</i>	51—10
<i>Pododesmus (Monia) macroschismus</i>	47—7, 8
Portlandia (Megayoldia) gratiosa	33—13
<i>Portlandia (Megayoldia) scapha</i>	42—7~11
<i>Portlandia (Megayoldia) thraciaeformis</i>	42—7~11
Propeamussium clancularium	53—7~11
<i>Propebela (Turritoma) angulata</i>	46—2
Propebela (Turritoma) candita	46—1, 2
<i>Propebela candita</i>	46—1
Propebela ? ozawai	44—8
<i>Protothaca sp.</i>	51—5
<i>Psammobia commoda</i>	27—2
<i>Psammobia oriens</i>	55—6
<i>Pseudamiantis oyuna</i>	53—5
Pseudoliotia micans	44—23
<i>Pseudomelatoma ? ogurana gracilis</i>	44—7

Pseudorhaphitoma ishiiana	55—2
<i>Pteromeris</i> (<i>Miodontiscus</i>) <i>nakamurai</i>	48—3
<i>Putilla</i> (<i>Pseudosetia</i>) <i>dharmia</i>	45—9
Pyrene fratercula	55—3

R

<i>Rectiplanes sactioannis</i>	44—3
<i>Rissoa</i> (<i>Alvania</i>) <i>akibai</i>	46—3
<i>Rissoa</i> (<i>Persephona</i>) <i>asura</i>	45—15
<i>Rissoa</i> (<i>Apicularia</i> ?) <i>asura</i>	45—15
<i>Rissoa</i> (<i>Cingula</i>) <i>dharmia</i>	45—9
<i>Rissoa</i> (<i>Alvania</i>) <i>lusoria</i>	45—18
<i>Rissoa</i> (<i>Alvania</i>) <i>maya</i>	44—24, 25
<i>Rissoa</i> (<i>Cingula</i>) <i>mundana</i>	45—11
<i>Rissoa</i> (<i>Apicularia</i>) <i>sadoensis</i>	45—12
<i>Rissoa</i> (<i>Alvania</i>) <i>sitta</i>	45—13
Rissoina fortunata	45—10
Rissoina (<i>Moerchiella</i>) <i>japonica</i>	46—12
<i>Rissoina</i> (<i>Zebina</i>) <i>occulta</i>	46—12
<i>Rissoina</i> (<i>Morchiella</i>) <i>sawanensis</i>	46—7
Rissoina tabatai	45—14

S

<i>Sanguinolaria</i> (<i>Nuttallia</i>) <i>commoda</i>	27—2
Sanguinolaria minoensis	39—13~16
Sanguinolaria (<i>Nuttallia</i>) <i>petri commoda</i>	27—2
Searlesia japonica	44—22
<i>Seila crassincincta</i>	49—11
<i>Serpulorbis shinanoensis</i>	25—10
Serripes aff. <i>groelandicus</i>	41—3
<i>Serripes</i> sp.	32—12, 13
<i>Sigaretus festivus</i>	25—6
Siogamaia clandestina	50—23, 24
Siphonacmea angustitesta	46—10
<i>Siphonacmea angustilesta</i>	46—14
Siphonacmea oblongata	46—14
Siphonalia declivis	50—19~21
Siphonodentalium (<i>Pulsellum</i>) <i>ozawai</i>	46—11
Solamen fornicatum	39—8, 9
<i>Solariella nipponensis</i>	45—16
<i>Soletellina minoensis</i>	39—13~16
<i>Soletellina</i> (<i>Nuttallia</i>) <i>petri</i>	27—2
<i>Solidicorbula erythron</i>	53—3
Spirotropis subdeclivis	50—8; 54—4
<i>Spisula grayana</i>	28—3
<i>Spisula</i> (<i>Macromeris</i>) <i>polynyma alaskana</i>	28—3
Spisula polynyma voyi	28—3

Spisula sachalinensis	28—5
<i>Surculites</i>	44—5

T

Tachyrhynchus yanamii	47—4
Tallorbis ornatissima	55—7, 8
<i>Tapes</i> sp.	32—10
<i>Taras tokunagai</i>	33—15, 16
Tectura asmiiformis	46—15
Tegula rustica	55—10
<i>Tellina optiva</i>	33—4, 5; 41—2
<i>Terebra asukana</i>	50—3
Terebra asukensis	50—3
Terebra (<i>Hastula</i>) <i>dainichiana</i>	50—4, 5
<i>Terebra dainichiana</i>	50—4, 5
Terebra eminula	32—1
Terebra ozawai	50—9
Terebra cf. <i>subtextilis</i>	50—2
Terebra triseriata	50—1
<i>Terebratalia excelsa</i>	25—9
Terebratalia gouldii	49—4
Terebratalia yokoyamai	25—9
<i>Terebratella excelsa</i>	25—9
Terebratella frontalis	48—5
Terebratulina japonica	33—6, 7
Thracia kamayashikiensis	27—4
<i>Thracia pubescens</i>	27—4
Thyasira bisecta ..33—1, 2; 42—12; 47—2, 3	
<i>Thyasira bisecta nipponica</i>	42—12
Thyasira ozawai	48—4
<i>Thyasira rotundata</i>	56—9, 13
<i>Tornatina yamakawai</i>	44—1
Trachycardium angustum	28—2
Trachycardium burchardi	37—3, 4
Trachycardium aff. <i>elongatum</i>	40—5
Trachycardium shiobarensense	38—2~5
<i>Tricolia tristis</i>	49—7
<i>Tridonta borealis</i>	49—2, 3
Trigonostoma kurodai	50—10
<i>Triton tenuiliratus</i>	53—14
<i>Trochus</i> sp.	32—4
<i>Trophon acharya</i>	44—14
<i>Trophon solitarius</i>	25—1, 2
<i>Trophon suborpheus</i>	44—18
Trophonopsis acharya	44—14
Trophonopsis (<i>Borectrophon</i>) <i>solitarius</i>	25—1, 2
<i>Trophonopsis suborpheus</i>	44—18
Trophonopsis uyemurai	41—4
<i>Turbo kalavinkum</i>	45—19

<i>Turbonilla (Mormula) chitaniana</i>	56—7
Turbonilla (Chemnitzia) fusoensis	46—6
<i>Turbonilla ? martensi</i>	56—7
<i>Turbonilla (Cingulina) morsei</i>	45—17
<i>Turbonilla (Cingulina) pseudocingulata</i> ..	47—1
<i>Turbonilla (Tragula) spinulosa</i>	47—5
<i>Turbonilla (Pyrgiscus) yanamii</i>	47—4
<i>Turricula shimomatana</i>	50—6, 7
Turricula sp.	50—22
<i>Turritella kiiensis</i>	51—3, 4
Turritella perterebra	51—3, 4
<i>Turritella saishuensis</i>	56—4, 5
<i>Turritella (Neohaustator) saishuensis</i> ..	56—4, 5
Turritella saishuensis etigoensis	56—4, 5
Turritellopsis acicula stimpsoni	45—17

U

<i>Urosalpinx birileffi</i>	53—16
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V

<i>Vasticardium burchardi</i>	37—3, 4
<i>Vasticardium otukai</i>	32—9
<i>Venericardia nakamurai</i>	48—3
Venericardia panda	51—1, 2
Venericardia (Miodontiscus) prolongata ..	48—3
<i>Venericardia prolongata</i>	48—3
Venericardia subnipponica	32—6

<i>Venericardia tokunagai</i>	39—17, 18
<i>Venericardia</i> sp.	32—6
<i>Venerupis</i> sp.	51—5
<i>Venus (Ventricola) foveolata</i>	51—7~9
<i>Venus ozawai</i>	51—5
<i>Venus</i> sp.	33—12
Ventricoloidea foveolata	51—7~9; 54—3
<i>Vermetus shinanoensis</i>	25—10
<i>Vicarya baculum</i>	39—4~6
<i>Vicarya callosa martini</i>	39—4~6
Vicarya vernuilli yokoyamai	39—4~6
Vicaryella ishiiiana	39—11, 12
Volsella difficilis	26—2
<i>Voluta hirugayensis</i>	50—16
<i>Voluta megaspira</i>	40—1
<i>Voluta megaspira striata</i>	32—2, 3; 40—1

Y

Yoldia ensicula	34—6
<i>Yoldia gratiosa</i>	33—13
<i>Yoldia kikuchii</i>	43—4
Yoldia sagittaria	43—4
<i>Yoldia scapha</i>	42—7~11; 47—6
Yoldia thraciaeformis	42—7~11
<i>Yoldia thraciaeformis</i>	47—6

Z

Zebina (Moerchiella ?) sawanensis	46—7
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Corrigenda for Part 1.

From “**Macoma optiva gratiosa**” in index, p. 2, “**gratiosa**” is scraped out.

Plate 3: add “8” after “1”, before “**Aturia**”.

Plate 7: for “see p. 40” (second line of f. 11) read “see pl. 20, f. 5”.

Plate 21: for “See p. 26”, (in the line of f. 5) read “See pl. 13, f. 2”.

Plate 24: for “**iwakianus**” (second line of f. 12) read “**iwakiana**”.

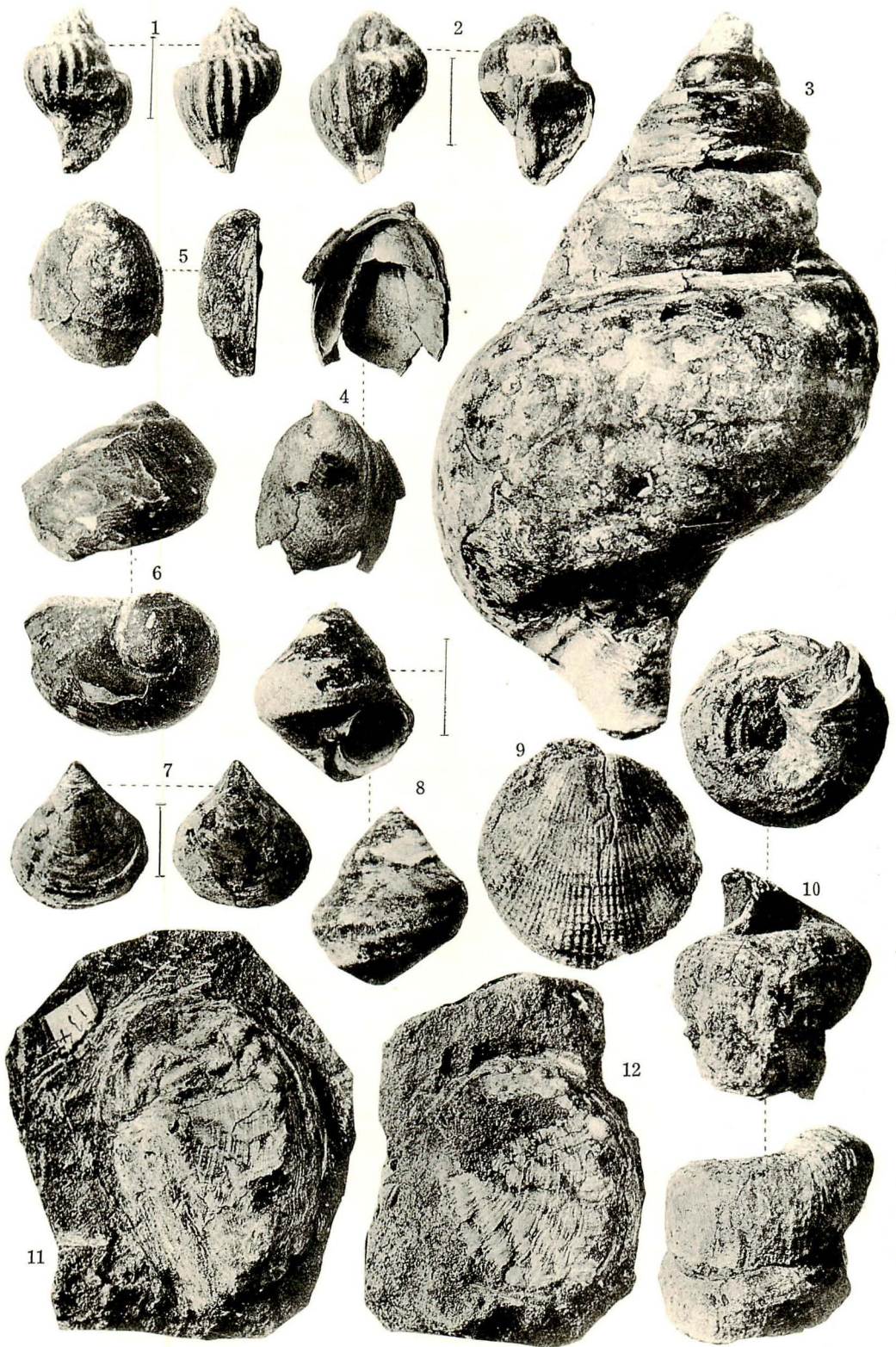
PLATE 25.

- 1, 2. *Trophon solitarius* YOKOYAMA, 1925 (IX, 6, n. sp.). Shigarami. *Neptunea solitaria*, KURODA, 1931; **Trophonopsis** (*Boreotrophon*) **solitarius** YOK., *fide* H. & N., 1952.
3. *Chrysodomus despectus* (LINNÉ), (IX, 5). Shigarami. **Neptunea modesta** (KURODA, 1931).
- 4, 5. **Crepidula navia** YOKOYAMA, 1925 (IX, 7, n. sp.). Shigarami.
6. *Sigaretus festivus* YOKOYAMA, 1925 (IX, 8, n. sp.). Shigarami. **Eunaticina festiva** YOK., KURODA, 1931.
7. *Hemithyris psittacea* (CHEMNITZ) var. *woodwardi* (A. ADAMS, 1863), (IX, 22). Shigami. **Hemithyris psittacea woodwardi**.
8. *Leptothyra sakaensis* YOKOYAMA, 1925 (IX, 8, n. sp.). Sakae. *Littorivaga brevicula* (PHILIPPI, 1845), KURODA, 1931; **Littorina sakaensis** (YOK.), *fide* KURODA, orally.
9. *Terebratella excelsa* YOKOYAMA, 1923 (IX, 21). Shigarami. **Terebratalia yokoyamai** MAKIYAMA, 1927, not *T. excelsa* from Saishu, see Pt. 1, pl. 4, f. 3, 4.
10. *Vermetus shinanoensis* YOKOYAMA, 1925 (IX, 6, n. sp.). Shigarami. **Serpulorbis shinanoensis** (YOK.).
- 11, 12. *Haliotis gigantea* CHEMNITZ var. *kamtschatkana* JONAS, 1845 (IX, 8). Shigarami. *H. kamtschatkana koyamzi* MAKIYAMA, 1927; *H. discus hannai* INO, 1952; **Haliotis discus koyamai** MAK.

Remarks.

Geography—Shigarami: Shimosoyama in Shigarami, Nagano Pref. 36°40' N, 139°07' E. Sakae: See "Ikari" and "Hitaka".

Stratigraphy—Shigarami: Shigarami Pliocene. Sakae: Ogawa Miocene.



IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 26.

1. **Mytilus grayana** DUNKER, 1853 (IX, 15). Ikari, Sakae. Subgenus: *Crenomytilus*, *fide* H. & N., 1952; see Pt. 1, pl. 17, f. 10.
2. *Modiola modiolus* LINNÉ, 1758 (IX, 15). Nakajō, Sakae. **Volsella difficilis** KURODA & HABE, 1950, non DESHAYES, 1863.
3. *Anomia densicostulata* YOKOYAMA, 1925 (IX, 16, n. sp.). Shigarami. *Monia macroschisma*, *fide* H. & N., 1952; **Monia macrochisma** (DESHAYES, 1850), see pl. 47, f. 7, 8.
4. *Pecten turpiculus* YOKOYAMA, 1925 (IX, 18, n. sp.). Shigarami. **Chlamys** (*Swiftopecten*) **swifftii turpicula** YOK., *fide* H. & N., 1952.
5. *Acmaea schrencki* LISCHKE, 1869 (IX, 9). Shigarami. *Notoacmaea schrenckii*, *fide* H. & N., 1952; **Notoacmea schrenckii** (LISCHKE), *fide* K. & H., 1952.
6. *Buccinum leucostoma* LISCHKE, 1872 (IX, 5). Hitaka, Sakae. *Beringius mitsuchii* KANEHARA, 1937; **Ancistrolepis mitsuchii** (KANEHARA), *fide* H. & N., 1952.
7. *Pectunculus minochiensis* YOKOYAMA, 1925 (IX, 21, n. sp.). Togakushi. **Glycymeris minochiensis** (YOK.).

Remarks.

Geography—Ikari: right bank of the Dōjiri-gawa, south of Ikari in Sakae, Kami-Minochi, Nagano Pref., 36°36' N, 138°04' E.

Nakajō: Nakajō in Sakae, about 02' east of Ikari.

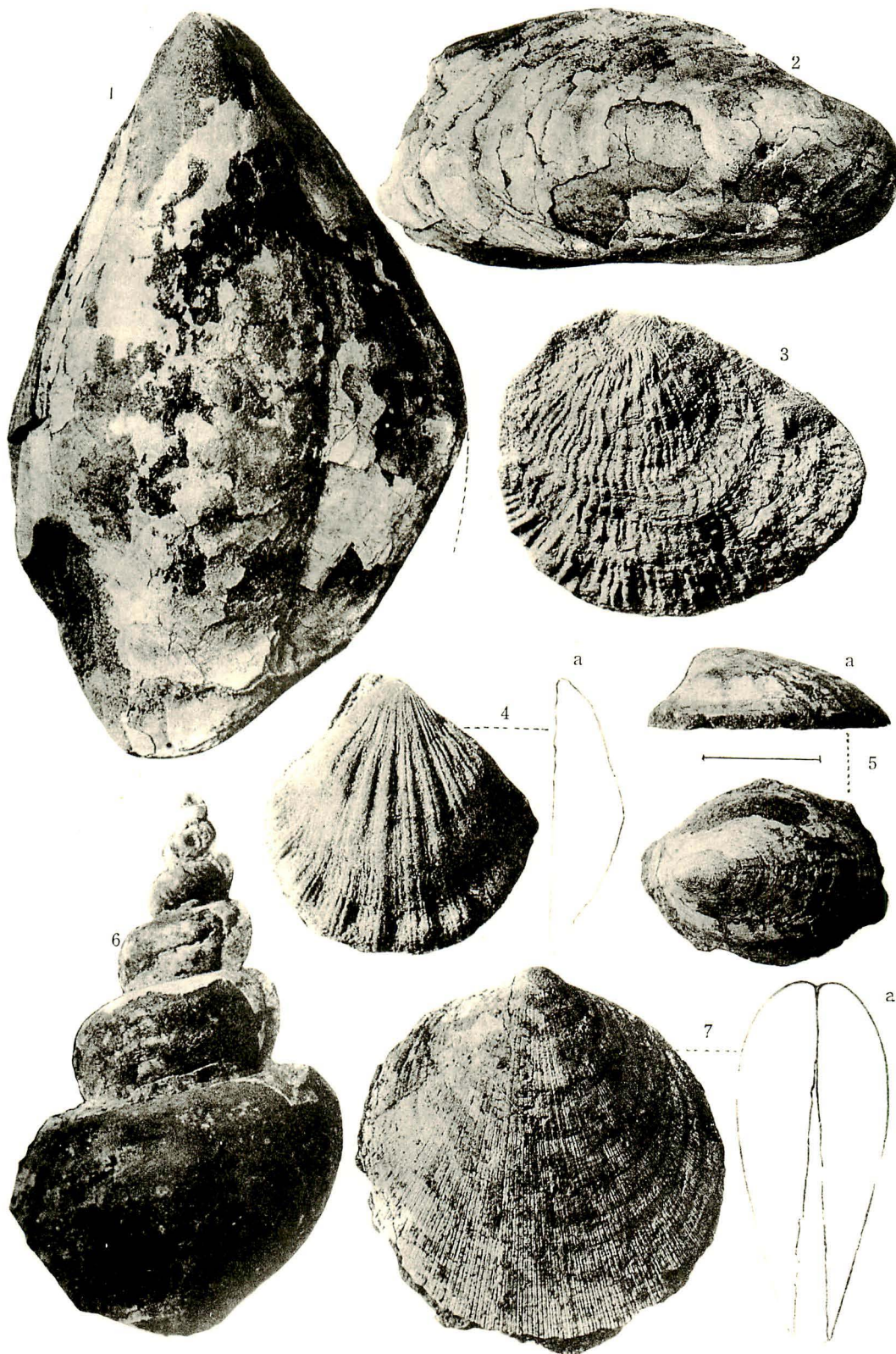
Hitaka: wayside exposure 200 m west of entrance of path in Sakae, halfway between the above two localities.

Togakushi: exact place unknown, elsewhere around the village.

Shigarami: loc. cit.

Stratigraphy—All localities in Sakae: Ogawa Miocene.

Togakushi and Shigarami: Shigarami Pliocene.



IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 27.

1. *Cucullaea longissima* YOKOYAMA, 1925 (IX, 20, n. sp.). Shigarami. ***Calypptogena longissima*** (YOK.), *fide* H. & N., 1952.
2. *Psammobia commoda* YOKOYAMA, 1925 (IX, 12, n. sp.). Togakushi. *Sanguinolaria (Nuttallia) commoda*, KURODA, 1927; *Soletellina (Nuttallia) petri* BARTSCH, 1929 var. ?, *fide* H. & N., 1952; ***Sanguinolaria (Nuttallia) petri commoda*** (YOK.).
3. *Mya arenaria* LINNÉ var. *japonica* JAY, 1857 (IX, 10). Hitaka, Sakae. ***Mya (Arenomya) oōnogai*** MAKIYAMA, 1935.
4. *Thracia pubescens* PULTENEY, 1799 (IX, 15). Shigarami. ***Thracia kamayashikiensis*** HATAI, 1940, *fide* H. & N., 1952.

Remarks.

Geography—Hitaka: see remarks on pl. 26.
Shigarami and Togakushi: loc. cit.



