7. *Marine Lower Pleistocene of the Central Kwanto Plain.*

(*An evidence of basin forming force of the Kwanto plain.*)

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It is regrettable that our knowledge regarding the distribution of the marine Lower Pleistocene in the Central Kwanto plain is so meagre. Recently the writer through the courtesy of the Nippon Sakusen Company, had occasion to examine some boring cores from Hudooka-mati, near Kazo-mati, Saitama pref.

The boring was made in the grounds of the Katakura Seisi Boseki Company situated at the east end of Hudooka-mati, near Kazo-mati, in Saitama prefecture, as shown in Fig. 1. Fig. 2 is a columnar section, showing the underground formation. In the columnar section, the sandy clay between the 106~116 m depths and the gravels of pumice between the 128~141 m depths below the ground surface are interesting.

The former contains many fossil mollusca and foraminifera, as listed below:

List I.

	Geologic occurrence nr. Tokyo		
	Pliocene	Pleisto-cene	Recent
Arca (*Scapharca*) *inflata* REEVE	Naganuma	Tokyo	Tokyo Bay
Meretrix meretrix (LINNÉ)	Omma series	Tokyo	Tokyo Bay
Dosinia (*Phacosoma*) *japonica* (REEVE)	Naganuma	Tokyo	Tokyo Bay
Cadulus sp.	*unknown*	*unknown*	*unknown*
Dentalium (*Dentalium*) *hexagonum* GOULD	Naganuma?	Tokyo	Tokyo Bay
Menestho nishiana (YOKOYAMA)	*unknown*	Tokyo	*unknown*
Odostomia sublimpida YOKOYAMA	Miyata?	Tokyo	*unknown*
Turbonilla edoensis YOKOYAMA	*unknown*	Tokyo	Turumi
Turbonilla keiskeana YOKOYAMA	*unknown*	Tokyo	*unknown*
Turbonilla (*Mormula*?) sp.	*unknown*	*unknown*	*unknown*
Pyramidella (*Tiberia*) *ebarana* YOKOYAMA	*unknown*	Tokyo	*unknown*
Polynices sagamiensis PILSBRY	Low. Kakegawa	Noto	Tokyo Bay
Natica (*Tectonatica*) *janthostoma* DESHAYES	Low. Musasino	Tokyo	Tokyo Bay
Nassarius (*Hinia*) *muroii* OTUKA n. sp.	*unknown*	Tokyo	Tokyo Bay
Clavatula consimilis (SMITH)	Naganuma	Tokyo	Tokyo Bay

(*to be continued.*)

List I. (*continued.*)

Suavodrillia declivus (MARTENS)	*unknown*	Simosa	Matusima Bay
Mangelia aff. *deshayesii* DUNKER	Low. Musasino	Tokyo	Matusima Bay
Mangelia gracilenta (REEVE) var.	*unknown*	Tokyo	Tokyo Bay?
Mangelia makiyamai OTUKA	*unknown*	Noto	*unknown*
Etrema fortilirata (SMITH)	*unknown*	Tokyo	C. W. Jap.
Terebra (*Strioterebrum*) *bathyraphe* SMITH	*unknown*	Tokyo	Tokyo Bay
Ringicula (*Ringiculella*) *yokoyamai* TAKEYAMA	Naganuma	Simosa	*unknown*
Rotalia sp.			
Echinoderm spines			

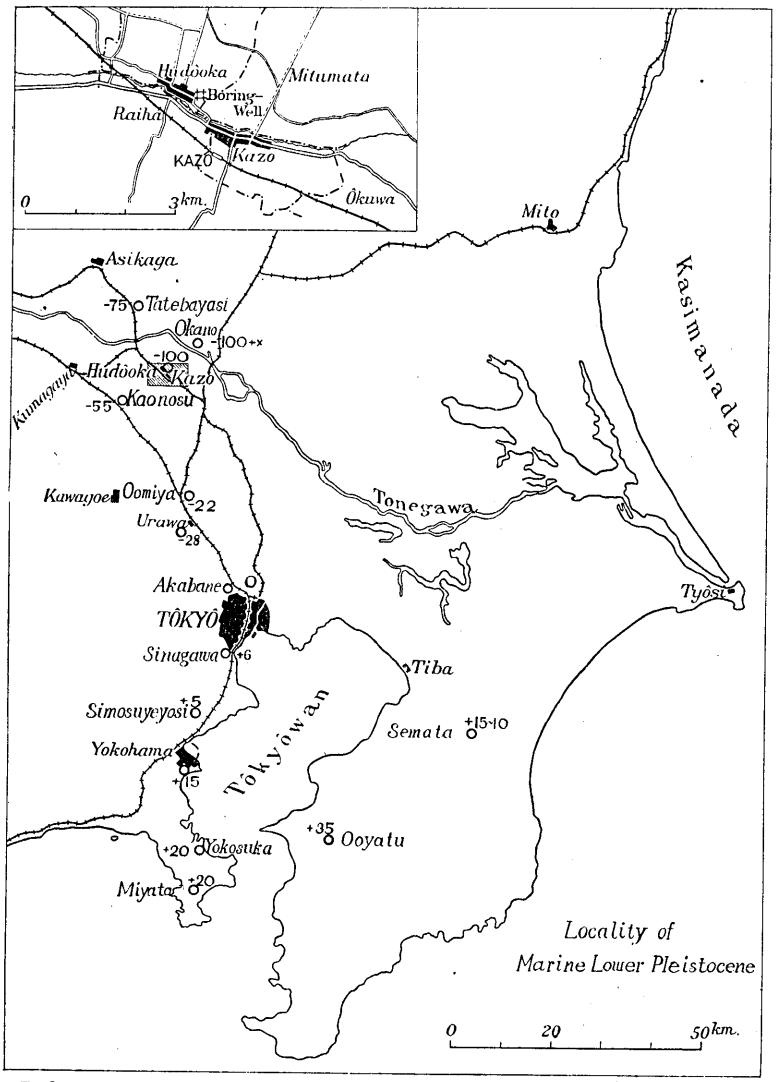

Fig. 1. Index map. Circles (O) show the localities of marine Lower Pleistocene. Numeral near the locality shows the height or depth of the marine Lower Pleistocene referred to the mean sea-level.

In the above list, 77 percent (17 out of 22 sp.) of mollusca are common to the marine Lower Pleistocene nr. Tokyo, in which a Lower Pleistocene mammal, *Elephas namadicus naumanni* MAKIYAMA,[1] is associated. Of these 17 sp., 4 sp. have been described by YOKOYAMA[2] as new from the Lower Pleistocene just mentioned.

"The gravels of pumice", which consists of andesite tuff is a characteristic bed. Similar beds are widely distributed below the marine Lower Pleistocene in Saitama and Tokyo prefectures; the borings at Urawa and Oomiya in Saitama prefecture, Akabane and Hongo in Tokyo prefecture having yielded pumice gravels below the marine Lower Pleistocene. From all this the writer concludes that the fauna of the shell bearing sandy clay between depths 106~116 m below the land surface at Hudooka-mati is probably contemporaneous with the marine Lower Pleistocene of Tokyo. Owing to this occurrence of marine fauna, the Lower Pleistocene shore line (d1 II) in the writer's figure[3] on page 1591 in the Proc. 5th Pacific Sci. Congr., Canada, has to be extended to the northern corner of Saitama prefecture.

As the land surface of Hudooka-mati is about 10 m above sea level, the shell bearing sandy clay is situated at about 100 m below sea-level, while the depth of the Lower Pleistocene shell bearing bed at Tatebayasi, Koonosu, Oomiya, Akabane, Hongoo, Kanagawa and Tiba prefecture gradually

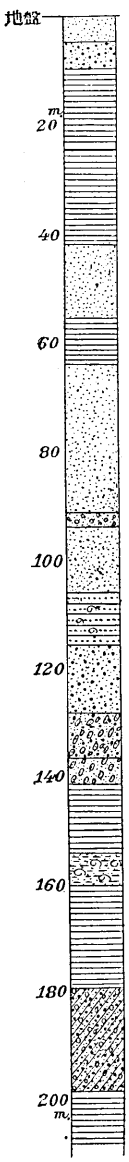

Fig. 2. Columnar section of bore well in the grounds of the Katakura Seisi Boseki Company, Hudooka mati, Kitasaitama-gori, Saitama-pref.