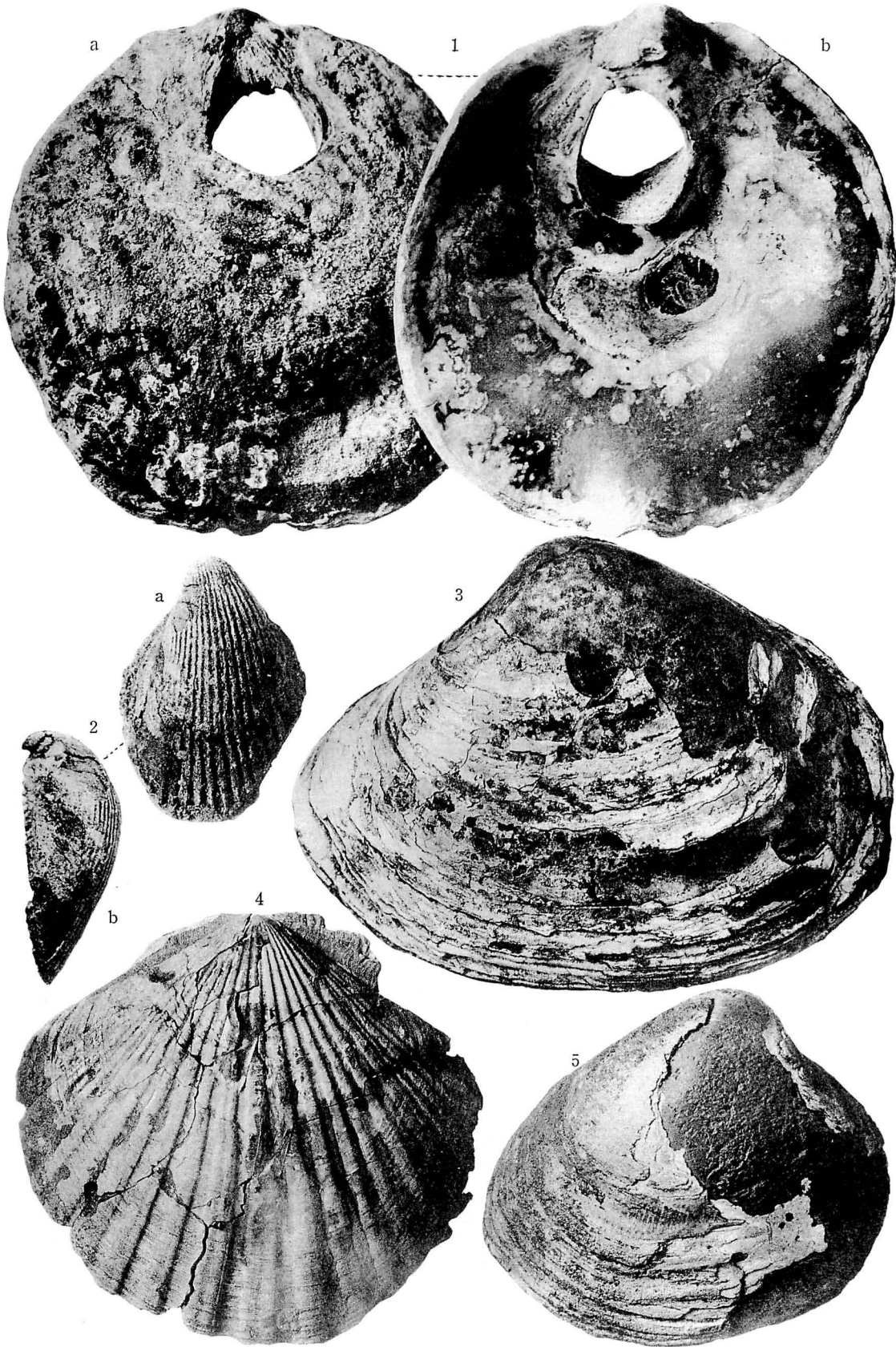
IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 28.

1. *Placuanomia ingens* YOKOYAMA, 1925 (IX, 16, n. sp.). Shigarami. **Monia macrochisma** (DESHAYES, 1836), see pl. 26, f. 3.
2. *Cardium angustum* YOKOYAMA, 1925 (IX, 13, n. sp.). Shigarami. *Cardium* (*Laevicardium*) *angustum*, KURODA, 1931; *Laevicardium* (*Trachicardium*) *angustum* YOK., *fide* H. & N., 1952; 1952; **Trachycadium angustum** (YOK).
3. *Spisula grayana* SCHRENCK, 1868 (IX, 11). Sakae. *Spisula* (*Mactromeris*) *polynyma alaskana* DALL, 1894, *fide* KURODA, 1931; **Spisula polynyma voyi** (GABB, 1866), *fide* KURODA, verbally.
4. **Pecten yessoensis** JAY, 1857 (IX, 17). Ikari, Sakae. *Patinopecten* auct.
5. *Mactra semmiana* YOKOYAMA, 1925 (IX, 11, n. sp.). Semmi, Mima. **Spisula sachalinensis** (SCHRENCK, 1861), *fide* KURODA, 1931.

Remarks.

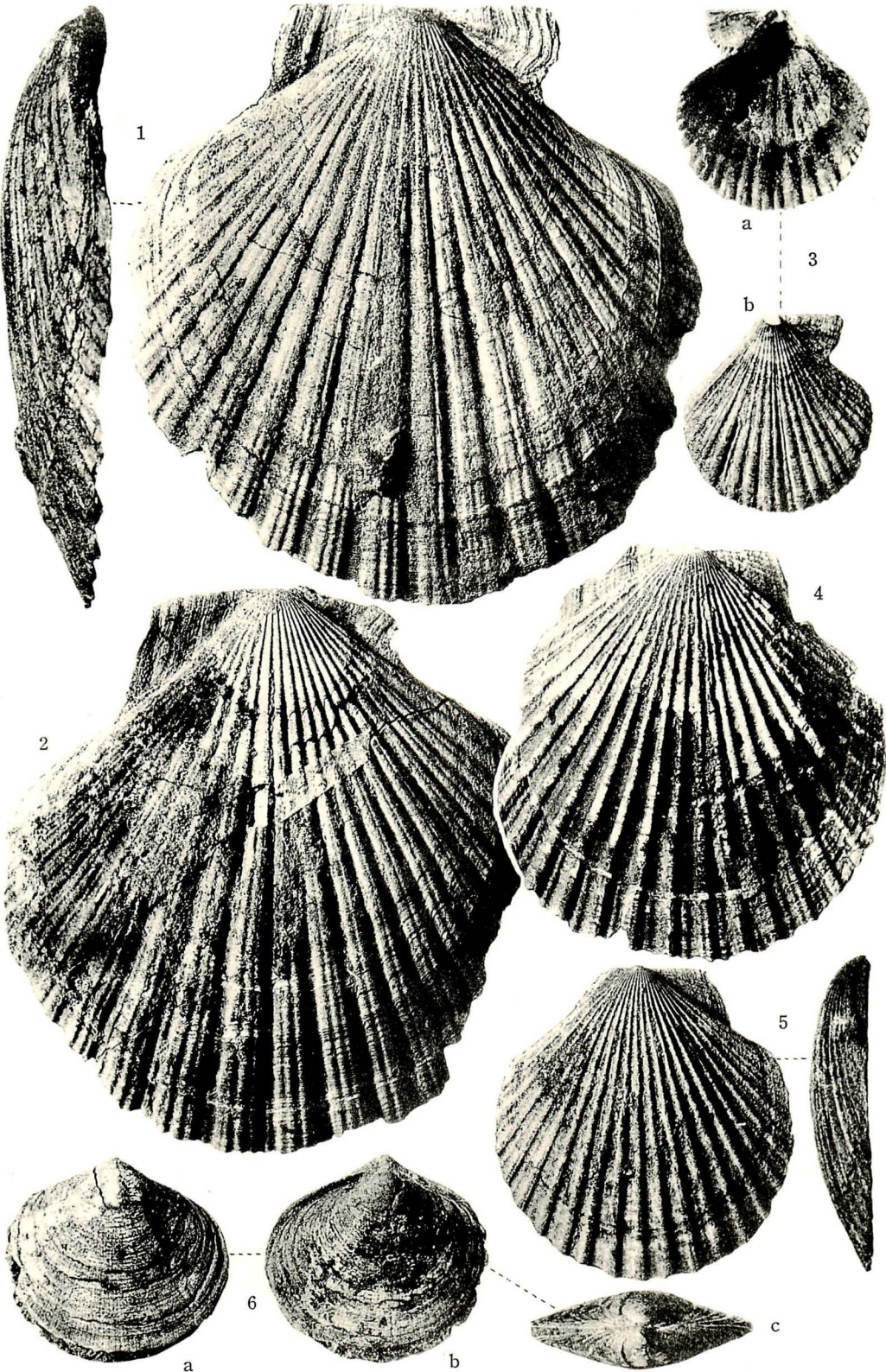
Geography and Stratigraphy—Semmi: valley of Nakanosawa, 500 m southeast of Semmi in Miasa, North Azumi, Nagano Pref., 38°35' N, 137°55' E, Ogawa Miocene.



IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 29.

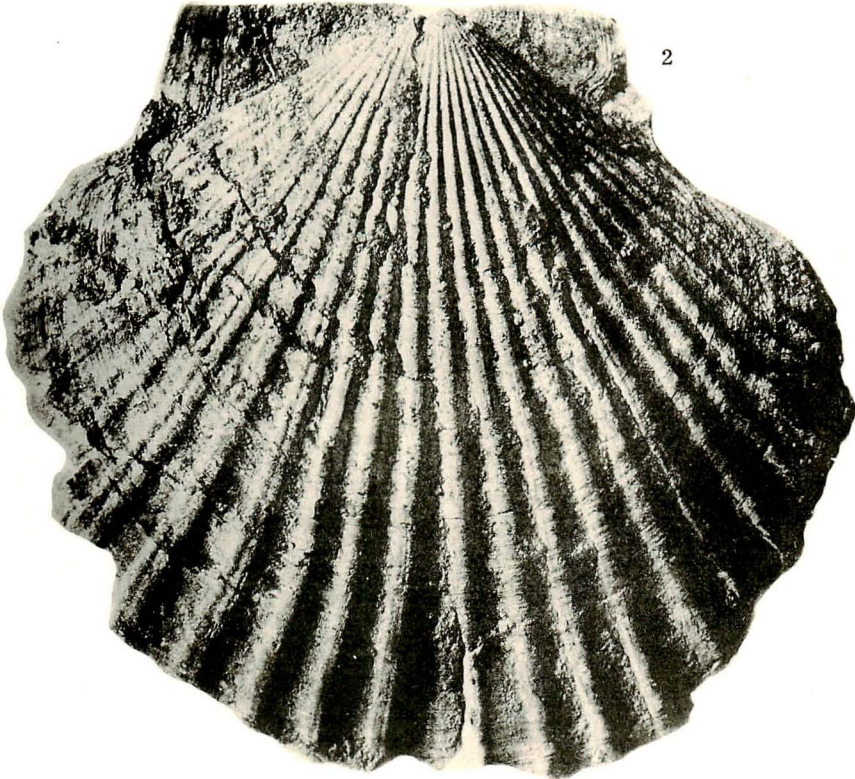
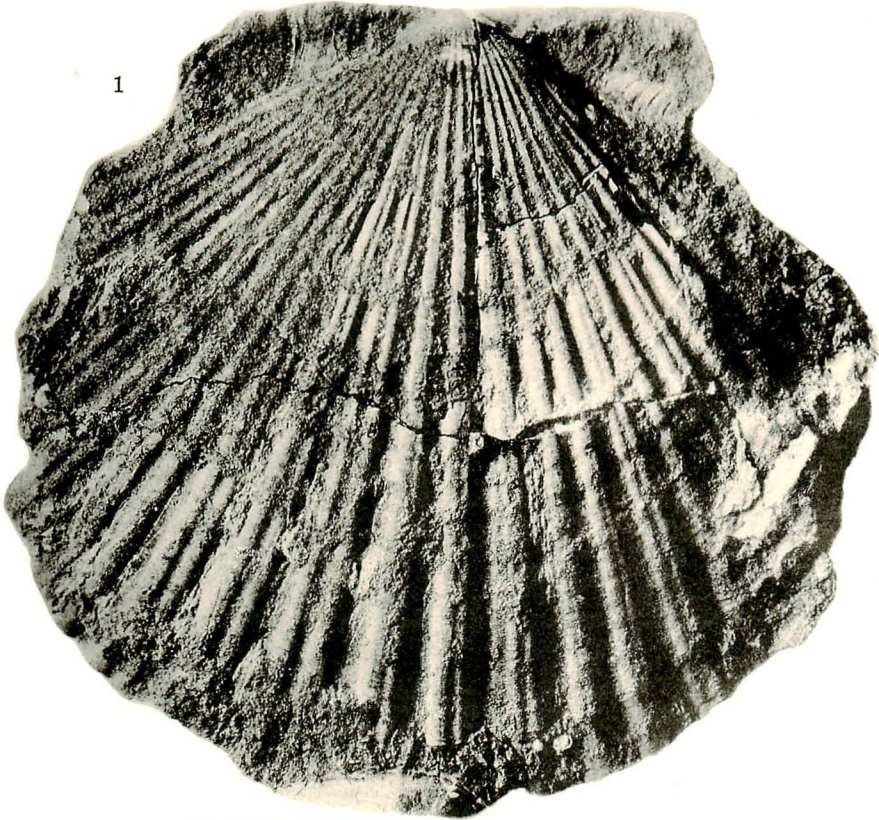
- 1, 2, 4, 5. *Pecten yamasakii* YOKOYAMA, 1925 (IX, 17, n. sp.). Shigarami. **Pecten** (*Patinopecten*) **healeyi yamasakii** YOK.
3. *Pecten insolitus* YOKOYAMA, 1925 (IX, 18, n. sp.). Shigarami. **Chlamys insolita** (YOK.).
6. *Pectunculus yamasakii* YOKOYAMA, 1925 (IX, 20, n. sp., typ. error: *yemasakii*). Shigarami. **Glycymeris yamasakii** (YOK.).



IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 30.

- 1, 2. *Pecten tryblum* YOKOYAMA, 1925 (IX, 17, n. sp.). Shigarami. **Pecten** (*Patinopecten*) **try-**
blium YOK.

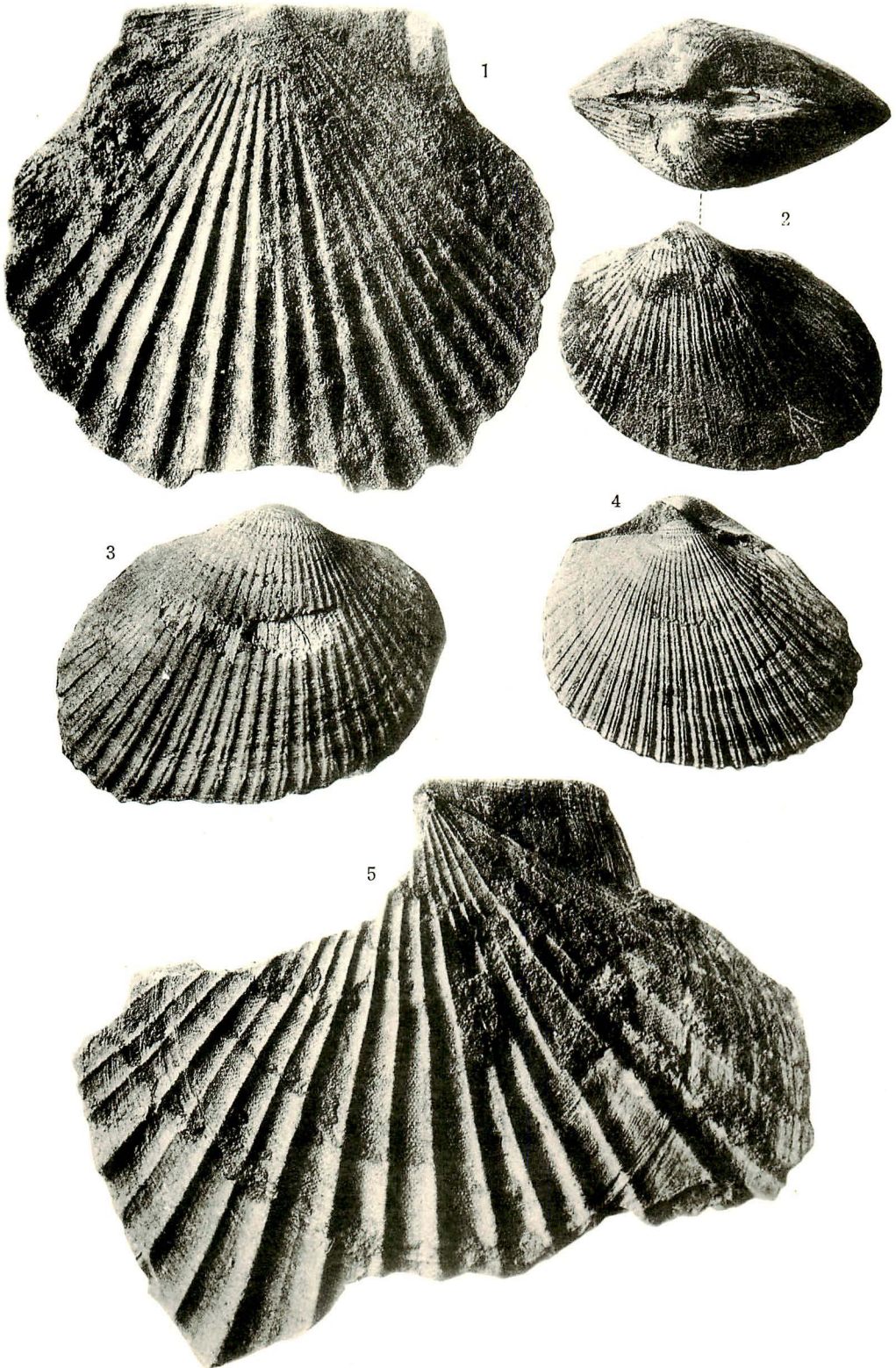


IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 31.

1, 5. **Pecten tryblium** YOKOYAMA, see pl. 30. Shigarami.

2, 3, 4. *Arca amicula* YOKOYAMA, 1925 (IX, 19, n. sp.). Sakae. *Anadara (Diluvarca) amicula* (YOK.), MAKIYAMA, 1927; **Anadara amicula** (YOK.), *fide* H. & N., 1952.



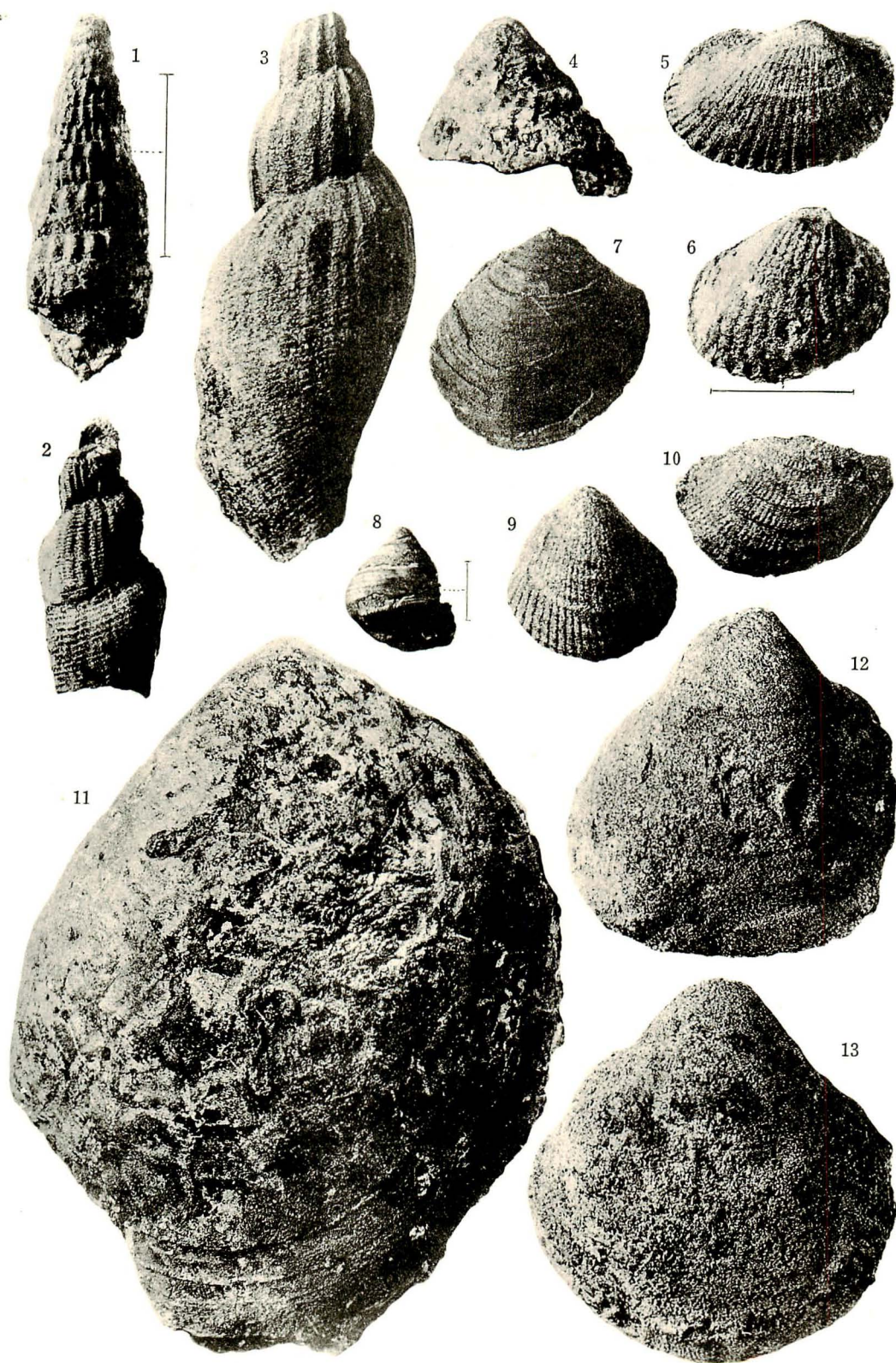
IX. Tertiary Mollusca from Shinano and Echigo.

PLATE 32.

1. ***Terebra eminula*** YOKOYAMA, 1925 (X, 115, n. sp.). Obashira, Chichibu.
2. *Voluta megaspira* SOWERBY var. *striata* YOKOYAMA, 1925 (X, 115, n. var.). Oobuchi, Chichibu. ***Fulgoraria (Psephaea) striata*** (YOK.), *fide* H. & N., 1952.
3. do. Sakakibara, Ise (out of Chichibu), for comparison.
4. *Trochus* sp. (X, 117). Yamada, Chichibu. Gen. & sp. indeterminable.
5. *Arca amicula* YOKOYAMA, 1925 (X, 124). Oobuchi, Chichibu. *Anadara chichibuensis* H. & N., 1952, *nom. nud.*, non *A. amicula* of Sakae (pl. 31).
6. *Venericardia* sp. (X, 122). Oobuchi, Chichibu. ***Venericardia subnipponica*** NAGAO, 1928 ?, *fide* H. & N., 1952.
7. *Clementia speciosa* YOKOYAMA, 1923 (X, 119). Obashira, Chichibu. *Clementia hanzawai* H. & N., 1952. *nom. nud.*, non *C. speciosa*.
8. *Leptothyra* sp. (X, 117). Takinoue, Shimokagemori, Chichibu. Gen. & sp. indeterminable.
9. *Cardium burchardi* DUNKER, 1877 (X, 120). Obashira, Chichibu. *Vasticardium otukai* H. & N., 1952, *nom. nud.*, not DUNKER's sp.
10. *Tapes* sp. (X, 120). Iida, Chichibu. *Cardium* sp., *fide* H. & N., 1952.
11. *Lima goliath* (SOWERBY, 1883), (X, 123). Obashira, Chichibu. ***Lima (Acesta) yagenensis*** OTUKA, *fide* OYAMA, 1943.
- 12, 13. *Cardium pauperculum* YOKOYAMA, 1923 (X, 121). Hino, Chichibu. *Serripes* sp., non *C. pauperculum*, Pt. 1, pl. 5, f. 2.

Remarks.

Stratigraphy—All the figured specimens were obtained from the Akahira group; subdivisions will be mentioned under the description of localities in the remarks of following plates. The Akahira is supposed to be older than Pliocene (YOKOYAMA's interpretation in 1925), as it be Oligocene.



X. Mollusca from the Tertiary Basin of Chichibu.

PLATE 33.

- 1, 2. **Thyasira bisecta** (CONRAD, 1849), (X, 122). Ootagawa, Chichibu. *Conchocele disjuncta*, H. & N., 1952, see Pt. 1, pl. 13, f. 2, pl. 21, f. 5.
3. *Pecten swiftii* BERNARDI, 1858 (X, 123). Obashira, Chichibu. **Chlamys** (*Swiftopecten*). **swiftii** (BERNARDI), see Pt. 1, pl. 17, f. 1.
- 4, 5. *Tellina optiva* YOKOYAMA, 1923 (X, 118). Ootagawa, Chichibu. **Macoma optiva** (YOK.), see Pt. 1, pl. 6, f. 5.
- 6, 7. **Terebratulina japonica** (SOWERBY, 1846), (X, 125). Obashira.
- 8, 9, 10, 11. *Crassatella pauxilla* YOKOYAMA, 1925 (X, 122, n. sp.). Shimokagemori (f. 8, 9); Obashira (f. 10, 11), Chichibu. **Crassatellites pauxillus** YOK.
12. *Venus* sp. (X, 120). Ogumasawa, Chichibu. Gen. sp. indet.
13. *Yoldia gratiosa* YOKOYAMA, 1923 (X, 125). Oota, Chichibu. **Portlandia** (**Megayoldia**) **gratiosa** (YOK.), see Pt. 1, pl. 6, f. 5.
14. *Lima* sp. (X, 123). Obashira, Chichibu. Gen. sp. indet.
- 15, 16. **Diplodonta tokunagai** YOKOYAMA, 1925 (X, 121, n. sp.). Shimokagemori, Chichibu. *Taras tokunagai*, fide H. & N., 1952.

Remarks.

Geography—Yamada: underneath bridge over a brook, south of cross-roads at Yamada in Takashino, Saitama pref., 36°0.5' N, 139°7.1' E, Takashino formation.

Shimo-Kagemori: hill side exposure, 200 m NW of temple at Takinoue in Kagemori, Saitama pref., 35°58.8' N, 139°3.8' E, Tsuyako formation.

Takinoue: foot hill on the river Ara, near the above loc., same bed.

Iida: river cliff of the Kawarasawa, 200 m west of forking of roads at Iida in Mitagawa, Saitama pref., 36°1.3' N, 138°58' E, Inugi formation.

Obashira: west cliff of river side of the Ara, 200 m SE of temple, Obashira in Oota, Saitama pref., 36°3.5' N, 139°5.8' E, Ogano formation.

Oobuchi: river cliff of the Akahira, 500 m SE of temple at Maebara in Kunigami, Saitama pref., 36°3.6' N, 139°4.9' E, Inugi formation.

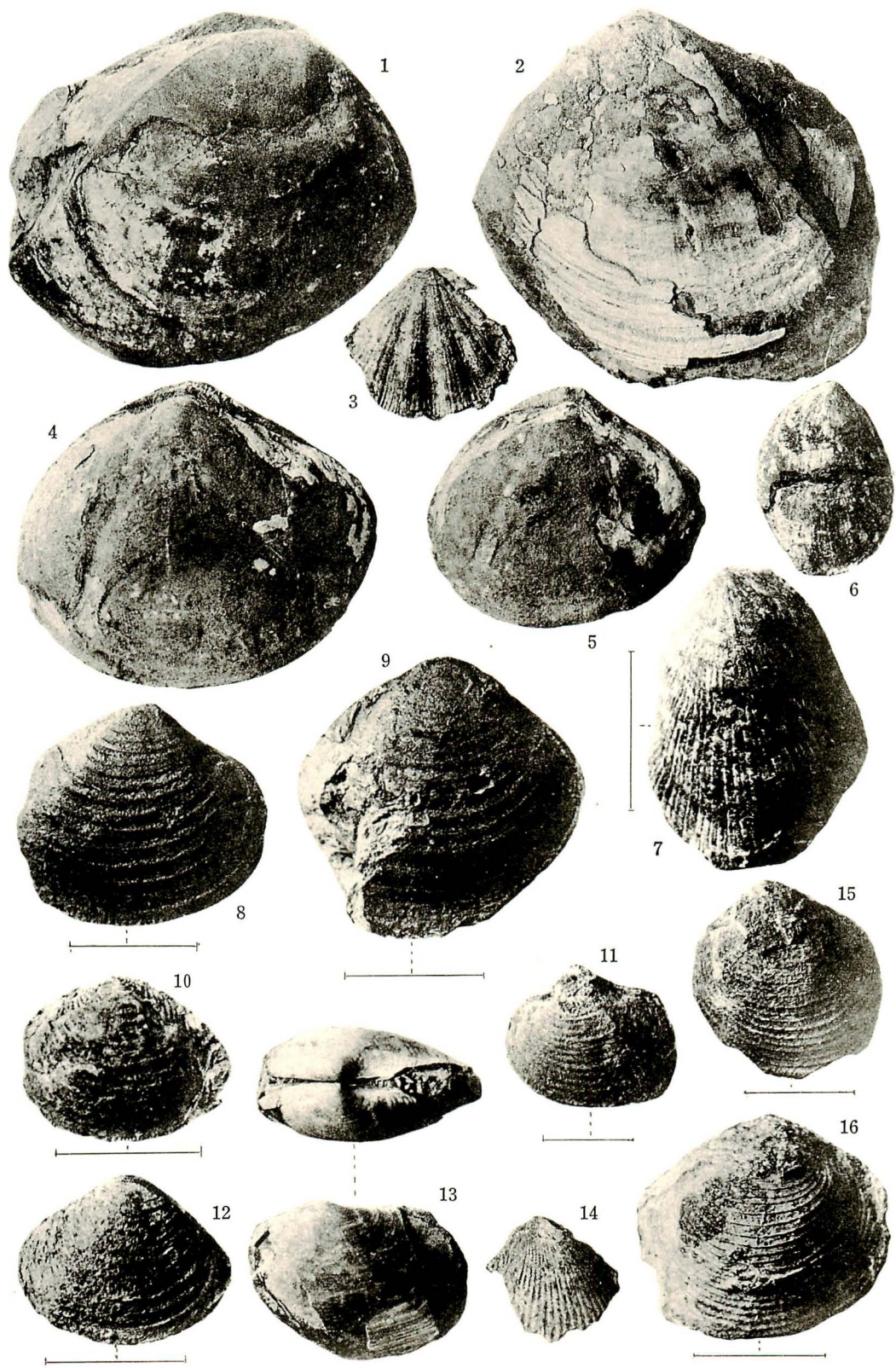
Hino: river cliff south of the Ara, 150 m NW of bifurcation of roads at Maruyama in Nakagami, Saitama pref., 35°57.2' N, 139°1.2' E, Tsuyako formation.

Ootagawa: left bank of the Akahira, 100 m east of Isobata bridge in Oota, Saitama pref., 36°3.6' N, 139°4.4' E, Inugi formation.

Oota: right bank underneath bridge over the Akahira in Oota, Saitama pref., 36°3.3' N, 139°3.7' E, Inugi formation.

Agumasawa: west crag on Aguma brook, 700 m NW of Muku shrine in Yoshida, Saitama pref., 36°2.8' N, 139°1.9' E.

Sakakibara, Ise: south crag of Kaisekiyama hill in Sakakibara, Isshi district, Mie pref., 34°42.5' N, 136°22.2' E, Isshi group, Miocene.



X. Mollusca from the Tertiary Basin of Chichibu.

PLATE 34.

- 1a. *Nucula mirabilis* ADAMS et REEVE, 1850 (XI, 137). III, Shiobara. *Acila divaricata* (HINDS, 1843) ?, *Acila submirabilis* MAKIYAMA, 1926.
- 1b. *Dosinia troscheli* LISCHKE, 1873 (XI, 133). III, Shiobara. cf. *Dosinia* (*Phacosoma*) *nomurai* OTUKA, 1934.
- 1c, 2, 3. *Mitra pristina* YOKOYAMA, 1923 (XI, 130). III, Shiobara. *Nassarius* (*Coraeophos*) *nakamurai* KURODA, 1931, *fide* H. & N., 1952, emend., not *Cancellaria pristina* (YOK.), pl. 9, f. 8.
4. *Macoma dissimilis* (MARTENS, 1865), (XI, 133). III, Shiobara. *Macoma tokyoensis* MAKIYAMA, 1927, see Pt. 1, pl. 20, f. 9, pl. 22, f. 19.
5. *Pectunculus* sp. (XI, 136). I, Shiobara. aff. *P. albolineatus* LISCHKE, *fide* YOKOYAMA, 1926; *Glycymeris cisshuensis* MAKIYAMA, 1926, *fide* H. & N., 1952.
6. *Yoldia ensicula* YOKOYAMA, 1926 (XI, 137, n. sp.). IV, Shiobara.

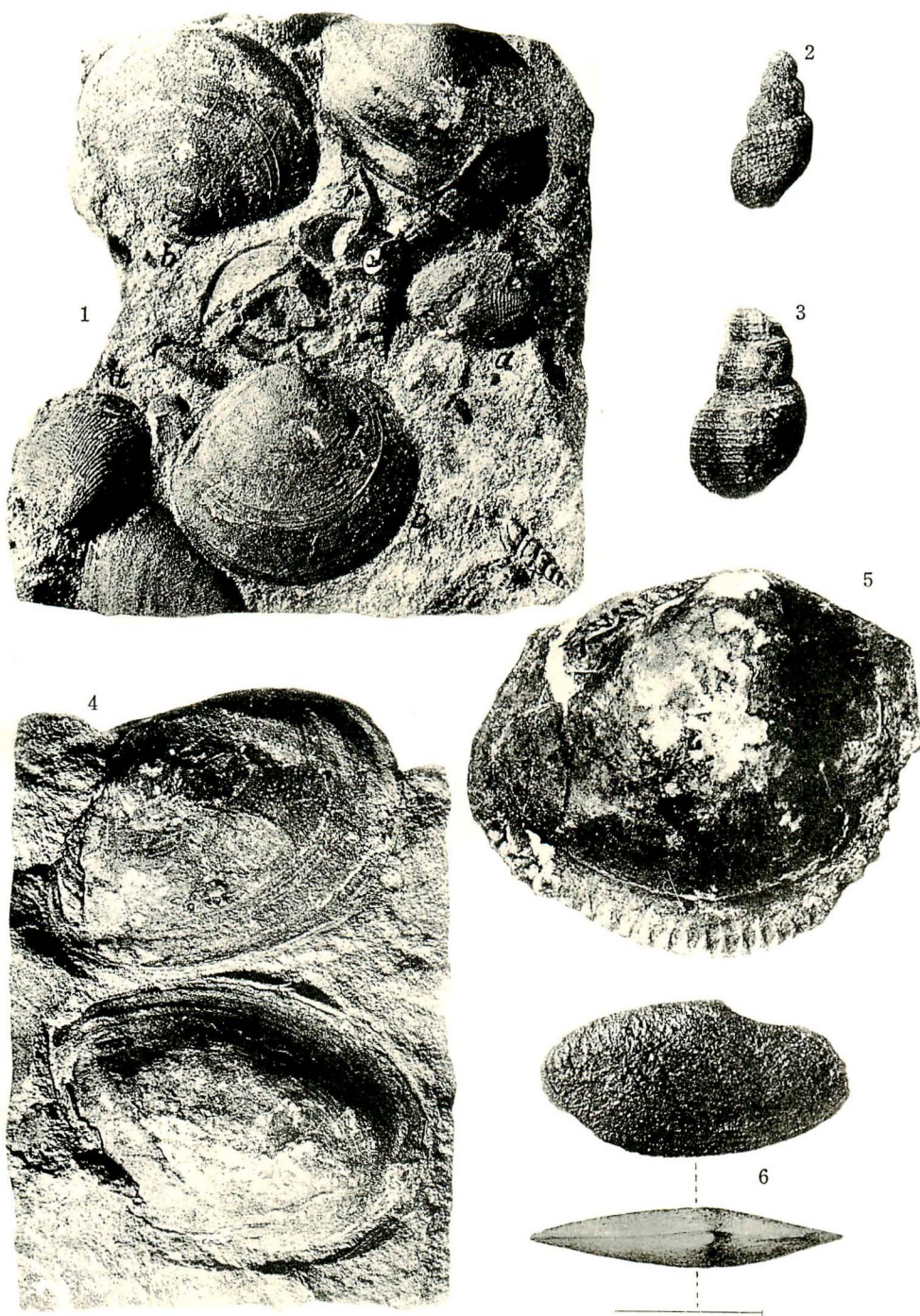
Remarks.

Geography—III, Shiobara: north slope of Masugata-yama, near head of branch valley of Fudōsawa, 900 m north of the summit, 1.4 km SE of Shionoyu spa in Shiobara, Tochigi pref., 36°56.5' N, 139°50.5' E.

I, Shiobara: way side exposure along the river Ojikata, 700 m south of the bench mark (538.99 m) in Fujiwara, Shiota district, Tochigi pref., 36°54.3' N, 139°42.3' E.

IV, Shiobara: greenish grey sandy tuff in Fudōsawa (valley), exact locality unknown, but presumably 1 km SE of loc. III.

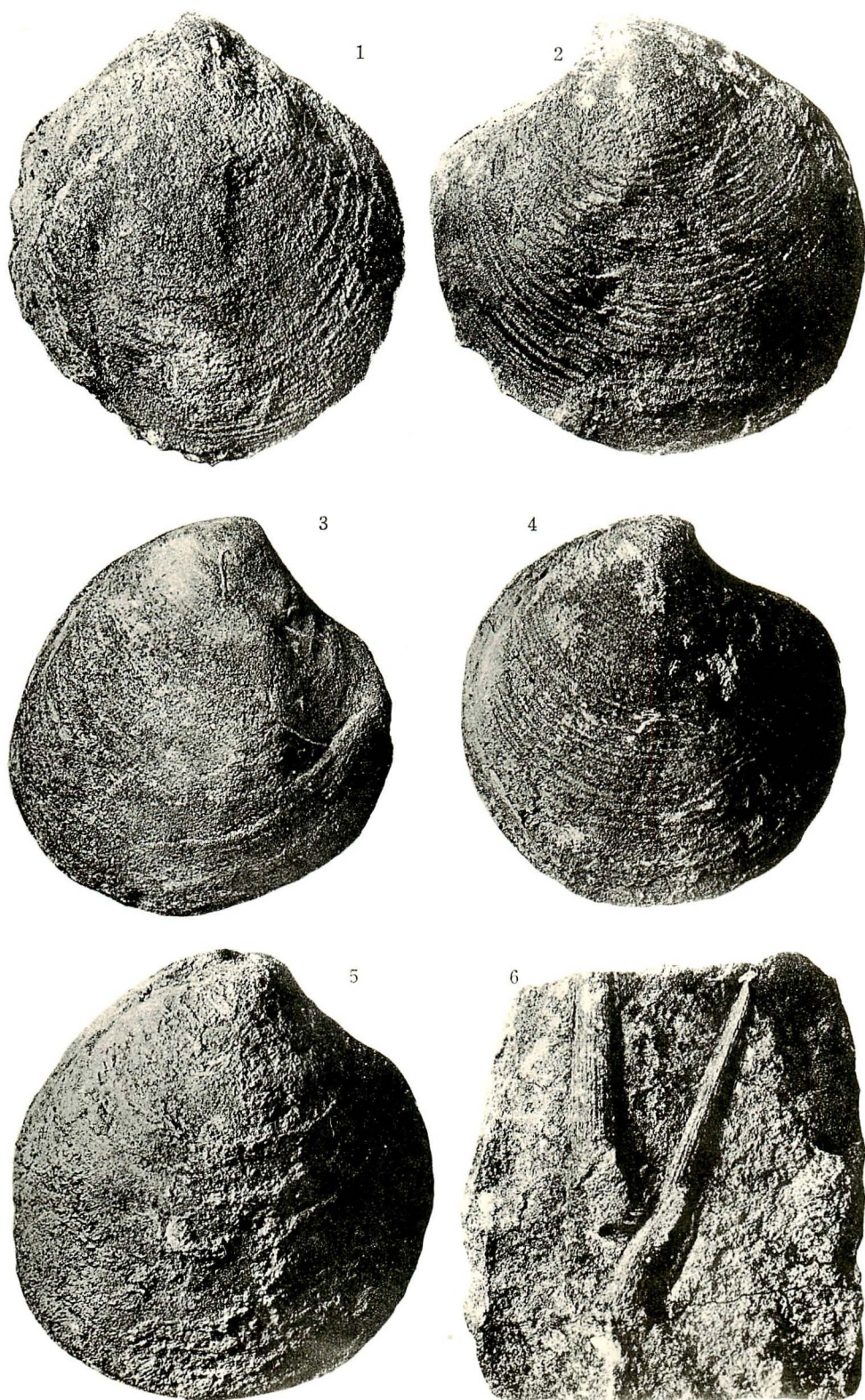
Stratigraphy—III: zone III of Yokoyama, Kanomatazawa formation, Miocene. I: zone I, Fukuwata formation, Miocene. IV: zone IV, Kanomatazawa Miocene. Yokoyama considered all these zones belong to Pliocene.



XI. Tertiary Mollusca from Shiobara.

PLATE 35.

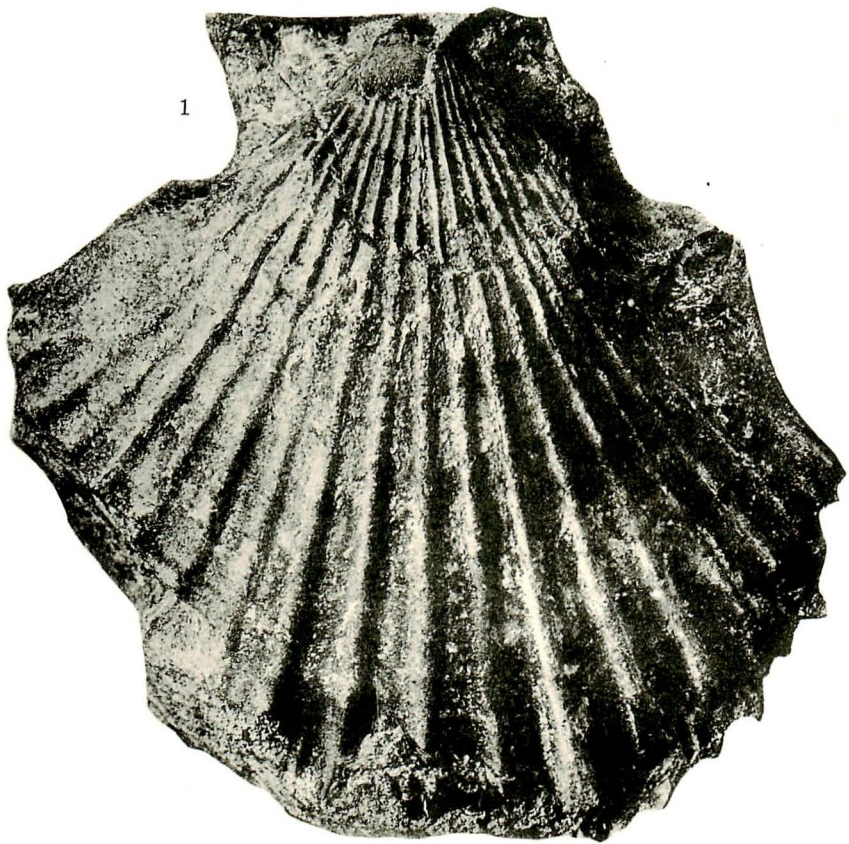
- 1, 2, 3, 4, 5. *Dosinia kaneharai* YOKOYAMA, 1926 (XI, 133, n. sp.). III, Shiobara. **Dosinia (Kaneharaiia) kaneharai** YOK., MAKIYAMA, 1936.
6. *Dentalium complexum* DALL, 1895 (XI, 131). III, Shiobara. **Dentalium yokoyamai** MAKIYAMA, 1931.



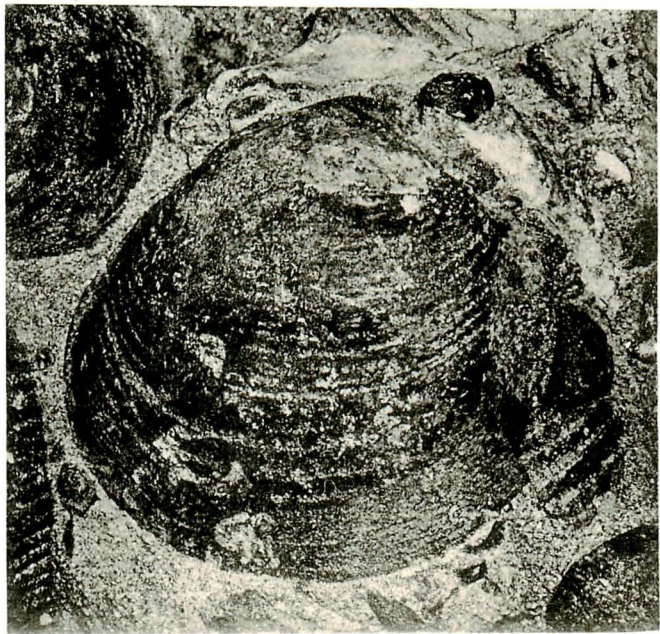
XI. Tertiary Mollusca from Shiobara.

PLATE 36.

1. *Pecten kaneharai* YOKOYAMA, 1926 (XI, 135, n. sp.). III, Shiobara. **Chlamys kaneharai** (YOK.).
2. **Dosinia (Kaneharaia) kaneharai** YOKOYAMA, see pl. 35.



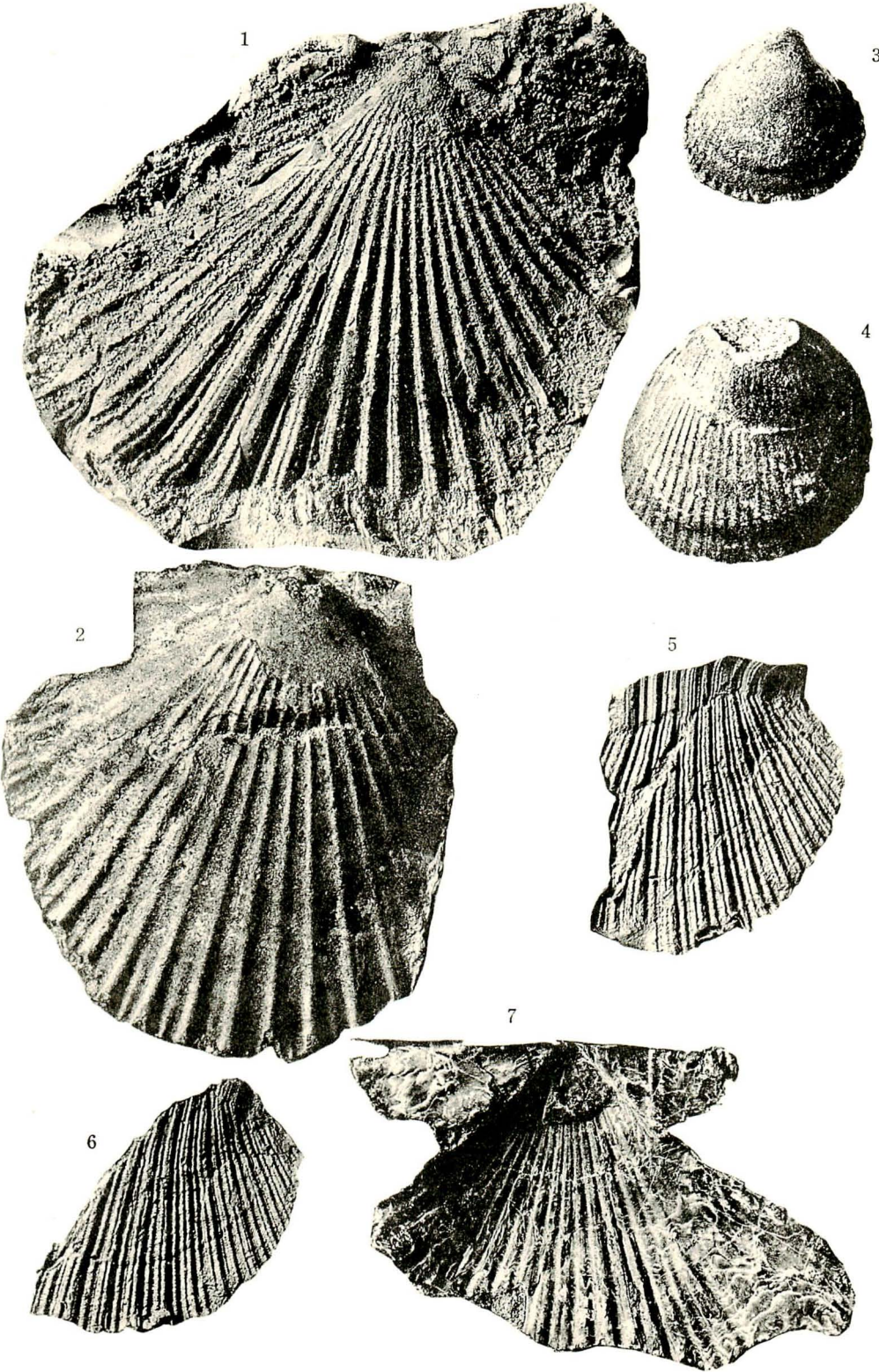
2



XI. Tertiary Mollusca from Shiobara.

PLATE 37.