1) S. TOKUNAGA, *Jour. Coll. Sci. Imp. Univ. Tokyo*, **21** (1906), 72~75.
J. MAKIYAMA, *Mem. Coll. Sci. Kyoto Imp. Univ.*, [B], **1** (1924), 255~264.
2) M. YOKOYAMA, *Jour. Fac. Sci. Imp. Univ. Tokyo*, [2], **1** (1927), 391~457.
3) Y. OTUKA, *Proc. 5th Pacific Sci. Congr.*, (1933), 1591.

decreases as one goes toward the south and west margin of the Kwanto plain. If these marine Lower Pleistocene beds are all almost the same ones, this diminishing of depth may support R. Aoki's[4] opinion that the Kwanto plain is the result of basin forming forces operating since late Pliocene.

The numerals placed near the localities of marine Lower Pleistocene deposits (the writer's dl II) in fig. 1 show the heights or depths of these shells bearing marine Lower Pleistocene beds referred to recent mean sea-level. From these numerical values, it may be seen that the Central Kwanto has subsided relatively to the south and west since early Pleistocene, although these marine beds are not strictly contemporaneous with eath other.

Followings are the list and the description of the fossils.

1. *Arca* (*Scapharca*) *inflata* REEVE

1844 *Arca inflata* REEVE, Conch. Icon. *Arca*, Pl. 25, fig. 30; 1859-67 *Arca broughtoni* SCHRENCK, Reis. Amurl. Zool., Moll.p. 578, Pl. 24, fig. 1~3; 1906 *Arca tenuis*, TOKUNAGA, Jour. Coll. Sci. Imp. Univ. Tokyo, Jap. **21**, 2, p. 53, Pl. 4, fig. 1; 1927 *Arca inflata*, YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10, p. 403, p. 446; 1930 *Anadara inflata*, KURODA, Venus, **2**, 1, Appendix p. 32.

Geol. age.—Pliocene-Recent. Geogr. distr.-Around Honsyu, Hokkaido, Kyusyu.

Some fragmental specimens were collected. Rg. No. 2542, Coll. E. R. I.*

2. *Meretrix meretrix* (LINNÉ)

1758 *Venus meretrix* LINNÉ, Syst. Nat. ed. **10**, p. 686; 1927 *Meretrix gordonis* YOKOYAMA, Jour. Fac. Sci. Tokyo Imp. Univ. (2), **1**, p. 429.

Geol. age.—Pliocene-Recent. Geogr. distr.—Around Honsyu, Kyusyu.

Some young specimens were collected. *Meretrix gordonis* YOKOYAMA may be young specimen of *Meretrix meretrix* (LINNÉ).

3. *Dosinia* (*Phacosoma*) *japonica* (REEVE)

1850 *Artemis japonica* REEVE, Conch. Icon., *Artemis*, Pl. 3, fig. 17; 1920 *Dosinia troscheli*, YOKOYAMA, Jour. Coll. Sci. Tokyo Imp. Univ., **39**, 6, p. 119, Pl. 8, fig. 5, 6.

Geol. age.—Pliocene-Recent. Geogr. distr.—Central and Western Japan, Hokkaido.

Some fragmental specimens were collected.

4. *Cadulus* sp.

Fig. 7.

5. *Dentalium* (*Dentalium*) *hexagonum* GOULD

1859 *Dentalium hexagonum* GOULD, Proc. Bost. Soc. Nat. Hist., **7**, p. 166.

Geol. age.—Pliocene-Recent. Geogr. distr.—Kyusyu, Honsyu, Sikoku.

8 fragmental specimens were collected.

6. *Menestho nishiana* (YOKOYAMA)

1927 *Odostomia*(*Menestho*)*nishiana* YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10. p. 421~2, Pl. 47, fig. 14.

Geol. age.—Lower Pleistocene.

One fragmental specimen was collected.

7. *Odostomia sublimpida* YOKOYAMA

4) R. AOKI, *Jour. Geol. Soc. Tokyo.*, **37**, (1930), 255~258.

* Coll. E. R. I.=Collection of Earthquake Research Institute.

1920 *Odostomia (Odostomia) sublimpida* YOKOYAMA, Jour. Coll. Sci. Tokyo Imp. Univ., **39**, 6, p. 82, Pl. 5, fig. 13.

Geol. age.—Pliocene-Lower Pleistocene. Geogr. distr.—Central Japan.

8. *Turbonilla edoensis* YOKOYAMA

1927 *Turbonilla (Chemnitzia) edoensis* YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10, p. 424, Pl. 47, fig. 24.