- 1, 2, 5, 6, 7. *Pecten kaneharai* YOKOYAMA, III, Shiobara. **Chlamys kaneharai** (Yok.), see pl. 36, f. 1.
- 3, 4. *Cardium burchardi* DUNKER, 1877 (XI, 134). III, Shiobara. *Vasticardium burchardi* DUNKER, *fide*, H. & N., 1952; *Acrostegrina (Vasticardium) burchardi* (DUNKER), *fide* TAKI & OYAMA, 1954. **Trachycardium burchardi** (DUNKER), *fide* K. & H., 1952. sp. ?



XI. Tertiary Mollusca from Shiobara.

PLATE 38.

1. *Mytilus giganteus* HOLMBERG, 1862 (XI, 135). III, Shiobara. ***Mytilus crassitesta* LISCHKE**, 1869, *fide* TAKI & OYAMA, 1954.
- 2, 3, 4, 5. *Cardium shiobarense* YOKOYAMA, 1926 (XI, 134, n.sp.). IV, Shiobasa. *Laevicardium* (*Trachycardium*) *shiobarense* (YOK.), *fide* H. & N., 1952; ***Trachycardium shiobarense* (YOK.)**.



XI. Tertiary Mollusca from Shiobara.

PLATE 39.

- 1, 2. *Cylichna affabilis* YOKOYAMA, 1926 (XII, 216, n. sp.). Shimo-Oda, Mino.
3. *Cylichna corpulenta* YOKOYAMA, 1926 (XII, 217, n. sp.). Shiroyama in Kamikiri.
- 4, 5, 6. *Vicarya baculum* (YOKOYAMA, 1923), (XII, 219). Matsubora. *Vicarya vernuilli yokoyamai* TAKEYAMA, 1933; *V. callosa martini* YABE & HATAI, 1938; not *Cerithium baculum* YOK.
7. *Cyclina chinensis* (CHEMNITZ), DESHAYES, 1850 (XII, 222). Matsubora. *Cyclina sinensis* GMELIN, 1790.
- 8, 9. *Crenella fornicata* YOKOYAMA, 1926 (XII, 224, n. sp.). Shiroyama in Kamikiri. *Solamen fornicatum* (YOK.), *fide* KURODA, orally.
10. *Macoma dissimilis* (MARTENS, 1865), (XII, 221). Tsukiyoshi, Mino. *Macoma tokyoensis* MAKIYAMA, 1927, see pl. 34, f. 4.
- 11, 12. *Cerithium ishiiianum* YOKOYAMA, 1926 (XII, 218, n. sp.). Tsukiyoshi (f. 11); Matsubora (f. 12). *Vicaryella ishiana* (YOK.).
- 13, 14, 15, 16. *Soletellina minoensis* YOKOYAMA, 1926 (XII, 221, n. sp.). Matsubora (f. 13); Tsukiyoshi (f. 14); Tsukiyoshi, cast (f. 15, 16). *Sanguinolaria minoensis* (YOK.).
- 17, 18. *Venericardia tokunagai* YOKOYAMA, 1924 (XII, 223). Hazamagabora (f. 17); Nakanishi, Kubohara (f. 18). cf. *Cyclocardia tokunagai* (YOK.), see Pt. 1, pl. 13, f. 10 etc.

Remarks.

Geography—Shimo-Oda: south comb 350 m SW of junction of roads at Shimo-Oda in Mizunami, Gifu pref., 35°21.5' N, 137°13.5' E.

Shiroyama: west slope of the hill near Kamigiri in Hongô, Ena district, Gifu pref., 35°22.6' N, 137°24.7' E.

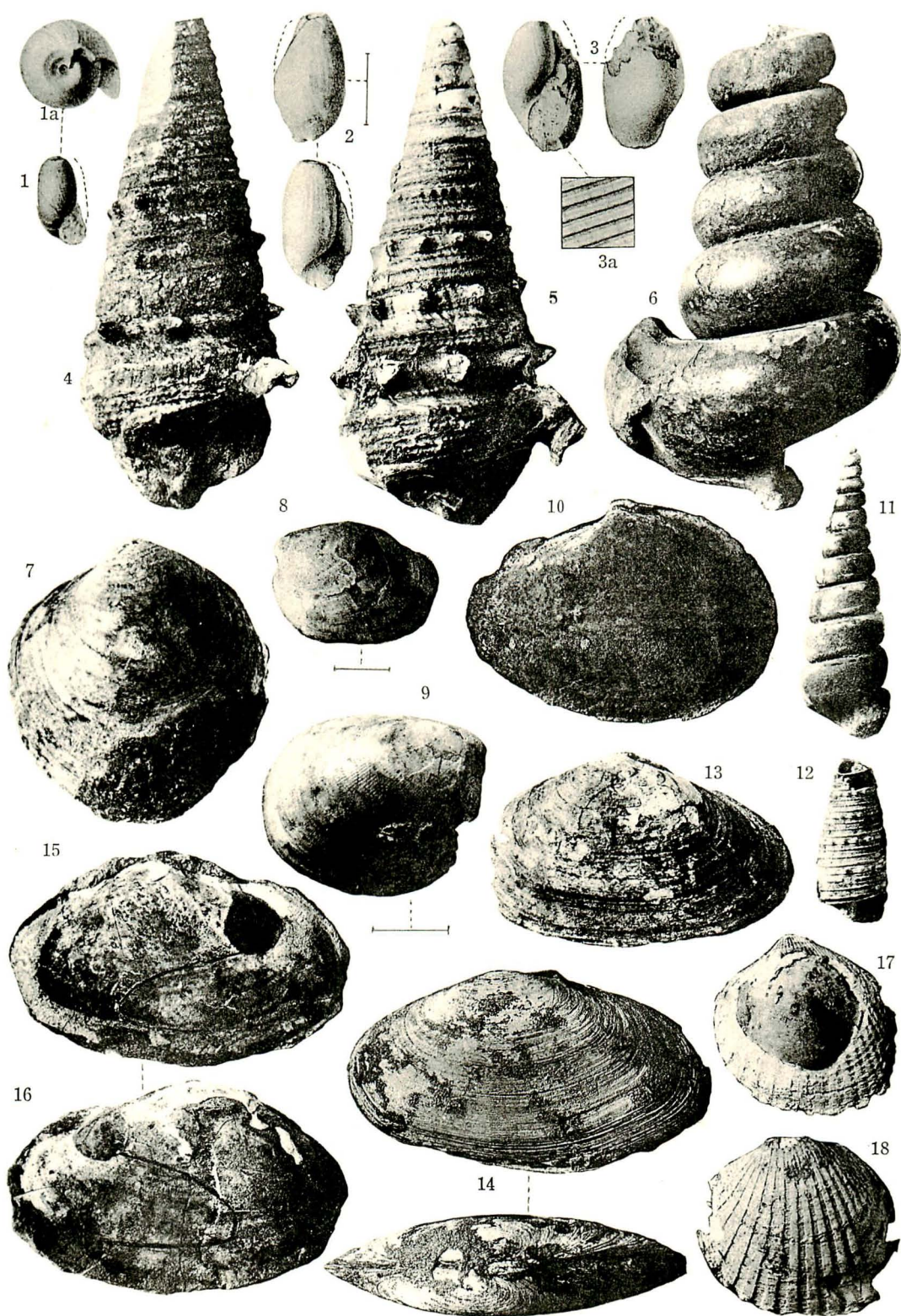
Matsubora: crag above Matsubora (valley), 300 m NE of the main road, in Taki, Gifu pref., 35°22.6' N, 137°15.5' E.

Tsukiyoshi: crag in a small valley 450 m west of the bench mark (187 m) near Mizunami.

Hazamagabora: 400 m north on bifurcating roads near Togari (W), Gifu pref., 35°22.2' N, 137°14.4' E.

Nakanishi: 200 m east of Nakanishi in Toyama, Ena district, Gifu pref., 35°21.8' N, 137°23.8' E.

Stratigraphy—Mizunami group, Miocene, Togari formation: Shimo-Oda, Hazamagabora; Tsukiyoshi formation: Tsukiyoshi, Matsubora; Kubohara formation: or Iwamura formation: Shiroyama, Nakanishi.



XII. Molluscan Remains from the Tertiary of Mino.

PLATE 40.

1. *Voluta megaspira* SOWERBY, 1844 (XIII, 232). Ichinokaya. **Fulgoraria (Psephaea) striata** (YOKOYAMA, 1925), see pl. 32, f. 2, 3., *Voluta megaspira striata* YOK.
- 2, 3, 4. **Crenella peramoena** YOKOYAMA, 1926 (XIII, 233, n. sp.). Kamaya, Oki.
5. *Cardium elongaium* BRUGUIÈRE, 1789 (XIII, 232). Tsukumogawa, Kôzuke. **Trachycardium** aff. **elongatum**.
- 6, 7, 8. *Mya crassa* GREWINCK, 1850 (XIII, 232). Shimonita (f. 6, 8); Ichinokaya (f. 7). f. 6, 8: **Mya** sp. cf. **japonica** JAY, 1857; f. 7: **Mya cuneiformis** (BÖHM, 1916).

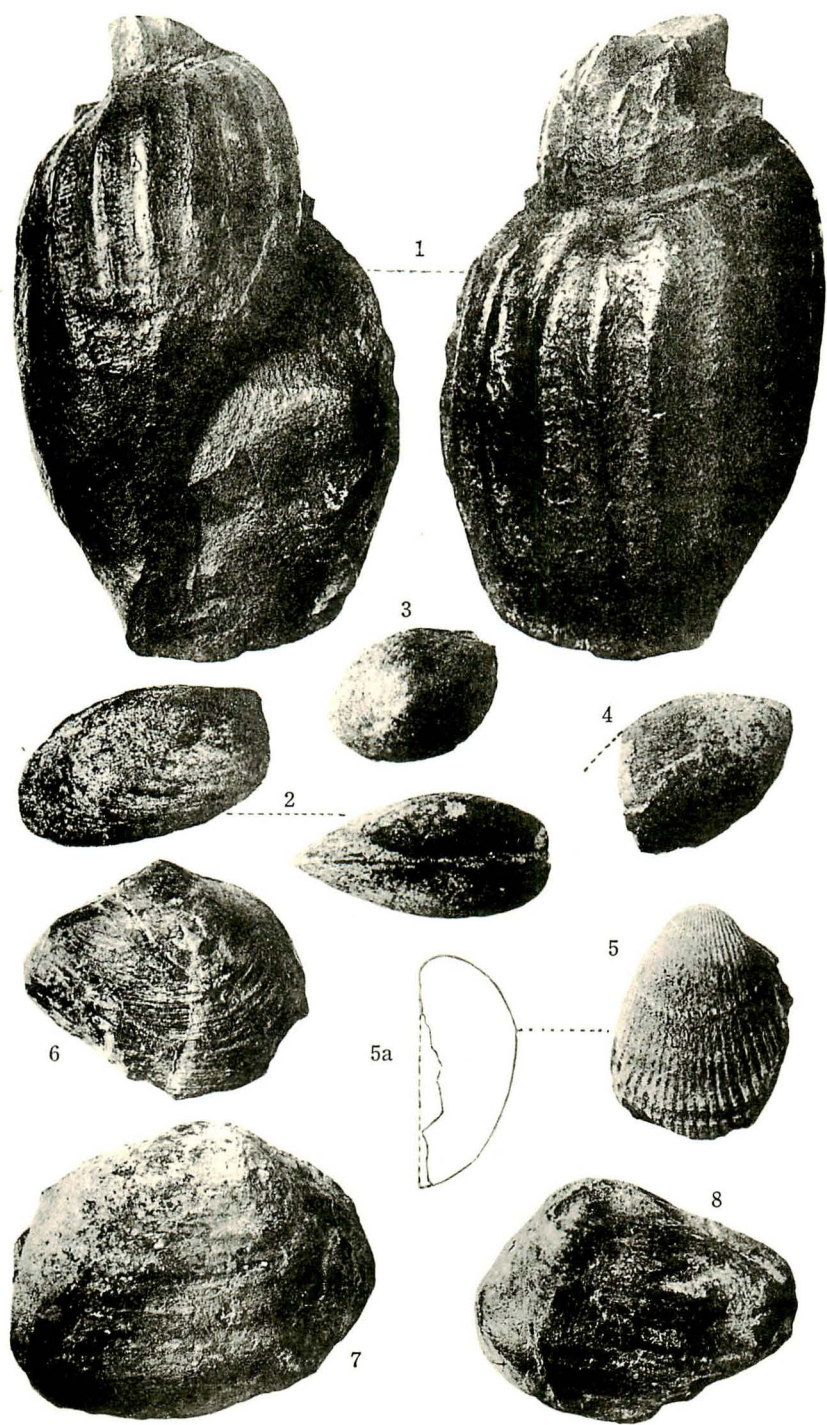
Remarks.

Geography—Ichinokaya: Ichinokaya in Nishi-Maki, Kita-Kanra district, Gunma pref., exact loc. unknown, from the Miocene rock.

Kamaya: Kamadani in Tsuma, Oki island, exact loc. unknown.

Tsukumogawa: Shimo-Hishio in Hosono on the Tsukumogawa, Gunma pref., Miocene.

Shimonita: bank of the Kitakawa in Shimonita, Gunma pref., Miocene.



XIII. Neogene Shells from Kozuké and other Provinces.

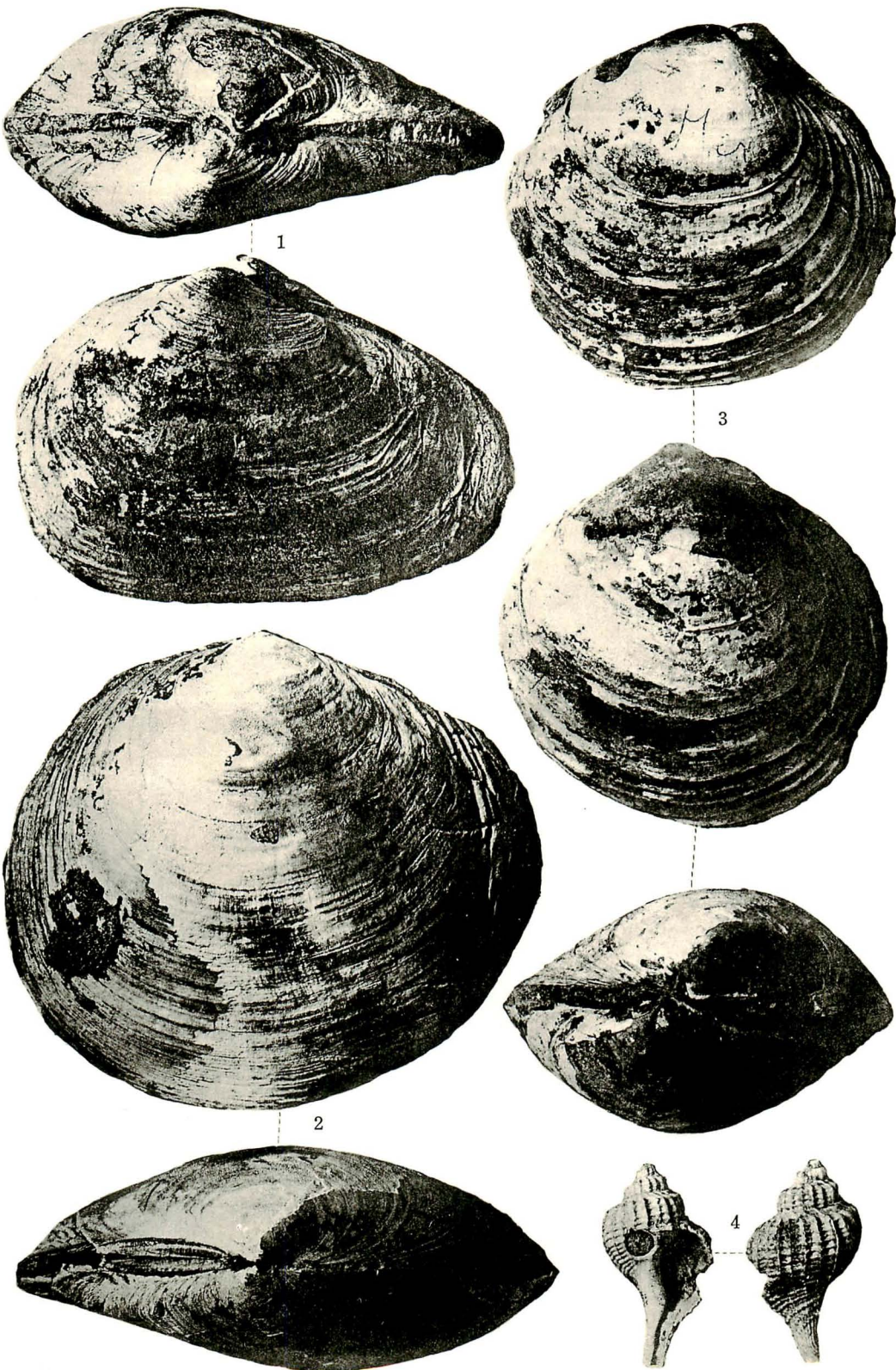
PLATE 41.

1. *Mya arenaria* LINNÉ, 1758 (XIV, 241). Beds C, Embets. **Mya japonica** JAY, 1857.
2. *Tellina optiva* YOKOYAMA, 1923 (XIV, 242). Beds C, Embets. **Macoma optiva** (YOK.), see Pt. 1, pl. 6, f. 3, 4.
3. *Cardium pauperculum* YOKOYAMA, 1923 (XIV, 243). Beds C, Embets. **Serripes** aff. **groe-landicus** (BRUGUIÈRE, 1792).
4. *Fusus uyemurai* YOKOYAMA, 1926 (XIV, 238, n. sp.). Beds A, Embets. **Trophonopsis uye-murai** (YOK.).

Remarks.

Geography and Stratigraphy—Beds C, Embets: Wakkanai shale, Miocene, the river bank of Uttsu, 5 km east to the confluence with the Bishkshusinai in Embets, Teshio district, Hokkaidô, Embets town at 44°45' N, 141°56.7' E.

Beds A, Embets: Yûchi sandstone, Miocene, somewhere upstream of the Uttsu, in Embets area, exact place unknown.



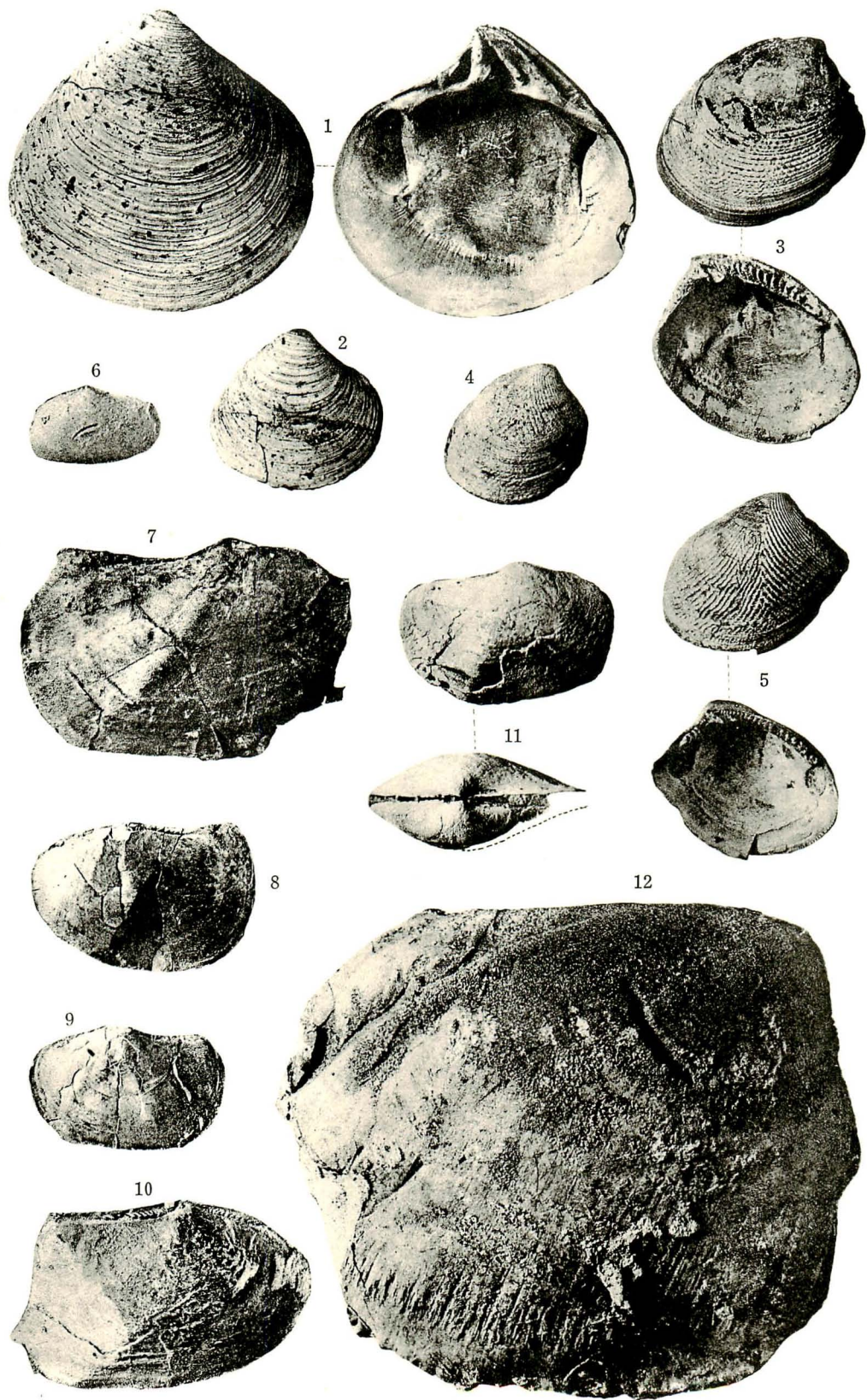
XIV. Tertiary Mollusca from Embets and Etaibets.

PLATE 42.

- 1, 2. *Astarte teshioensis* YOKOYAMA, 1926 (XIV, 244, n. sp.). Beds A, Embets. **Astarte (Tridontia) teshioensis** YOK.
- 3, 4. *Nucula cobboldiae* SOWERBY, 1817 (XIX, 246). Beds A, Embets. **Acila (Truncacila) gottschei** (BÖHM, 1916), *fide* NAGAO & HUZIOKA, 1941.
5. *Nucula mirabilis* ADAMS et REEVE, 1850 (XIV, 246). Shinagawa cutting in Tokyo, Upper Musashino form for comparison. **Acila divaricata** (HINDS, 1843).
6. *Leda* sp. (XIV, 246). C, Embets. *Yoldia* sp., *fide* H. & N., **Nuculana** sp. indet.
- 7, 8, 9, 10, 11. *Yoldia scapha* YOKOYAMA, 1926 (XIV, 247, n. sp.). C, Embets. *Portlandia (Megayoldia) thraciaeformis* (STORER, 1838), *fide* HABE, 1951; *Portlandia (Megayoldia) scapha*, *fide* H. & N., 1952; **Yoldia thraciaeformis**, *fide* KURODA, verbally.
12. *Thyasira bisecta nipponica* YABE & NOMURA, 1925 (XIV, 243). Beds B, Embets. *Conchocele nipponica*, *fide* H. & N., 1952; **Thyasira bisecta** CONRAD, 1849, see Pt. 1, pl. 13, f. 2, MAKIYAMA, 1934.