Geol. age.—Lower Pleistocene-Recent (Turumi?) Geogr. distr.—Kwanto. Rg. No. 2543. Coll. E. R. I.

Specimens from Oogisima, nr. Turumi have more distinct axial ribs than the fossil specimens. Hudooka specimens are quite identical with the type specimens from Kurumatyo near Sinagawa in Tokyo.

9. *Turbonilla keiskeana* YOKOYAMA

1927 *Turbonilla (Chemnitzia) keiskeana*, YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10, p. 424, Pl. 47, fig. 19.

Geol. age.—Lower Pleistocene. Geogr. distr.—Tokyo.

Specimen from Hudooka is a fragmental shell. Rg. No. 2594, Coll. E. R. I.

10. *Turbonilla* sp.

This species closely allied to *Turbonilla (Mormula) semicolorata* YOKOYAMA[5] in its outline, but the former differs from the latter in having no spiral sculpture in interspaces between axial ribs. Rg. No. 2596, Coll. E. R. I.

11. *Pyramidella (Tiberia) ebarana* YOKOYAMA

Pyramidella (Tiberia) ebarana YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10, p. 418, Pl. 47, fig. 6.

Geol. age.—Pleistocene. Geogr. distr.—Central Japan.

4 specimens were collected. Rg. No. 2544, Coll. E. R. I.

12. *Polynices sagamiensis* PILSBRY

1904 *Polinices sagamiensis* PILSBRY, Proc. Acad, Nat. Sci. Philadelphia, **56**, p. 23, Pl. 4, figs. 37, 37 a; 1935 *Polynices sagamiensis*, OTUKA, Bull. Earthq. Res. Inst., **13**, 4, p. 866, Pl. 53, fig. 36.

One fragmental specimen was collected.

13. *Natica janthostoma* DESHAYES

Natica janthostoma DESHAYES, Revue d. Zool. p. 361.

One specimen was collected.

14. *Nassarius (Hinia) muroii* OTUKA n. sp.

Fig. 8, 9.

Shell ovate-turreted, solid and thick. Sculpture of strong rounded longitudinal folds as wide as their intervals, 12~16 in number on last whorl, last one much larger, forming a prominent, rounded swollen varix behind lip, usually preceeded by a small rib. Varix usually visible on last 2 whorls. Over folds and intervals coarsely run fine and large spiral cords, rounded or flattened, as wide as their intervals or narrower. On last whorl, there are 1~3 fine in subsutural area, and 9~10 large cords on surface except subsutural area. Whorls about 7·5~7; 2·5 of which smooth embryonal. Aperture ovate; outer lip with 7~10 equal teeth within; columella calloused, well defined, white, with one small tooth near posterior corner.

(Holotype) Length 10·4 mm diam. 6·7 mm, largest diam. of aperture 4·6 mm.
(Paratype) " 8·7 mm " 4·6 mm, " " " 4·0. mm.

This form may be a variety of *Nassarius semiplicatus hiradoensis* PILSBRY (Proc. Acad. Nat. Sci. Philad. **56** (1904), pp. 20~21, Pl. 4, fig. 35), but the former has fine

5) M. YOKOYAMA, *Jour. Fac. Sci. Imp. Univ. Tokyo*, [ii], **1** (1927), 424, Pl. 47, fig. 22.

subsutural spiral cords, almost equal teeth on the inner side of outer lip, and well defined callous with one tooth on the posterior corner of columella.

Nassarius fraterculus (DUNKER)[6] has a higher shell with finer sculptures.

Nassarius (*Hinia*) *dominulus* (TAPPARONE-CANEFRI)[7] is another allied species. But this sp. has a shell sculptured with 16 axial ribs. Inner side of outer lip of this shell is toothed irregularly.

Holotype and Paratype: No. 2593, in E. R. I.

15. *Clavatula consimilis* (SMITH)

1879 *Pleurotoma consimilis* SMITH, Proc. Zool. Soc. London, p. 188, Pl. 19, fig. 11.
1935 *Clavatula consimilis*, OTUKA, Bull. Earthq. Res. Inst. Imp. Univ. Tokyo, **13**, 4, p. 172, Pl. 54, figs. 103, a, b, c.

Geol. age.—Pliocene-Recent. Geogr. distr.—Isikawa pref. Tokyo, Kanagawa, Matusima bay, Hukui pref. Rg. No. 2590, Coll. E. R. I.