Remarks.

Geography and Stratigraphy—Beds B, Embets: Koitoi formation, Pliocene, bank of the Tomataushnai (river), 6 km SE of Embets centre.



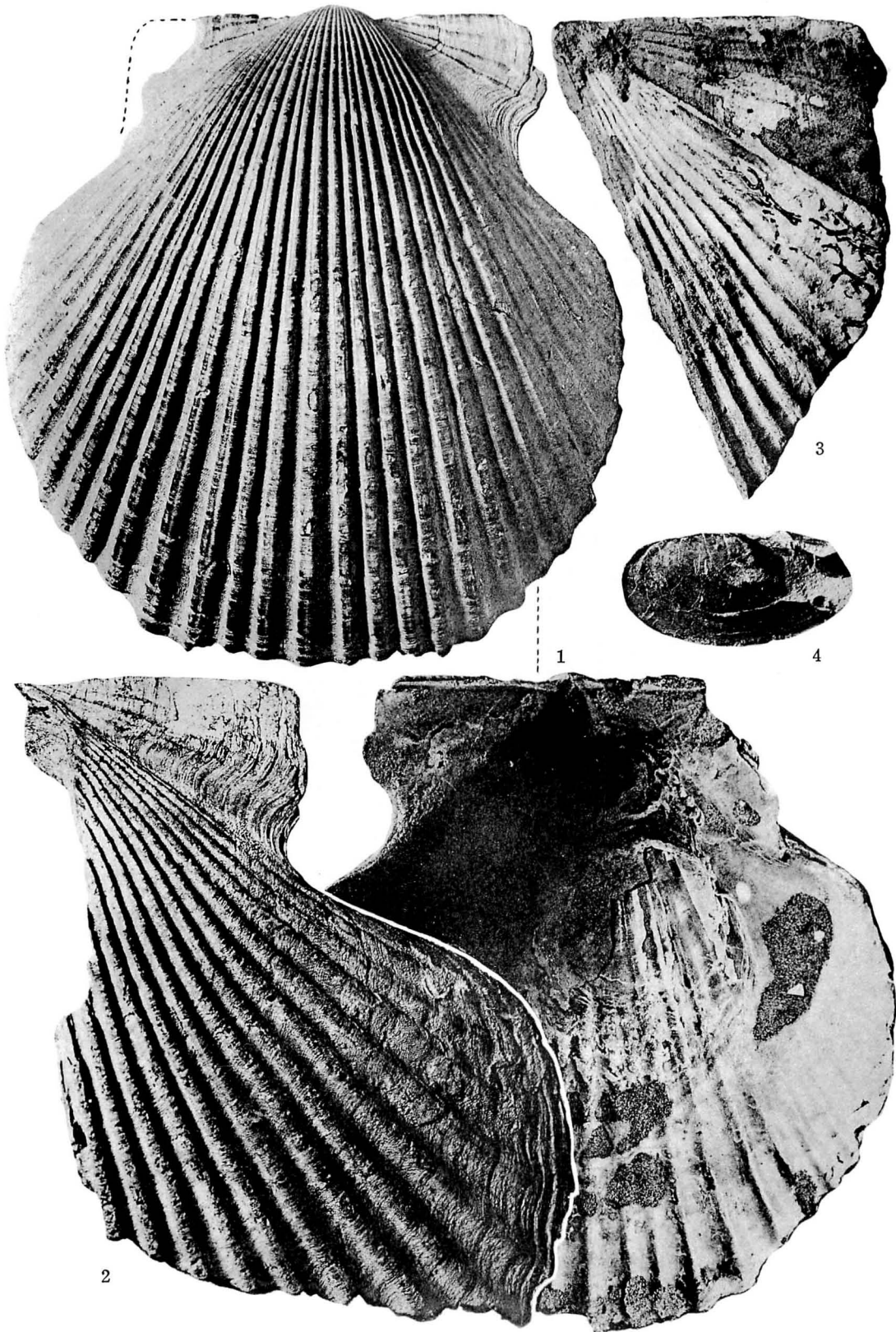
XIV. Tertiary Mollusca from Embets and Etaibets.

PLATE 43.

1. **Pecten poculum** YOKOYAMA, 1926 (XIV, 245, n. sp.). Kayasawa, Akita pref. for comparison. See f. 2, 3.
- 2, 3. *Pecten poculum* YOK. Beds A, Embets. **Pecten** (*Patinopecten*) **poculum** YOKOYAMA, 1926.
4. **Yoldia sagittaria** YOKOYAMA, 1925, (XIV, 247). Beds C, Embets. aff. *Yoldia kikuchii* KURODA, 1930, MAKIYAMA, 1934.

Remarks.

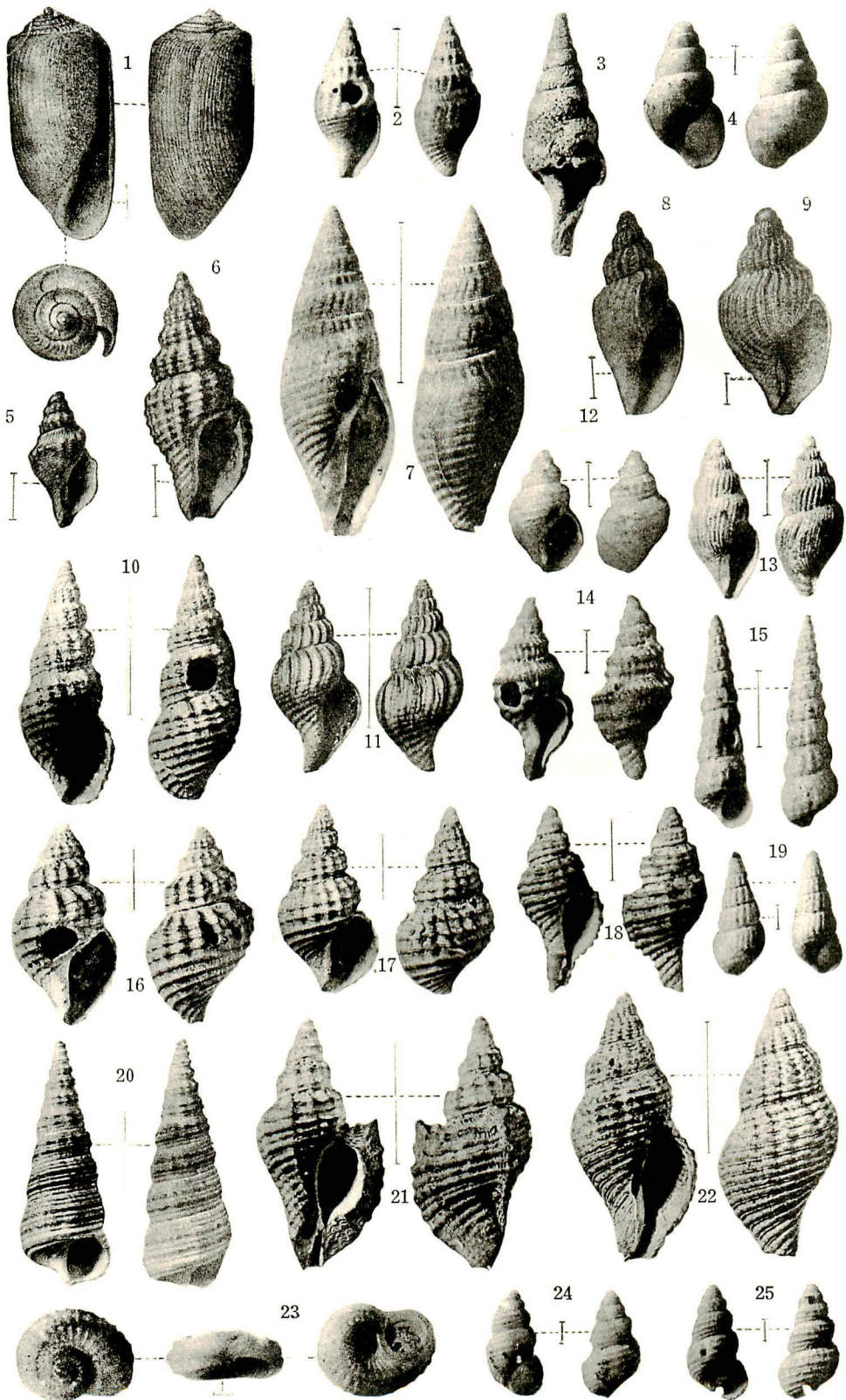
Geography—Kayasawa: east crag on brook near shrine at Kayasawa in Yamamoto district, Akita pref., 40°17.7' N, 140°14.5' E.



XIV. Tertiary Mollusca from Embets and Etaijets.

PLATE 44.

1. *Tornatina yamakawai* YOKOYAMA, 1926 (XV, 258). Upper horizon, Sawane. **Decolifer yamakawai** (YOK.), *fide* H. & N., K. & H., 1952.
2. *Genotia pseudopannus* YOKOYAMA, 1922 (XV, 260). Upper horizon, Sawane. **Ophiodermella miyatensis** (YOKOYAMA, 1920), *fide* K. & H., 1952.
3. *Pleurotoma sadoensis* YOKOYAMA, 1926 (XV, 257, n. sp.) Upper horizon, Sawane. *Rectiplanes saciiioannis* (SMITH), *fide* H. & N., 1952; **Antiplanes (Rectiplanes) sanctiioannis** (SMITH, 1875), *fide* K. & H., 1952.
4. *Odostomia (Ondina?) calypso* YOKOYAMA, 1926 (XV, 279, n. sp.). Upper horizon, Sawane. **Menestho calypso** (YOK.), *fide* H. & N., 1952.
5. *Bela sattva* YOKOYAMA, 1926 (XV, 260, n. sp.). Upper horizon, Sawane. position doubtful (H. & N., 1952); immature, *Surculites* or its ally.
6. *Mangilia sawanensis* YOKOYAMA, 1926 (XV, 263, n. sp.). Upper horizon, Sawane. **Lienardia grainesi** (PILSBRY, 1895), *fide* H. & N., K. & H., 1952.
7. *Genotia ogurana* YOKOYAMA, 1922, var. *gracilis* YOKOYAMA, 1926 (XV, 260, n. var.). Upper horizon, Sawane. *Pseudomelatoma? ogurana gracilis* (YOK.) *fide* H. & N., 1952; **Ophiodermella miyatensis gracilis** (YOK.).
8. *Bela ozawai* YOKOYAMA, 1926 (XV, 260, n. sp.). Upper horizon, Sawane. *Funitoma? ozawai* (YOK.), *fide* H. & N., 1952; **Propebela? ozawai** (YOK.), *fide* KURODA, verbally.
9. *Bela exquisita* YOKOYAMA, 1926 (XV, 262, n. sp.). Upper horizon, Sawane. **Nematoma exquisita** (YOK.), *fide* H. & N., K. & H., 1952.
10. **Cancellaria longispirata** YOKOYAMA, 1926 (XV, 265, n. sp.). Upper horizon, Sawane.
11. *Bela yanamii* YOKOYAMA, 1926 (XV, 261, n. sp.). Lower horizon, Sawane. *Plicifusus yanamii* (YOK.), *fide* H. & N., 1952; **Mohnia yanamii** (YOK.), *fide* KUROKA, verbally.
12. *Cancellaria tabatai* YOKOYAMA, 1926 (XV, 265, n. sp.). Upper horizon, Sawane. **Admete tabatai** (YOK.), *fide* H. & N., K. & H., 1952.
13. *Bela dissoluta* YOKOYAMA, 1926 (XV, 263, n. sp.). Lower Horizon (mentioned "upper" in explanation of figure), Sawane. **Granotoma dissoluta** (YOK.), *fide* K. & H., H. & N., 1952.
14. *Trophon acharya* YOKOYAMA, 1926 (XV, 269, n. sp.). Upper horizon, Sawane. **Trophonopsis acharya** (YOK.), *fide* H. & N., 1952.
15. *Bittium binodulosum* YOKOYAMA, 1920, (XV, 270). Upper horizon, Sawane. *B. yokoyamai* OTUKA, 1936; **Plesioacirsa yokoyamai** (OTUKA), *fide* KURODA, verbally.
- 16, 17. *Cancellaria lischkei* YOKOYAMA, 1926 (XV, 264, n. sp.). Upper horizon, Sawane. *Admete japonica* (SMITH, 1878), *fide* K. & H., H. & N., 1952; **Cancellaria japonica lischkei** (YOK.), *fide* KURODA, verbally.
18. *Trophon suborpheus* YOKOYAMA, 1926 (XV, 268, n. sp.). Upper horizon, Sawane. *Trophonopsis suborpheus* (YOK.), *fide* H. & N., 1952; **Ocenebra japonica** DUNKER, 1860, *fide* K. & H., 1952.
19. *Odostomia (Egilina) marielloides* YOKOYAMA, 1922 var. *gracilis* YOKOYAMA, 1926 (XV, 279, n. var.). Upper horizon, Sawane. **Miralda (Egilina) gracilis** YOK., *fide* H. & N., 1952.
20. *Bittium ozawai* YOKOYAMA, 1926 (XV, 270, n. sp.). Upper horizon, Sawane. (*B. ozawa* in pl. 32, f. 20, explanation). **Batillaria cumingi** (CROSSE, 1862), *fide* H. & N., 1952.
21. *Ocenebra lumaria* YOKOYAMA, 1926 (XV, 270, n. sp.). Upper horizon, Sawane. **Ocenebra lumaria** YOK., *fide* K. & H., 1952.
22. **Searlesia japonica** YOKOYAMA, 1926 (XV, 269, n. sp.). Kaidate, Sawane.
23. *Cyclostrema pulchellum* DUNKER, 1860, (XV, 285). Upper horizon, Sawane. **Pseudoliotia micans** (A. ADAMS, 1850), *fide* H. & N., K. & H., 1952.
- 24, 25. *Rissoa (Alvania) maya* YOKOYAMA, 1926 (XV, 274, n. sp.). Upper horizon, Sawane. **Alvania (Taramellia) maya** YOK., *fide* KURODA, verbally.



XV. Fossil Shells from Sado.

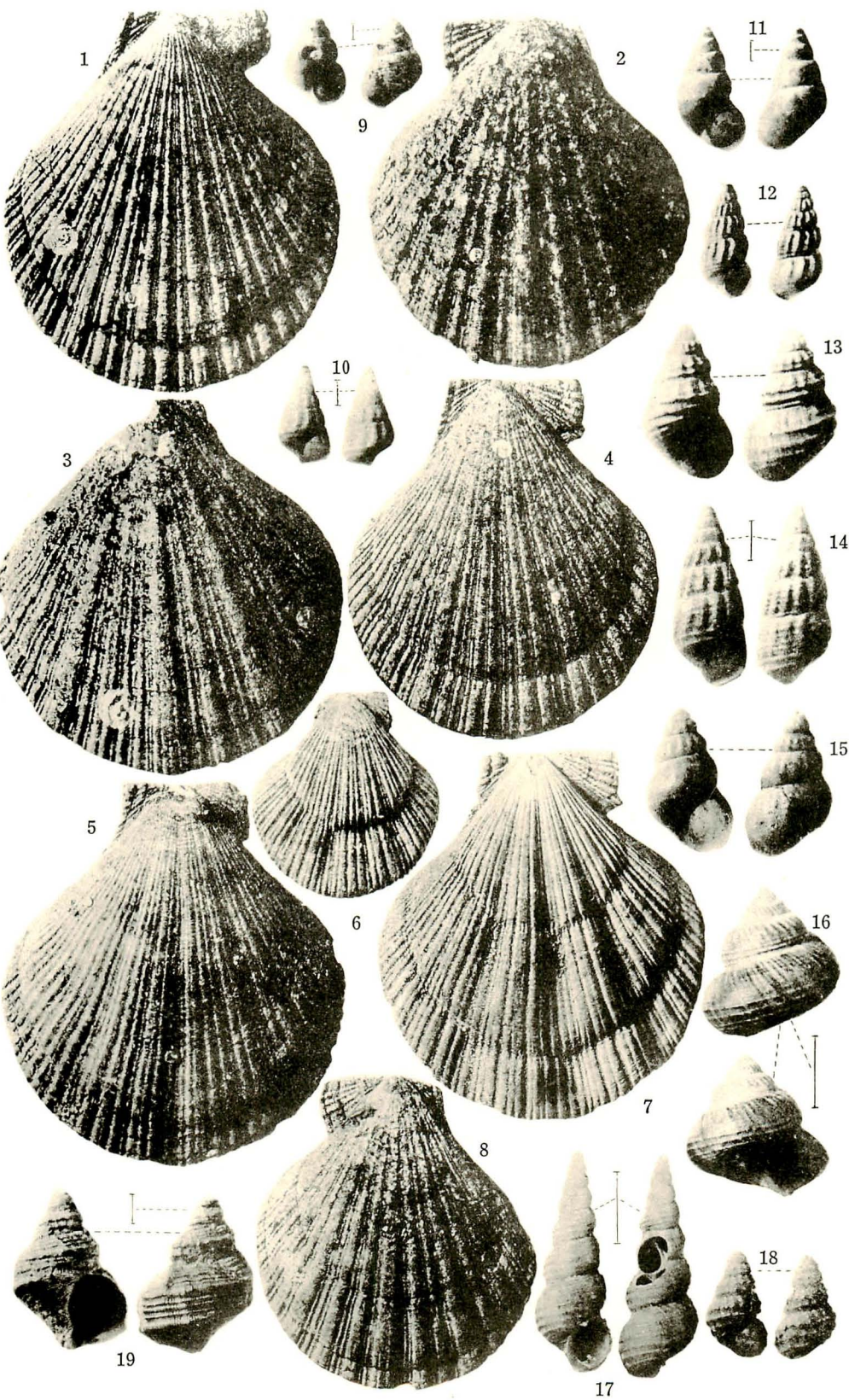
PLATE 45.

- 1, 2, 3, 4, 5, 6, 7, 8. *Pecten heteroglyptus* YOKOYAMA, 1926 (XV, 304, n. sp.). Kaidate, Sawane:
1, 2, 3, 4, 5, 8. *Chlamys cosibensis heteroglypta* (YOK.)
6, 7. *Chlamys cosibensis cosibensis* (YOK.)
9. *Rissoa (Cingula) dharma* YOKOYAMA, 1926 (XV, 275, n. sp.). Upper horizon, Sawane. *Putilla*
(*Pseudosetia*) *dharma* (YOK.), fide H. & N., 1952; *Cingula dharma* (YOK.), fide K. & H.,
1952.
10. *Rissoina fortunata* YOKOYAMA, 1926 (XV, 276, n. sp.). Upper horizon, Sawane.
11. *Rissoa (Cingula) mundana* YOKOYAMA, 1926 (XV, 276, n. sp.). Upper horizon, Sawane.
Cingula mundana YOK., fide K. & H., H. & N., 1952.
12. *Rissoa (Apicularia) sadoensis* YOKOYAMA, 1926 (XV, 272, n. sp.). Upper horizon, Sawane.
Alvania plicosa (SMITH, 1875), fide K. & H., 1952; *Alvania (Actonia) sadoensis* YOK., fide
KURODA, 1957 = *concinna* A. ADAMS?
13. *Rissoa (Alvania) sitta* YOKOYAMA, 1926 (XV, 274, n. sp.). Upper horizon, Sawane. *Alvania*
(*Taramella*) *sitta* YOK., fide H. & N., 1952; *Alvania (Nishiyama) sitta* YOK.
14. *Rissoina tabatai* YOKOYAMA, 1926 (XV, 277, n. sp.). Upper horizon, Sawane.
15. *Rissoa (Apicularia?) asura* YOKOYAMA, 1926 (XV, 273, n. sp.). Upper horizon, Sawane.
Rissoa (Persephona) asura YOK., fide H. & N., 1952; *Alvania asura* (YOK.), fide K. & H.,
1952.
16. *Solariella nipponensis* YOKOYAMA, 1926 (XV, 272, n. sp.). Upper horizon, Sawane. *Minolia*
nipponensis (YOK.), fide H. & N., 1952; *Machaeroplax coreanica nipponensis* (YOK.), fide
KURODA, verbally, *M. coreanica* DALL, 1919. var.
17. *Turbonilla (Cingulina) morsei* YOKOYAMA, 1926 (XV, 281, n. sp.). Upper horizon, Sawane.
Turritelopsis acicula stimpsoni (DALL, 1919), fide KURODA, verbally.
18. *Rissoa (Alvania) lusoria* YOKOYAMA, 1926 (XV, 273, n. sp.). Upper horizon, Sawane.
Alvania (Taramellia) lusoria YOK. fide H. & N., 1952; *Alvania ferruginea* A. ADAMS, 1861,
fide KURODA verbally.
19. *Calliostoma kalavinka* YOKOYAMA, 1926 (XV, 285, n. sp.). Lower horizon, Sawane. *Turbo*
kalavinkum (YOK.), fide H. & N., 1952; an immature Buccinid form.

Remarks.

Geography—Upper and Lower horizons, Sawane: sea-cliff west of Sawane, 250 m to 400 m SW of bifurcation of main roads, Sado island, Niigata prefecture, 37°59.8' N, 138°16.7' E.

Kaidate: Kaidate-no-sawa near Sawane (Tsurushi, 2 km inland), valley crag, 150 m SW of temple at north end of Tanaka, 38°1' N, 138°16.9' E.



XV. Fossil Shells from Sado.

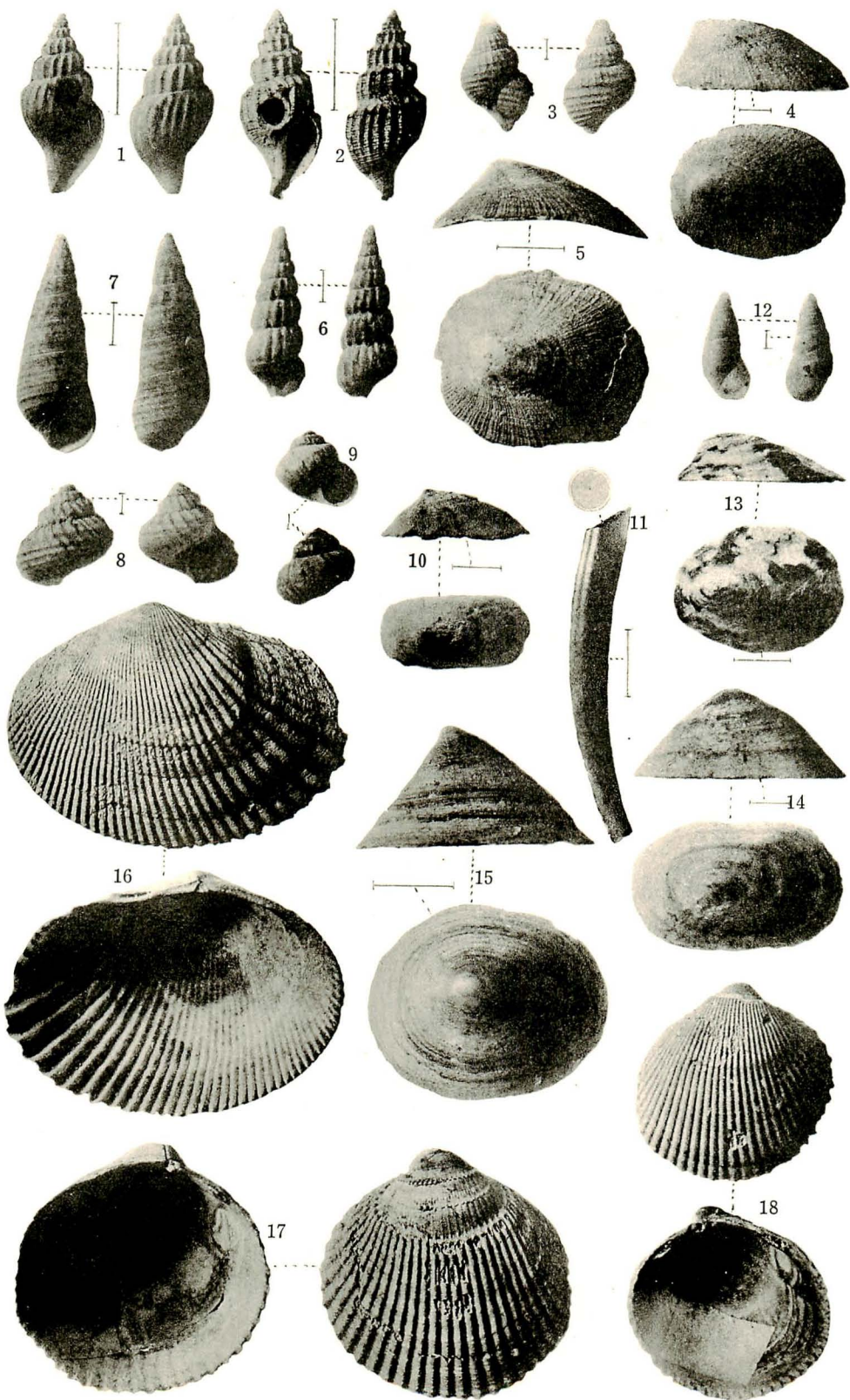
PLATE 46.

- 1, 2. *Bela candida* YOKOYAMA, 1926 (XV, 261, n. sp.). Upper horizon, Sawane. 2. var. *angulata* YOK. (n. var.). *Propebela candida* for f. 1, *Propebela (Turritoma) angulata* for f. 2, *fide* H. & N., 1952; ***Propebela (Turritoma) candida*** (YOK.), *fide* KURODA, verbally.
3. *Rissoa (Alvania) akibai* YOKOYAMA, 1926 (XV, 275, n. sp.). Upper horizon, Sawane. ***Alvania (Arsenia) akibai*** YOK., *fide* H. & N., 1952.
4. *Acmaea asperulata* YOKOYAMA, 1926 (XV, 287, n. sp.). Upper horizon, Sawane. *Notoacmaea asperulata* (YOK.), *fide* H. & N., 1952; ***Lepeta (Cryptobranchia) lima*** DALL, 1918, immature, *fide* KURODA, verbally.
5. *Acmaea concinna* LISCHKE, 1871 (XV, 286). Upper horizon, Sawane. (*A. concinna* SCHR. in explanation of plate—obvious error); ***Notoacmaea concinna***, *fide* H. & N., K. & H., 1952.
6. ***Turbonilla (Chemnitzia) fusoensis*** YOKOYAMA, 1926 (XV, 280, n. sp.). Upper horizon, Sawane.
7. *Rissoina (Morchiella) sawanensis* YOKOYAMA, 1926 (XV, 277, n. sp.). Upper horizon, Sawane. ***Zebina (Moerchiella ?) sawanensis*** YOK., *fide* H. & N., 1952.
8. *Margarita laudata* YOKOYAMA, 1926 (XV, 284, n. sp.). Upper horizon, Sawane. ***Margarites laudata*** YOK., *fide* H. & N., 1952.
9. *Margarita hilarula* YOKOYAMA, 1926 (XV, 284, n. sp.). Upper horizon, Sawane. ***Margarites (Margaritopsis) hilarula*** YOK., *fide* H. & N., 1952.
10. *Acmaea angustitesta* YOKOYAMA, 1926 (XV, 288, n. sp.). Upper horizon, Sawane. *Lepta (Cryptobranchia) angustitesta* (YOK.), *fide* H. & N., 1952; ***Siphonacmea angustitesta*** (YOK.), *fide* KURODA, verbally.
11. ***Siphonodentalium (Pulsellum) ozawai*** YOKOYAMA, 1926 (XV, 289). Upper horizon, Sawane.
12. *Rissoina (Zebina) occulta* YOKOYAMA, 1926 (XV, 277). Upper horizon, Sawane. ***Rissoina (Moerchiella) japonica*** WEINKAUFF, 1881, *fide* KANEKO.
13. *Acmaea schrenckii* LISCHKE, 1869 (XV, 287). Upper horizon, Sawane. ***Notoacmaea schrenckii*** (LISCHKE), *fide* K. & H., 1952.
14. *Acmaea oblongata* YOKOYAMA, 1926 (XV, 288, n. sp.). Upper horizon, Sawane. ***Siphonacmea oblongata*** (YOK.), probably a young of *S. angustitesta*.
15. *Acmaea asmiiformis* YOKOYAMA, 1926 (XV, 287, n. sp.). Upper horizon, Sawane. ***Tectura asmiiformis*** (YOK.), *fide* H. & N., 1952.
16. *Papyridea (Fulvia) nipponica* YOKOYAMA, 1924 (XV, 294). Upper horizon, Sawane. Not *P. nipponica*=*P. harrimani* DALL, 1904, see Pt. 1, pl. 13, f. 3, 4; ***Papyridea (Fulvia) kurodai*** HATAI & NISHIYAMA, 1952, *ipsa facto* valid, for YOKOYAMA gave a special account on the specimens of Sawane.
- 17, 18. *Cardium shinjiense* YOKOYAMA, 1923 (XV, 293). Upper horizon, Sawane. ***Clinocardium ciliatum*** (FABRICIUS, 1780),

Remarks.

Stratigraphy—Upper and Lower horizons of Sawane: Sawane formation, Pliocene, or the Aoikui Beds (Local name).

Kaidate: the same formation as Sawane.



XV. Fossil Shells from Sado.

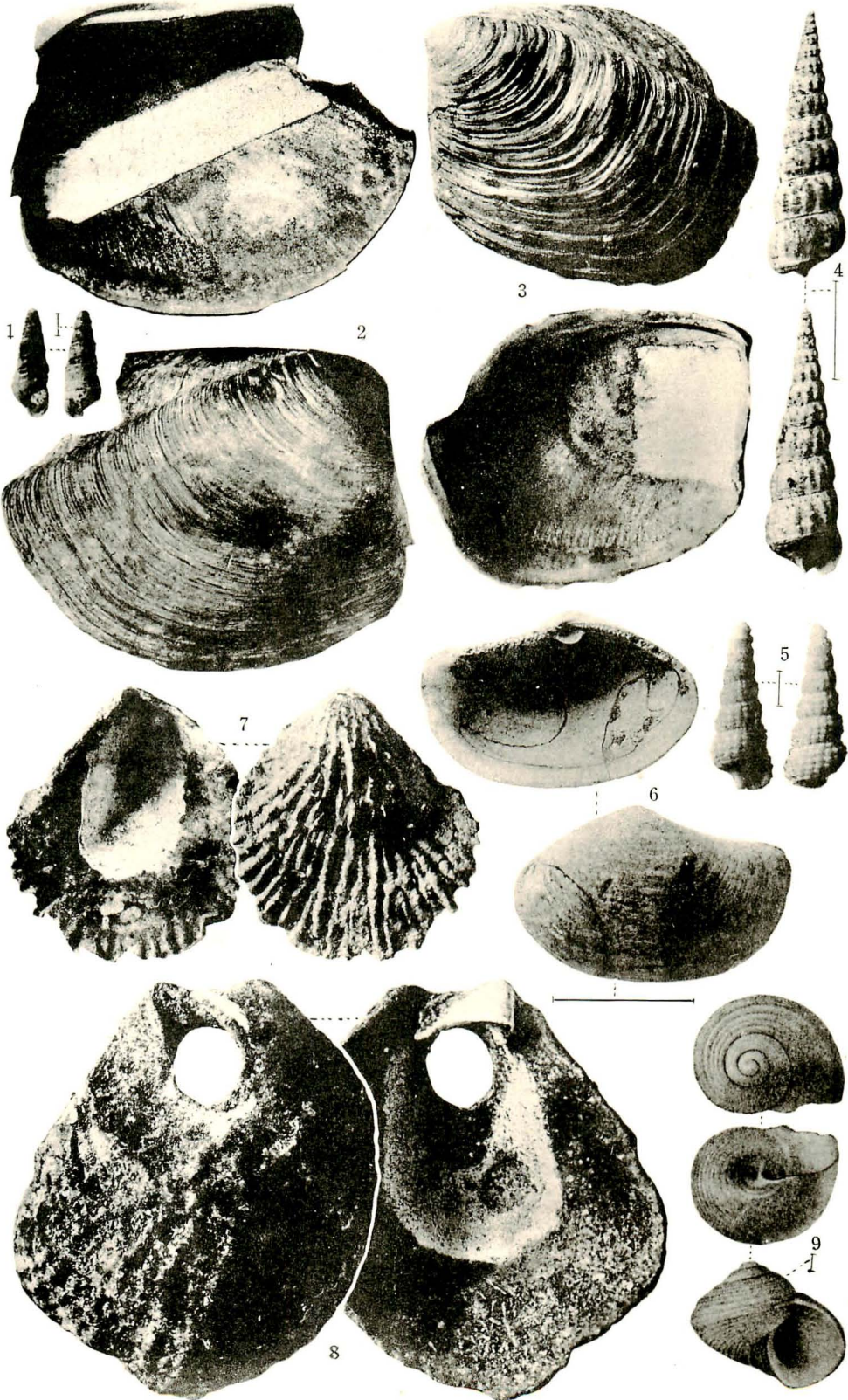
PLATE 47.

1. *Turbonilla* (*Cingulina*) *pseudocingulata* YOKOYAMA, 1926 (XV, 281, n. sp.). Upper horizon, Sawane. ***Cingulina pseudocingulata*** YOK., *fide* H. & N., 1952.
- 2, 3. ***Thyasira bisecta*** (CONRAD, 1849), (XV, 294). Upper horizon, Sawane. See Pt. 1, pl. 13, f. 2.
4. *Turbonilla* (*Pyrgiscus*) *yanamii* YOKOYAMA, 1926 (XV, 280, n. sp.). Lower horizon, Sawane. ***Tachyrhynchus yanamii*** (YOK.), *fide* H. & N., K. & H., 1952.
5. *Turbonilla* (*Tragula*) *spinulosa* YOKOYAMA, 1926 (XV, 281, n. sp.). Upper horizon, Sawane. Genus doubtful, by H. & N., 1952.
6. *Yoldia scapha* YOKOYAMA, 1926 (XV, 309). Lower horizon, Sawane (upper horizon in the explanation of plate). Neither *Yoldia scapha* YOK. nor *Y. thraciaeformis* (STORER), cf. pl. 42, f. 7-11.
- 7, 8. *Placuanomia macroschisma* (DESHAYES, 1836), (XV, 301). Kaidate. *Pododesmus* (*Monia*) *macroschismus*, H. & N., 1952; ***Monia macrochisma*** DESHAYES*.
9. ***Gibbula orientalis*** YOKOYAMA, 1926 (XV, 283, n. sp.). Upper horizon, Sawane.

Remarks.

Taxonomy—*Pecten intuscostatus* YOKOYAMA, 1920 in XV, 305 (not figured) with the variety name *multicostata* is not conspecific with the Lower Musashino type, but it is ***Pecten sawanensis*** HERTLEIN, 1931.

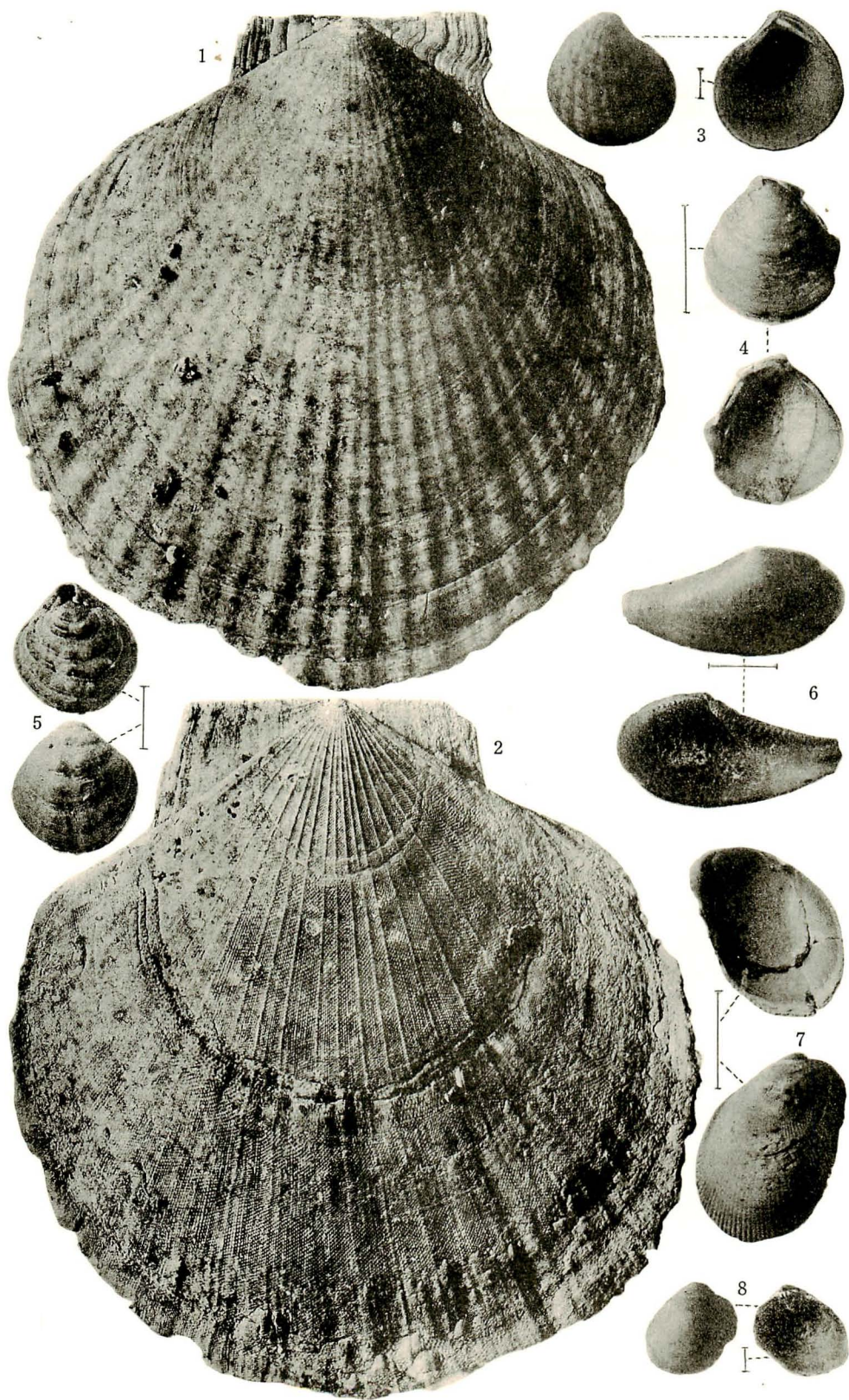
* DESHAYES's original spell was "*macrochisma*"; SOWERBY, 1835 and AGASSIZ, 1846 wrote "*macroschisma*".



XV. Fossil Shells from Sado.

PLATE 48.

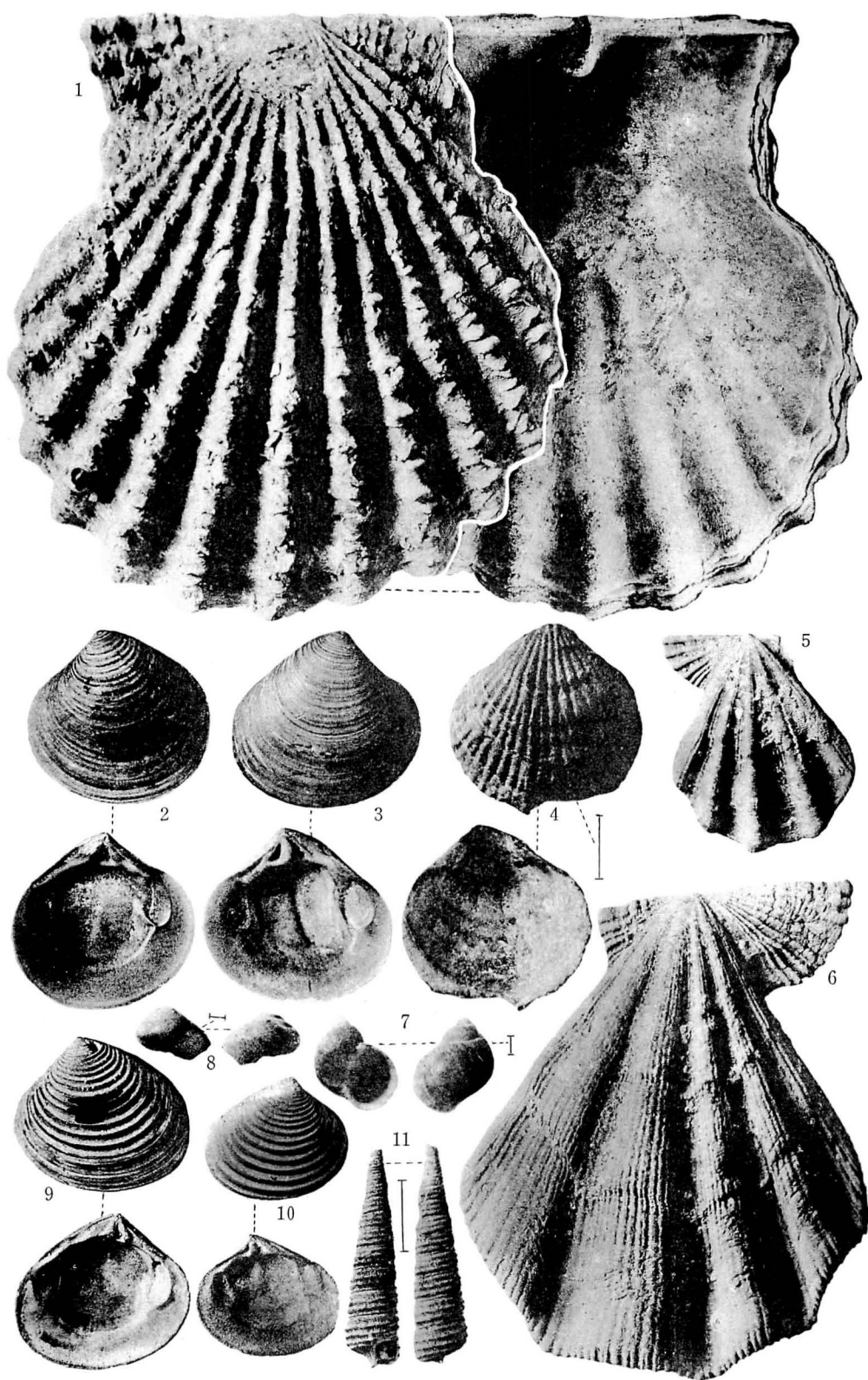
- 1, 2. **Pecten plebejus** YOKOYAMA, 1926 (XV, 305, n. sp.). Kaidate.
3. *Venericardia nakamurai* YOKOYAMA, 1923 (XV, 298). Upper horizon, Sawane. *Pteromeris (Miodontiscus) nakamurai* (YOK.), *fide* H. & N., 1952; *Venericardia prolongata* (CARPENTER, 1863), *fide* K. & H., 1952; **Venericardia (Miodontiscus) prolongata** (CARPENTER), *fide* KURODA.
4. **Thyasira ozawai** YOKOYAMA, 1926 (XV, 295, n. sp.). Upper horizon, Sawane.
5. **Terebratella frontalis** (MIDDENDORFF, 1849), (XV, 310). Upper horizon, Sawane.
6. *Leda sadoensis* YOKOYAMA, 1926 (XV, 308, n. sp.). Upper horizon, Sawane. **Nuculana per-nula sadoensis** (YOK.), *fide* K. & H., 1952.
7. **Crenella delicatula** YOKOYAMA, 1926 (XV, 301, n. sp.). Upper horizon, Sawane.
8. **Crenella pervula** YOKOYAMA, 1926 (XV, 301, n. sp.), "*Crenella parva*" in the explanation of plate (misprint). Upper horizon, Sawane.



XV. Fossil Shells from Sado.

PLATE 49.

1. *Pecten foedus* YOKOYAMA, 1926 (XV, 305, n. sp.). Kaidate, Sawane. **Chlamys foeda** (Yok.), *fide* H. & N., 1952.
- 2, 3. *Astarte borealis* (CHEMNITZ), YOKOYAMA, 1926 (XV, 298). Upper horizon, Sawane. **Astarte borealis** SCHUMACHER, 1817, subgenus: *Tridonta*, *fide* H. & N., 1952.
4. **Terebratalia gouldii** (DALL, 1891), (XV, 310). Upper horizon, Sawane.
- 5, 6. *Pecten swiftii* BERNARD, (XV, 303). Upper horizon, Sawane. *Pecten tigerrinus* YOKOYAMA, 1920; **Chlamys swiftii** BERNARD, see Pt. 1, pl. 17, f. 1, also pl. 33, f. 3.
7. *Phasianella tristis* PILSBRY, 1904 (XV, 283). Upper horizon, Sawane. *Tricolia tristis*, H. & N., 1952; **Eotricolia tristis** (PILSBRY), *fide* K. & H., 1952.
8. *Margarita vahliioides* YOKOYAMA, 1926 (XV, 283, n. sp.). Upper horizon, Sawane. **Margarites vahliioides** YOK.
- 9, 10. *Astarte sulcata* (DACOSTA, 1778), (XV, 298). Upper horizon, Sawane. **Asarte alaskensis** DALL, 1903.
11. *Cerithiopsis crassincincta* YOKOYAMA, 1926 (XV, 271, n. sp.). Upper horizon, Sawane. **Seila crassincincta** (Yok.), *fide* H. & N., K. & H., 1952.



XV. Fossil Shells from Sado.

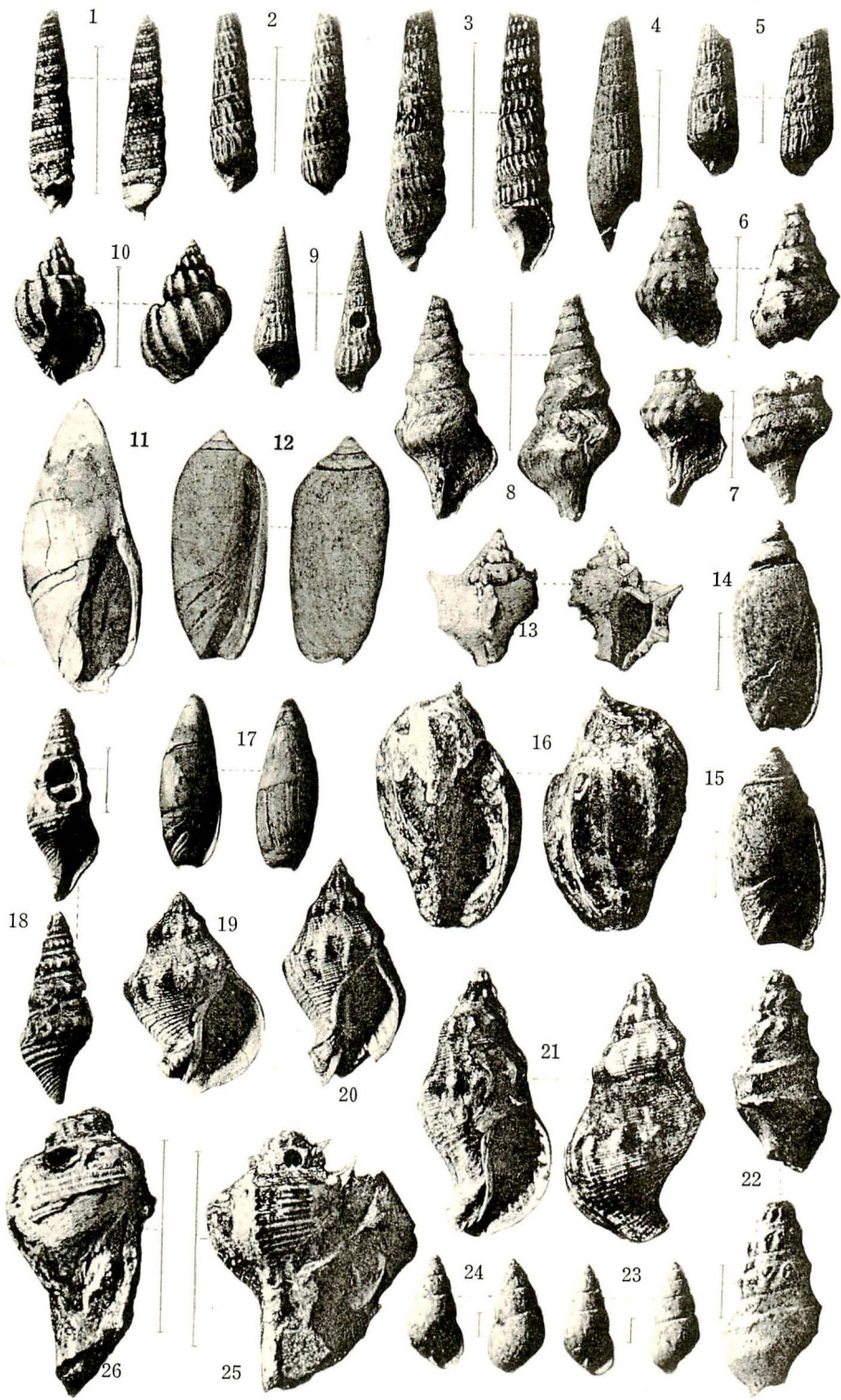
PLATE 50.

1. **Terebra triseriata** GRAY, 1833 (XVI, 326). Asuka.
2. **Terebra** cf. **subtextilis** SMITH, 1879 (XVI, 327). Asuka.
3. **Terebra asukensis** YOKOYAMA, 1926 (XVI, 327, n. sp.). Asuka. *Terebra asukana*, H. & N., 1952.
- 4, 5. *Terebra dainichiana* YOKOYAMA, 1926 (XVI, 328, n. sp.). Dainichi. **Terebra (Hastula) dainichiana** YOK., MAKIYAMA, 1927.
- 6, 7. *Pleurotoma shimomatana* YOKOYAMA, 1926 (XVI, 330). Shimomata. *Turricula shimomatana*, MAKIYAMA, 1931; **Leucosyrinx coreanica** (ADAMS & REEVE, 1849), *fide* H. & N., K. & H., 1952.
8. *Pleurotoma subdeclivis* YOKOYAMA, 1926 (XVI, 329, n. sp.). Mitare. **Spirotropis subdeclivis** (YOK.), *fide* H. & N. and by K. & H., 1952.
9. **Terebra ozawai** YOKOYAMA, 1926 (XVI, 328, n. sp.). Dainichi.
10. *Cancellaria bocageana* CROSSE et DEBEAUX, 1863 (XVI, 333). Asuka. **Trigonostoma kurodai** MAKIYAMA, 1927.
11. **Ancilla rubiginosa** (SWAINSON, 1825), (XVI, 334). Kamiyashiki, Taruki. *Ancilla (Baryspira) albo-callosa* LISCHKE, 1874, *fide* H. & N., 1952; *Ancilla albocallosa* LKE., MAKIYAMA, 1927.
12. *Oliva irisans* LAMARCK, 1811 (XVI, 333). Asuka. **Oliva erythrostoma tremulina** LAMARCK, 1811, *fide* K. & H., 1952.
13. *Murex (Phyllonotus) bullocki* YOKOYAMA, 1923 (XVI, 340). Asuka. **Ocenebra bullocki** (YOK.), see Pt. 1, pl. 7, f. 5, 6.
- 14, 15. **Olivella spretoides** YOKOYAMA, 1922 (XVI, 334). Asuka. See T. & O., 1954, pl. 22, f. 4.
16. *Voluta hirugayensis* YOKOYAMA, 1926 (XVI, 335, n. sp.). Hirugaya. *Fulgoraria hirugayaensis* (YOK.), *fide* H. & N., 1952; **Fulgoraria hirugayensis** (YOK.).
17. *Ancilla suavis* YOKOYAMA, 1926 (XVI, 334, n. sp.). Shimomata. **Ancilla angusta suavis** YOK., *fide* KURODA, verbally; *A. angustata* SOWERBY, 1878 var.
18. *Drillia asukana* YOKOYAMA, 1926 (XVI, 331, n. sp.). Asuka. **Clavatula (Paradrillia) asukana** (YOK.).
- 19, 20, 21. **Siphonalia declivis** YOKOYAMA, 1926 (XVI, 337, n. sp.). Asuka.
22. *Drillia* sp. (XVI, 332). Honjo. **Turricula** sp.
- 23, 24. *Odostomia (Miralda ?) clandestina* YOKOYAMA, 1926 (XVI, 345, n. sp.). Dainichi. **Siogamaia clandestina** (YOK.), H. & N., 1952.
- 25, 26. *Murex spinicosta* BROWN (in BRONN, 1828), (XVI, 340). Dainichi. *Murex yokoyamai* HATAI & NISHIYAMA, 1952, *nom. nud.*; cf. *Murex djarianensis* MARTIN, 1895.

Remarks.

Geography—Asuka: Loc. Kyoto Univ. TK-637, Asuka in Taruki, NW of Kakegawa, Shizuoka pref., 34°47' N, 137°59' E., Dainichi sands.

Other localities: see the following remarks.



XVI. Tertiary Mollusca from Southern Tôtômi.

PLATE 51.

- 1, 2. *Cardita panda* YOKOYAMA, 1926 (XVI, 355, n. sp.). Asuka. **Venericardia panda** (YOK.), MAKIYAMA, 1927; *Megacardita panda*, H. & N., 1952.
- 3, 4. *Turritella kiiensis* YOKOYAMA, 1923 (XVI, 343). Asuka. **Turritella perterebra** YOKOYAMA, 1923, see Pt. 1, pl. 10, f. 2-5.
5. *Venus ozawai* YOKOYAMA, 1926 (XVI, 351, n. sp.). Hirugaya. Immature individual of a *Venerupis* or *Protothaca* sp.
6. *Crassatella uchidana* YOKOYAMA, 1926 (XVI, 356, n. sp.). Mitare. **Crassatellites oblongatus uchidanus** YOK., MAKIYAMA, 1927.
- 7, 8, 9. *Chione casinaeformis* YOKOYAMA, 1926 (XVI, 352, n. sp.). Hirugaya (f. 7), Living specimens from Sagami Bay for comparison (f. 8, 9). *Venus (Ventricola) foveolata*, H. & N., 1952; **Ventricoloidea foveolata** (SOWERBY, 1853), *fide* KURODA, verbally.
10. *Cardium ? egregium* YOKOYAMA, 1926 (XVI, 354, n. sp.). Hirugaya. *Pododesmus (Monia) egregius* (YOK.), *fide* H. & N., 1952; **Monia egregia** (YOK.).
- 11, 12. **Limopsis chitaniana** YOKOYAMA, 1926 (XVI, 361, n. sp.). Asuka.
13. *Chione chitaniana* YOKOYAMA, 1926 (XVI, 352, n. sp.). Tomoda. **Mercenaria chitaniana** (YOK.), H. & N., 1952,=*Mercenaria yokoyamai*, auct. non MAKIYAMA, 1927.

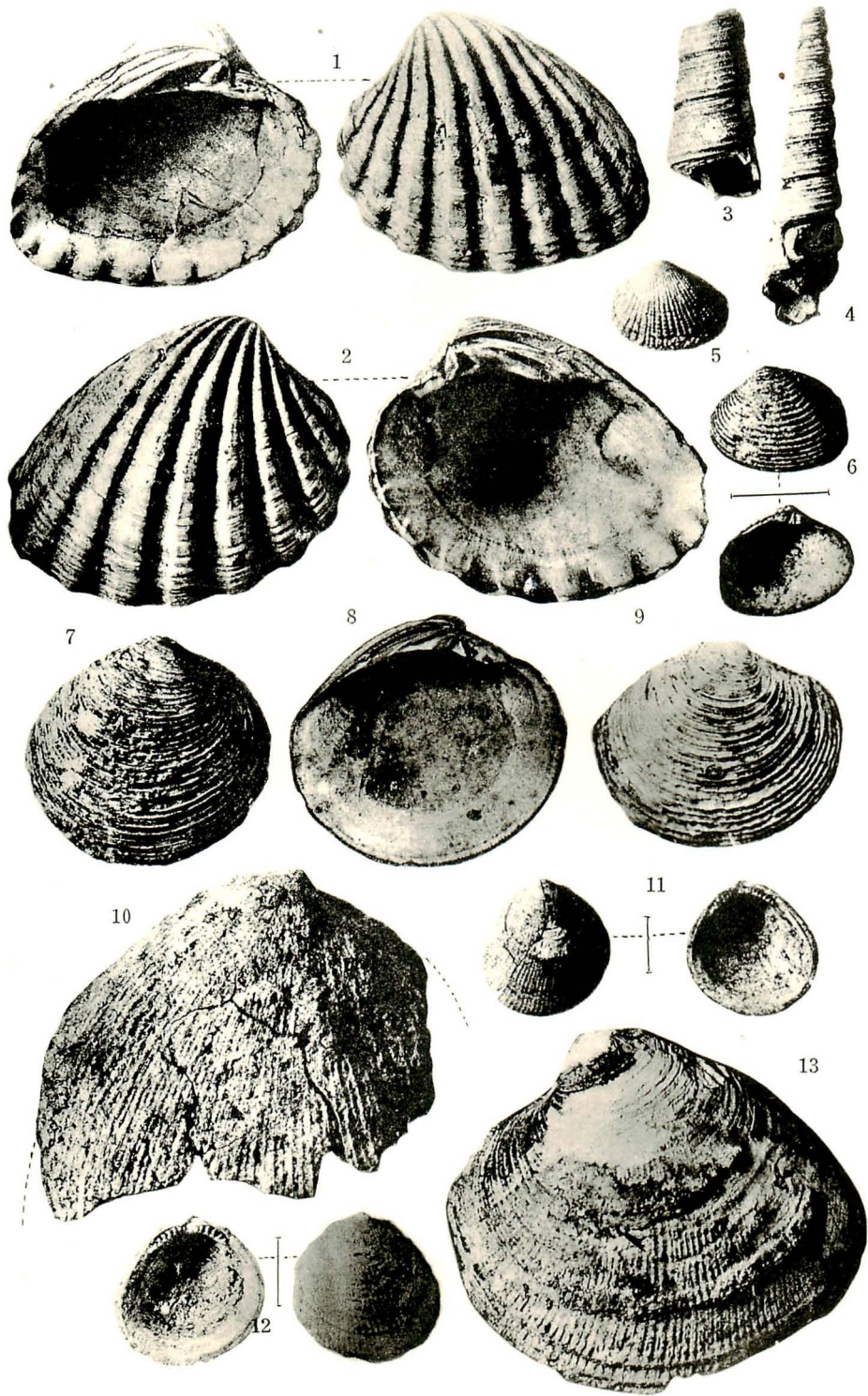
Remarks.

Geography—Dainichi: Kyoto Univ. Loc. TK-613, Dainichi in Ugari (Yamanashi), Shizuoka pref., 34°48'N, 137°4' E.

Shimomata: Loc. TK-307, wayside cutting, a kilometer SW of Railway cross in Kakegawa, 34°45' N, 138° E.

Mitare: Loc. TK-670, exposure on creek, 1.2 km NE of Kakegawa centre.

Kamiyashiki: exact loc. unknown, TK-630 or elsewhere in Taruki, Kita-Ogasa-mura, NW of Kakegawa.



XVI. Tertiary Mollusca from Southern Tôtômi.

PLATE 52.

- 1, 2. *Pecten praesignis* YOKOYAMA, 1922 (XVI, 357). Loc. unknown. ***Amussiopecten praesignis*** (YOK.), MAKIYAMA, 1927. Loc.: holotype (Jour. Geol. Soc. Tokyo, vol. 39, pl. 5, f. 1-3. and this plate) was obtained in the Tennô sand of Tennôyama near Kakegawa, TK-653 or elsewhere nearby.

Remarks.

Geography—Hirugaya: north margin of reservoir 500 m NW of Hirugaya, north of Sagara, 34°43' N, 138°10' E.

Honjo: west brook of Honjo, near shrine, East Yamaguchi section of Kakegawa city, Shizuoka pref., 34°47.1' N, 138°64' E.

Senba (pl. 53): Loc. TK-674, 400 m NE of shrine at Senba in Awamoto, Mikasa-mura, north to Kakegawa, 34°47.2' N, 138°3' E.

Tonbe (pl. 53): Loc. TK-431, wayside cutting, 800 m NW of Sakuragi station at Tonbe in Kita-Ogasa-mura, near Kakegawa.

Hosoya (pl. 53): Loc. TK-540, wayside cutting about 200 m N of cross roads at Hosoya in Haranoya-mura near Kakegawa, about 1 km north of Loc. TK-431, 34°47.2' N, 137°57.2' E.

Stratigraphy—Asuka, Dainichi, Kamiyashiki: Dainichi sands, *Suchian* the lower Pliocene, (YOKOYAMA's Satsuka Beds).

Hosoya: Hosoya formation, lower *Kechienjian*, the upper Pliocene.

Tonbe: Nangô formation, lower *Kechienjian*.

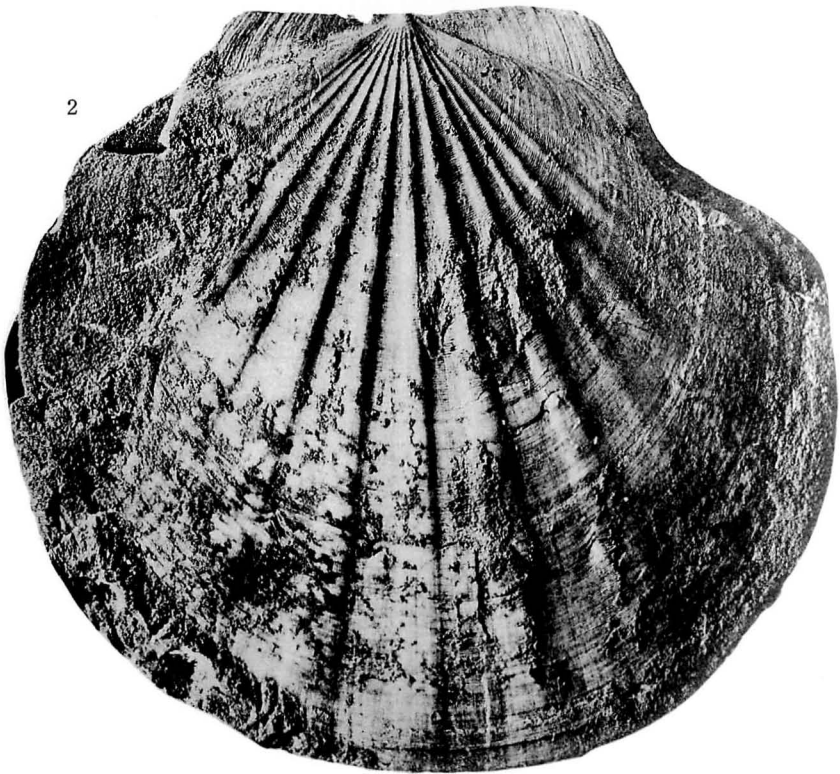
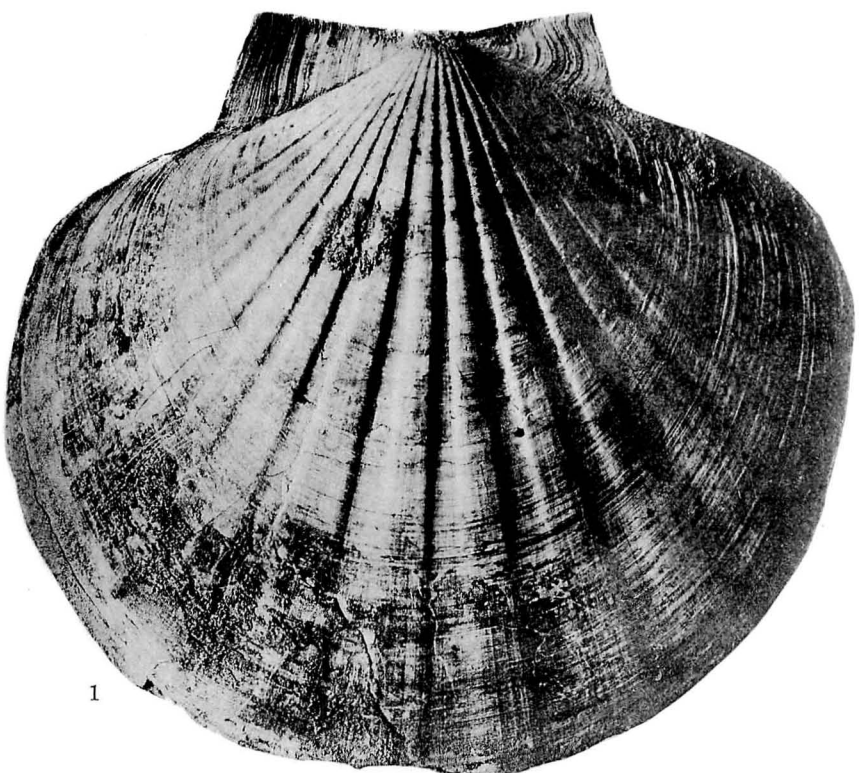
Shimomata: Hijikata formation or Kechienji mudstone.

Mitare: peripheral conglomerate of Horinouchi formation, upper *Suchian*, the lower Pliocene.

Senba: the same formation as the above, but in a lower horizon.

Honjo; Tamari formation of Sagara group, *Yuian* stage.

Hirugaya: upper Sagara formation, *Yuian* stage.



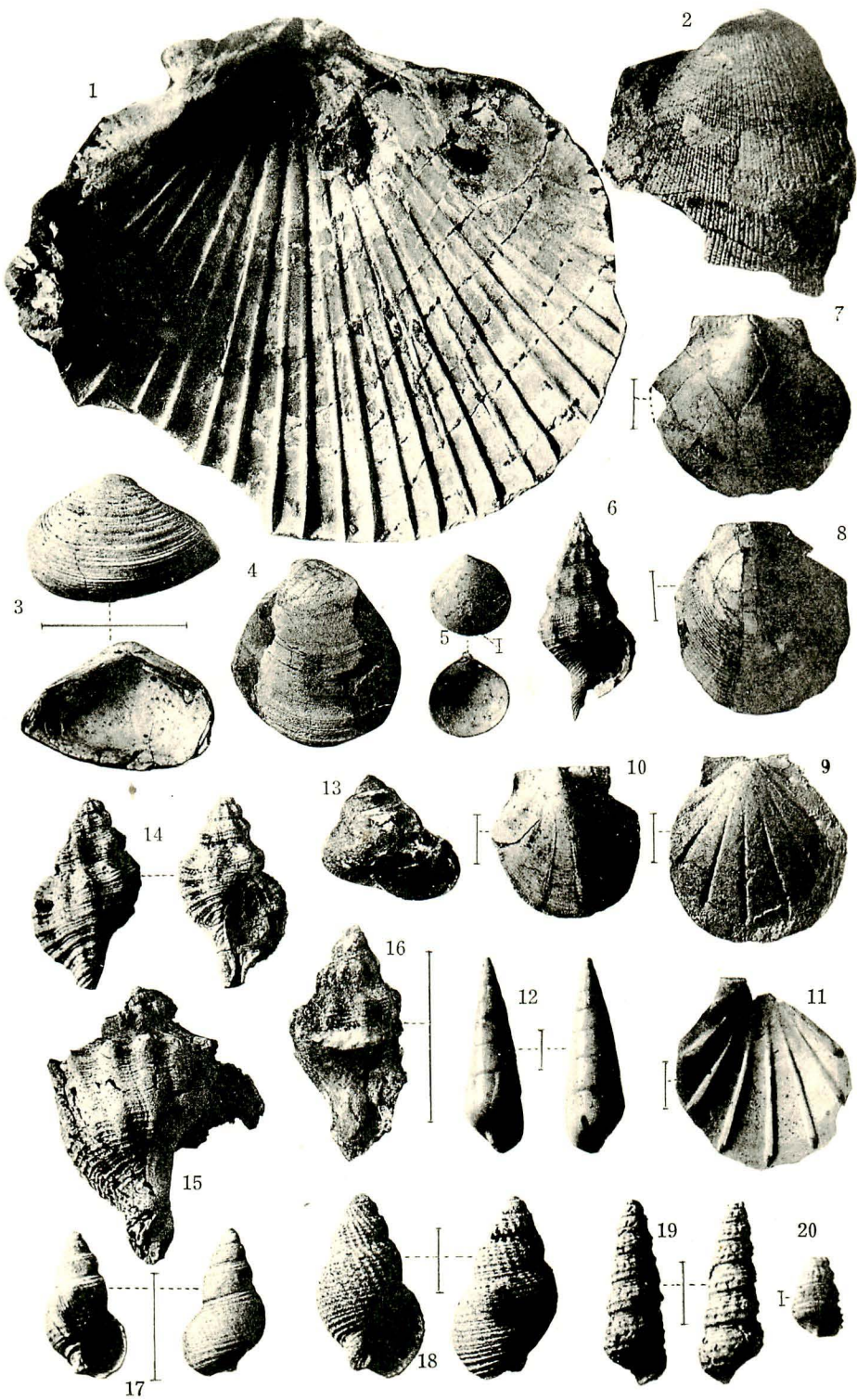
XVI. Tertiary Mollusca from Southern Tôôtômi.

PLATE 53.

1. *Pecten praesignis*, see pl. 52. Asuka. **Amussiopecten praesignis** (YOK.) $\times \frac{3}{4}$.
2. *Cucullaea concamerata* (MARTINI, 1891), (XVI, 360). Dainichi. **Cucullaea granulosa** (JONAS, 1846).
3. *Corbula erythron* LAMARCK, 1818 (XVI, 348). Dainichi. **Aloides erythron** (LAM.), K. & H., 1952; *Solidicorbula*, H. & N., 1952; *Coryocorbula*, T. & O., 1954.
4. *Dosinia* sp. (XVI, 349). Senba.
5. **Meretrix ôyuana** YOKOYAMA, 1926 (XVI, 350, n. sp.). Dainichi. *Pseudamiantis oyana* (YOK.), fide H. & N., 1952; immature.
6. **Nassaria magnifica** LISCHKE, 1874 (XVI, 338). Shimomata.
- 7, 8, 9, 10, 11. *Pecten clancularius* YOKOYAMA, 1926 (XVI, 358, n. sp.). Tombe. **Propeamussium clancularium** (YOK.), fide H. & N., 1952.
12. **Eulima (Leiostraca) hosoyana** YOKOYAMA, 1926 (XVI, 345, n. sp.). Hosoya.
13. **Calliostoma unicum** (DUNKER, 1860), (XVI, 346). Dainichi. *Calliostoma (Tristichotrochus) unicum*, IKEBE, 1942.
14. *Triton tenuiliratus* LISCHKE, 1873 (XVI, 341). Dainichi. **Cymatium (Septa) tenuiliratum** (LKE.), auct.
15. *Melongena miranda* YOKOYAMA, 1926 (XVI, 342, n. sp.). Hirugaya. **Cancellaria cf. nodulifera** SOWERBY, 1855.*
16. *Urosalpinx birileffi* (LISCHKE, 1871), (XVI, 341). Hirugaya. **Bedevena birileffi** (LKE.), see Pt. 1, pl. 7, f. 1.
17. *Bullia (Adenus?) chitanii* YOKOYAMA, 1926 (XVI, 338, n. sp.). Asuka. **Nassarius (Caesia) demissus** (YOK.), a racial form.
18. *Nassa (Niotha) congrua* YOKOYAMA, 1926 (XVI, 339, n. sp.). Asuka. **Nassarius congruus** (YOK.).
- 19, 20. **Bittium misellissimum** YOKOYAMA, 1926 (XVI, 343, n. sp.). Dainichi.

Remarks.

Taxonomy—**Melongena miranda*: proposed for the misidentified Kii specimens (Pt. 1, pl. 7, f. 2, 3), but the type was Hirugaya material; therefore the Kii form cannot be *M. miranda*.



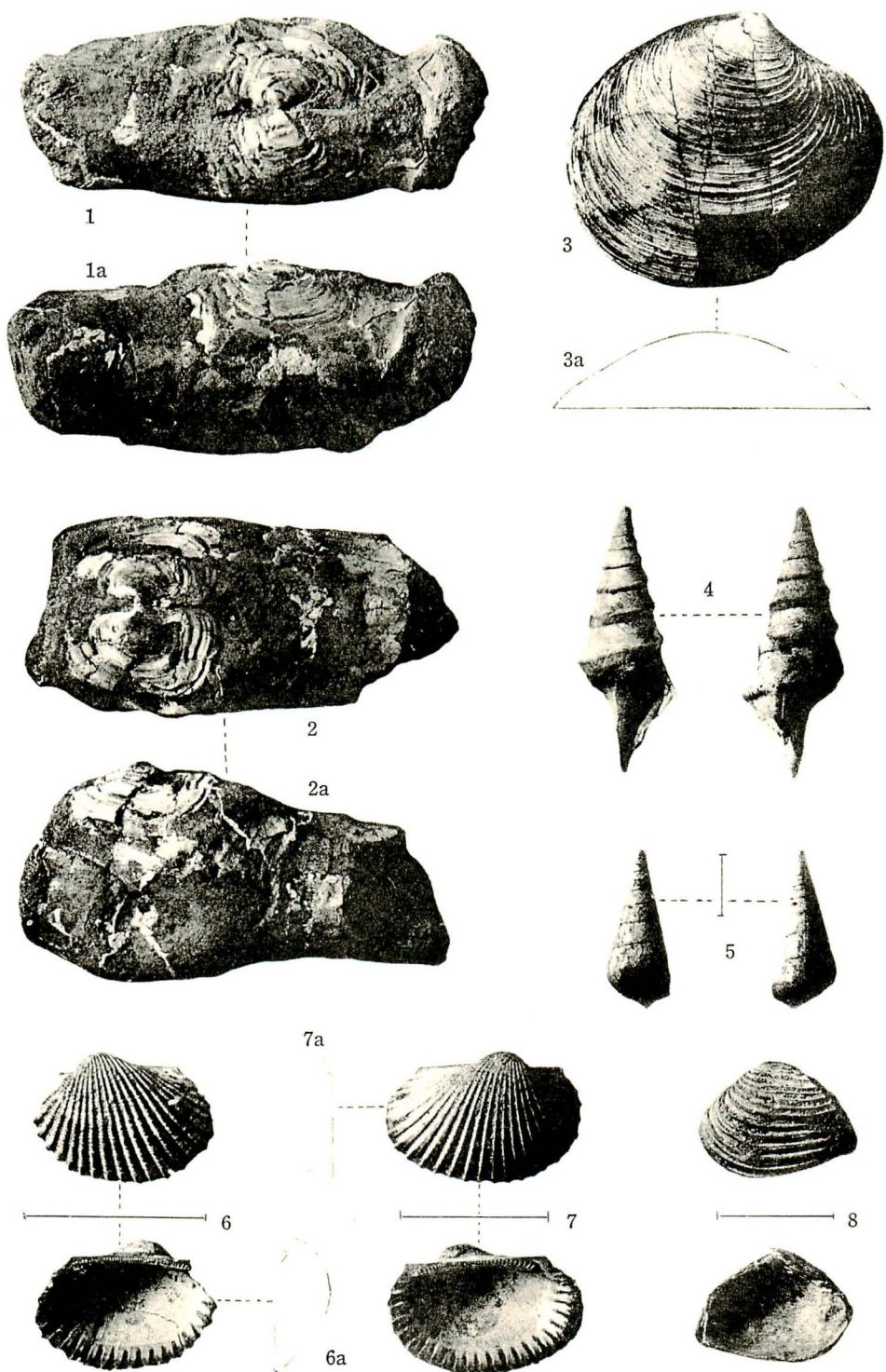
XVI. Tertiary Mollusca from Southern Tôtômi.

PLATE 54.

- 1, 2. *Aspergillum giganteum* PILSBRY, 1895 (XVII, 368). Oono, Tosa. *Brechites* (*Warnea*) *giganteus* (SOWERBY), *fide* H. & N., 1952; *Penicillus giganteus* (SOWERBY, 1888), *fide* K. & H., 1952.
3. *Chione casinaeformis* YOKOYAMA, 1926 (XVII, 368). Oono, Tosa. **Ventricoloidea foveolata** (SOWERBY, 1853), see pl. 51, f. 7, 8, 9.
4. *Pleurotoma subdeclivis* YOKOYAMA, 1926 (XVII, 367). Oono, Tosa. **Spirotropis subdeclivis** (YOK.), see pl. 50, f. 8.
5. *Niso interrupta* SOWERBY, 1834 (XVII, 367). Oono, Tosa. **Niso yokoyamai** KURODA & HABE, 1950.
- 6, 7. *Arca suzukii* YOKOYAMA, 1926 (XVII, 368, n. sp.). Oono, Tosa. *Anadara* (*Scapharca*) *philippiana* (DUNKER, 1882), *fide* H. & N., 1952. **Anadara tricenicosta** (NYST, 1844), by K. & H., 1952, *fide* Ooyama.
8. *Corbula peregrina* YOKOYAMA, 1923 (XVIII, 367). Oono, Tosa. **Aloides** (**Cuneocorbula**) **peregrina** (YOK.), see Pt. 1, pl. 8, f. 9-12.

Remarks.

Geography and Stratigraphy—Oono, Tosa: Tōnohama exposures in Oono near Yasuda, Kochi pref., 33°26' N, 134° E., Tōnohama formation, upper *Suchian*, the lower Pliocene.



XVII. Tertiary Shells from Tosa.

PLATE 55.

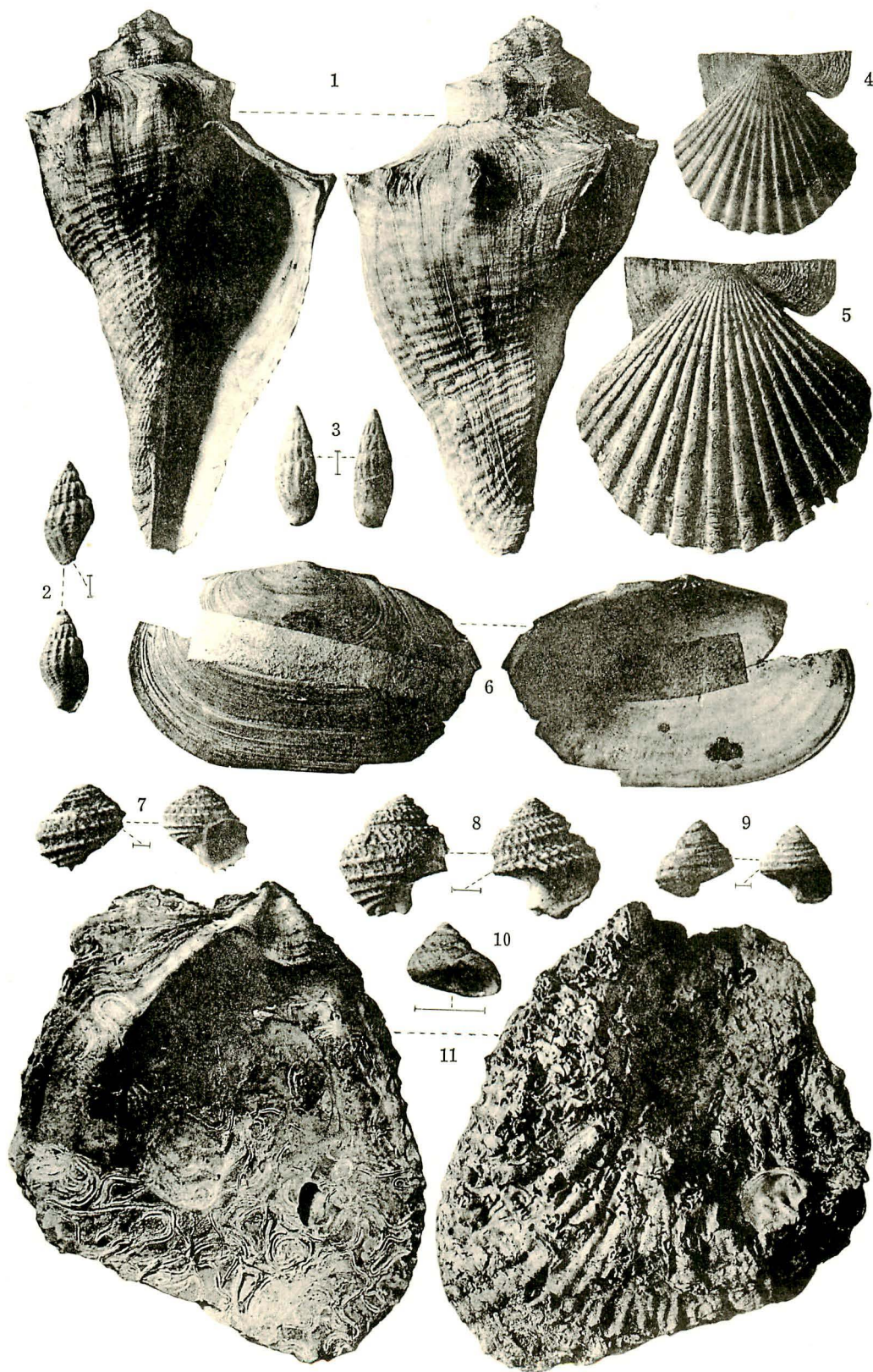
1. *Hemifusus ternatanus* (GMELIN, 1790), (XVIII, 372). Upper clay, Tonami. **Hemifusus tuba** (GMELIN, 1790), *fide* KURODA, verbally.
2. *Mangilia ishiiana* YOKOYAMA, 1926 (XVIII, 372, n. sp.). Upper clay, Tonami. **Pseudorhaphitoma ishiiana** (YOK.), *fide* H. & N., 1952.
3. *Columbella (Anachis) fratercula* YOKOYAMA, 1926 (XVIII, 373, n. sp.). Upper clay, Tonami. **Pyrene fratercula** (YOK.), *fide* H. & N., 1952.
- 4, 5. *Pecten atsumiensis* YOKOYAMA, 1926 (XVIII, 375, n. sp.). Upper clay, Tonami. **Chlamys hirasei awajiensis** PILSBRY, 1905, *fide* KURODA & HABE, 1952.
6. *Psammobia oriens* DESHAYES, 1855 (XVIII, 374). Lower gravels, Ikobe. **Dysmea oriens** (DESHAYES), *fide* K. & H., 1952.
- 7, 8. *Euchelus ornatissimus* YOKOYAMA, 1926 (XVIII, 374, n. sp.). Upper clay, Tonami. **Taliorbis ornatissima** (YOK.), *fide* KURODA, verbally.
9. *Calliostoma ishiianum* YOKOYAMA, 1926 (XVIII, 373, n. sp.). Upper clay, Tonami. *Calliostoma (Tristichotrochus) consors multiliratum*, *fide* IKEBE, 1942; **Calliostoma multiliratum** (SOWERBY, 1875), *fide* K. & H., 1952.
10. *Chlorostoma rusticum* GMELIN, 1790 (XVIII, 373). Upper clay, Tonami. **Tegula rustica** (GMELIN), *fide* K. & H., 1952.
11. *Ostrea denselamellosa* LISCHKE, 1868 (XVIII, 375). Upper clay, Tonami.

Remarks.

Geography—Tonami: sea cliff below Tonami in Atsumi peninsula, Aichi pref.

Ikobe: sea cliff at Ikobe, Takatoyo, Atsumi peninsula, Aichi pref.

Stratigraphy—Pleistocene deposits of Atsumi; mollucan assemblages show increasing salinity from the lower gravels to the upper clay.



XVIII. Fossil Shells from the Atsumi Peninsula.

PLATE 56.

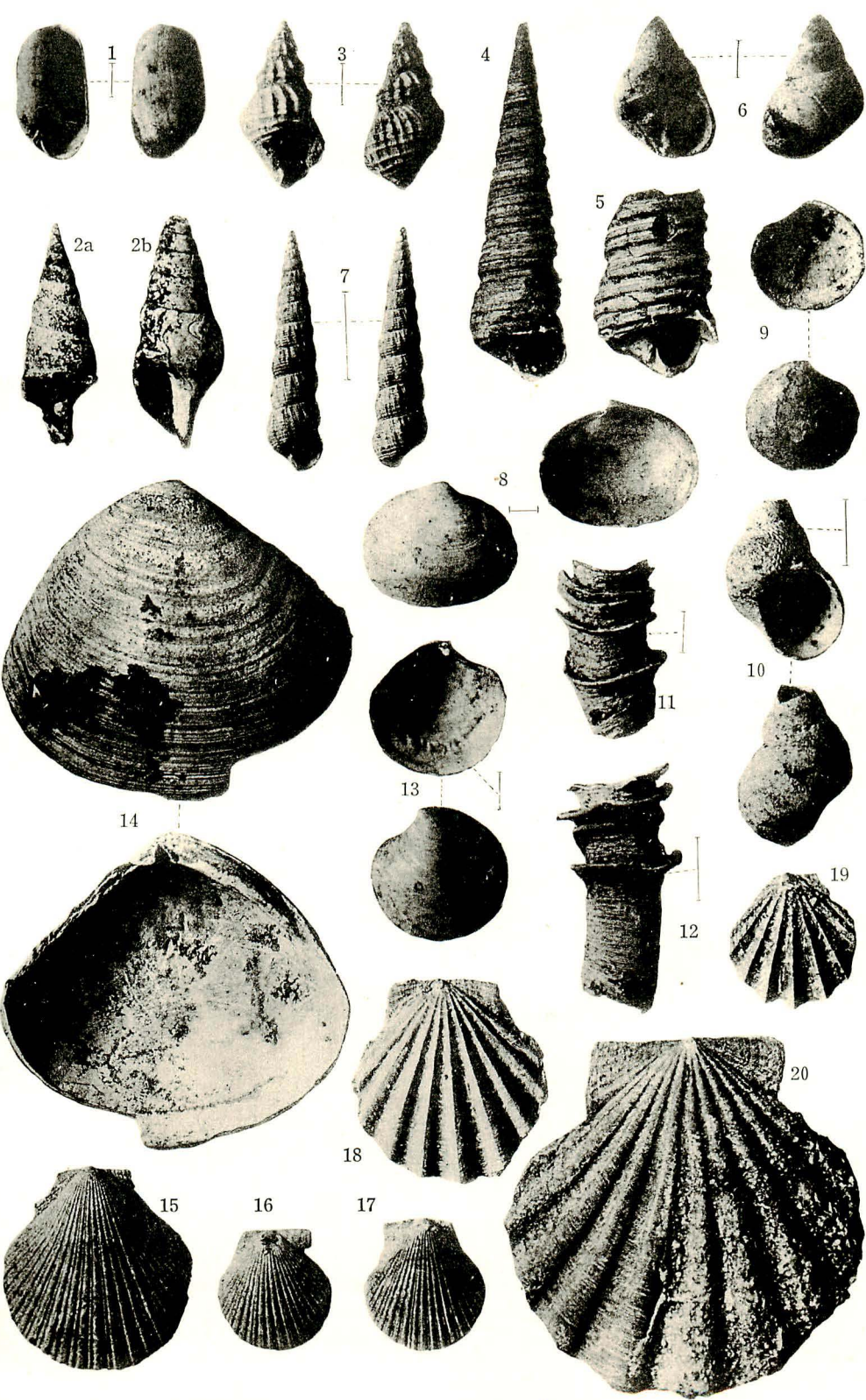
1. *Cylichna andenica* YOKOYAMA, 1926 (XIX, 383, n. sp.). Beds A, Anden.
2. *Pleurotoma contraria* YOKOYAMA, 1926 (XIX, 383, n. sp.). Beds B, Manganji. **Antiplanes kamchatica** DALL, 1919, *fide* K. & H., 1952.
3. *Cancellaria murayamai* YOKOYAMA, 1926 (XIX, 384, n. sp.). Beds B, Manganji. **Admete murayamai** (YOK.), *fide* H. & N., 1952.
- 4, 5. *Turritella saishuensis* YOKOYAMA, 1923 (XIX, 384). Beds B, Manganji. **Turritella saishuensis etigoensis** IKEBE, 1940; *Turritella* (*Neohaustator*) *saishuensis*, IDA, 1952.
- 6, 10. *Gibbula inornata* YOKOYAMA, 1926 (XIX, 385, n. sp.). Beds A, Anden.
7. *Turbonilla* (*Mormula*) *chitaniana* YOKOYAMA, 1926 (XIX, 384, n. sp.). Beds A, Anden. **Plesioacirsa chitaniana** (YOK.),=? *martensi* DE BOURY, 1936.
8. *Kellia laperosii* DESHAYES, 1839 (XIX, 386). Beds A, Anden. **Chironia suborbicularis laperosii** (DESHAYES), *fide* GRANT & GALE, 1931; not *Erycina laperosii* RÉCLUZ, 1844.
- 9, 13. *Thyasira rotundata* YOKOYAMA, 1926 (XIX, 386, n. sp.). Beds A, Anden. **Leptaxinus rotundatus** (YOK.), *fide* H. & N., K. & H., 1952.
- 11, 12. *Clavagella japonica* YOKOYAMA, 1926 (XIX, 386, n. sp.). Beds A, Anden.
14. *Gastrana yantaiensis* (CROSSE et DEBEAUX, 1863), (XIX, 385). Beds A, Anden. *Macoma middendorffi* DALL, 1886 ? *fide* KURODA, verbally; *Heteromacoma irus* (HANLEY, 1845), *fide* H. & N., 1952.
- 15, 16, 17. *Pecten akitanus* YOKOYAMA, 1926 (XIX, 388, n. sp.). Beds B, Kurosawa. **Chlamys akitana** (YOK.), *fide* H. & N., 1952.
- 18, 19, 20. *Pecten murayamai* YOKOYAMA, 1926 (XIX, 387, n. sp.). Beds B, Kurosawa.

Remarks.

Geography—Anden: sea cliff near Anden, NW shore of Oga peninsula, Akita pref., 39° 58.2' N, 139° 51.2' E.

Manganji: small exposure behind Manganji in Otomo, Yuri district, Akita pref., 39° 20' N, 140° 5' E.

Kurosawa: wayside big exposure near Kurosawa in Taihei, Minami-Akita district, Akita pref., 39° 44' N, 140° 13.1' E.



XIX. Fossil Mollusca from the Oil-Fields of Akita.

PLATE 57.

- 1, 2. **Ostrea gravitesta** YOKOYAMA, 1926 (XIX, 388, n. sp.). Beds F, Kinonezaka.
3. **Pecten kurosawensis** YOKOYAMA, 1926 (XIX, 388, n. sp.). Beds B, Kurosawa. *Pecten kurosawaensis*, genus doubtful H. & N., 1952.
4. *Pandora pulchella* YOKOYAMA, 1926 (XIX, 387, n. sp.). Beds A, Anden. **Pandora (Kennerlia) pulchella** YOK. auct.

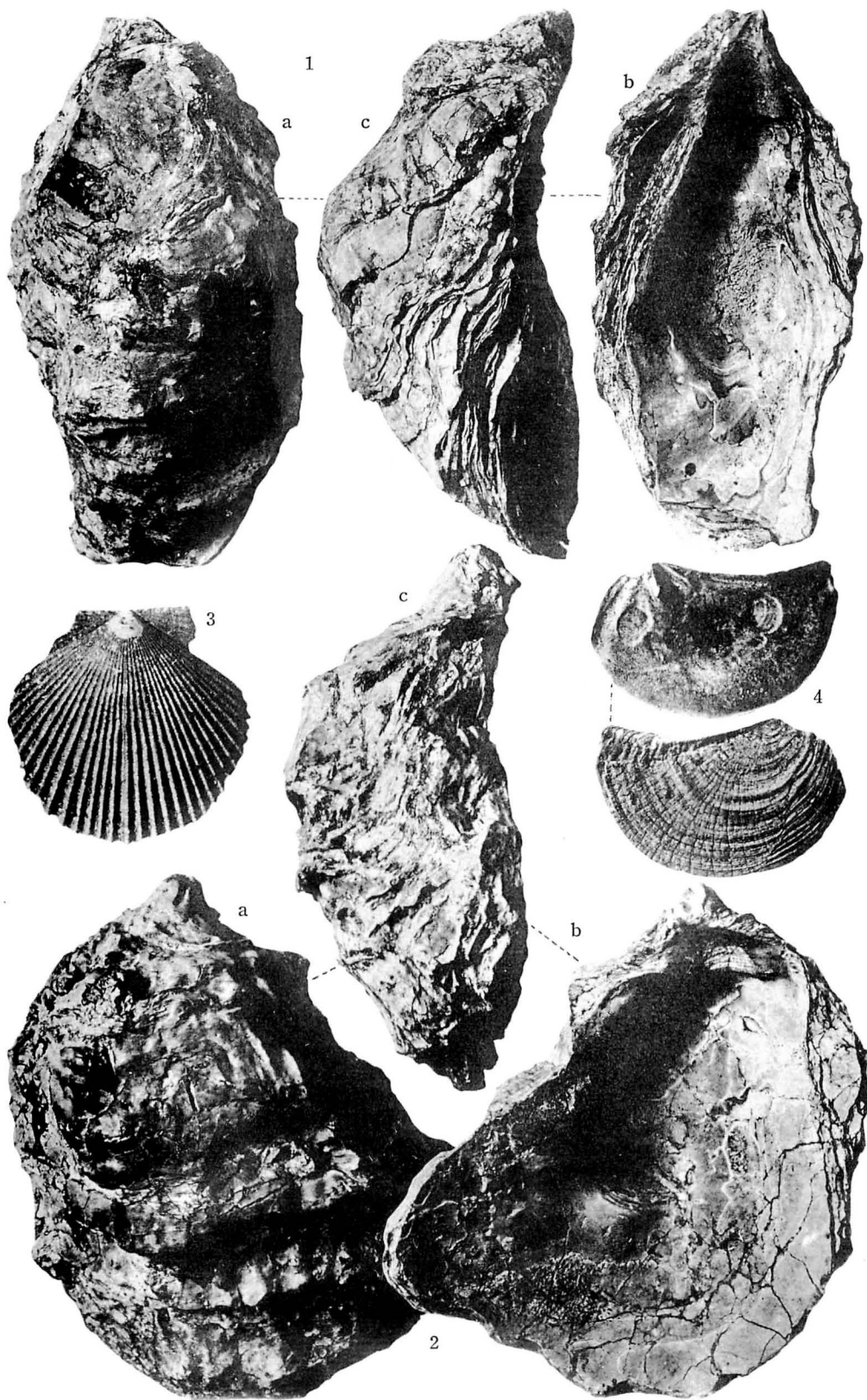
Remarks.

Geography—Kinonezaka: quarry near Kinonezaka in Yaji of Soto-Otomo, Senpoku district, Akita pref., 39°22.1' N, 140°21.1' E.

Stratigraphy—Beds A: Wakimoto Pliocene.

Beds B: sandy shale, Wakimoto Pliocene, *Manganjian* stage.

Beds F: green tuffite, Miocene.



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