16. *Suavodrilla declivus* (MARTENS)

Pleurotoma declivus MARTENS, Conchol. Mittheil., p. 39, Pl. 9, fig. 2.

Geol. age.—Pliocene-Recent. Geogr. distr.—Northern Japan, Tokyo, Tiba, Ibaraki. Rg. No. 2591, Coll. E. R. I.

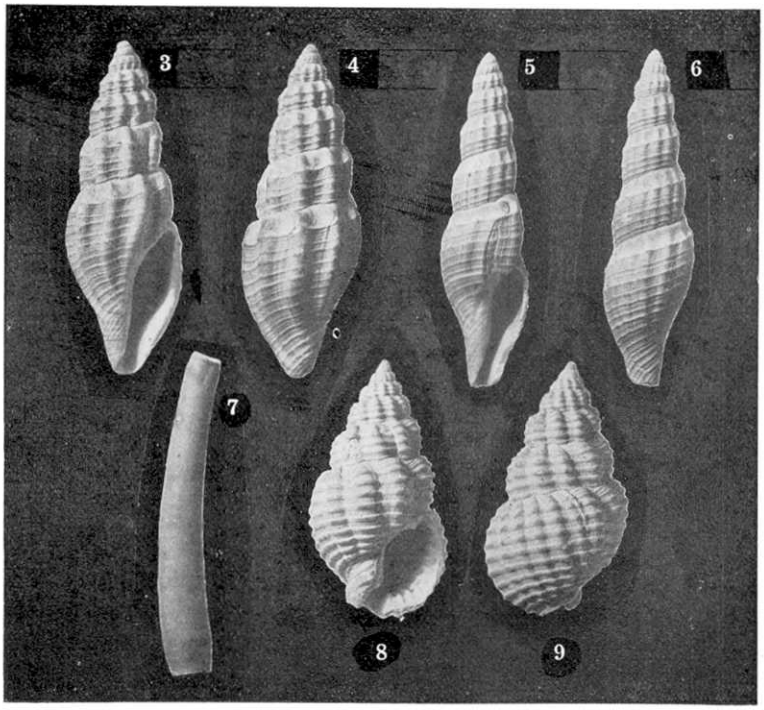

Fig. 3, 4. *Mangelia deshayesi* DUNKER. Fig. 5, 6. *Mangelia gracilenta* var. Fig. 7. *Cadulus* sp. Fig. 8, 9. *Nassarius muroii* n. sp.

17. *Mangelia deshayesii* DUNKER

Fig. 3, 4.

6) DUNKER, *in malakoz. Bl.* 1860, p. 380.

7) (TAPPARONE-CANEFRI, *Zool. del Viaggio intorno al globo della Regia fregata Magenta durante gli Anni* 1865~68, *Malacologia*, 1874, p. 19, Pl. 1, fig. 17.)

1860 *Mangilia (Pleurotoma) deshayesii* DUNKER, in malakoz. Bl., **6**, p. 228; 1920 *Mangilia deshayesii*, YOKOYAMA, Jour. Coll. Sci, Tokyo Imp. Univ., **39**, 6, p. 41, Pl. 1, fig. 24.

Shell very small, fusiform; spire terraced; whorls about 7~8, apical 3 of which nuclear. First and second nuclear whorls smooth, third ornamented with spiral sculpture which sometimes worned. Postnuclear whorl sculptured with slightly curved, obliquely longitudinal ribs and unequal spiral threads. Axial ribs prominent, angled near preceding suture. Body whorl sculptured with 8~9 axial ribs which are crossed by about more than 13 spaced spiral threads, with 5~8 smaller threads between them. On penultimate whorl 9~11 axial ribs, 4~5 large spiral threads, and 5~7 fine intercalaries exist. Broad sloped subsutural area sculptured with fine spiral threads (about 16), and bounded by blunt shoulder angle on which uppermost large spiral thread located. Aperture oblong; columellar margin concave slightly above the middle. Outer lip thick, with a moderately deep rounded sinus above; smooth within. Varix visible on last three whorls.

Length	8·7 mm	Diam.	3·0 mm	Largest diam. of aperture			4·1 mm.
〃	7·2 mm	〃	2·8 mm	〃	〃	〃	3·4 mm.

Hypotype: No. 2546, Coll. E. R. I.

This species corresponds fairly well with *Mangelia kamakurana* PILSBRY[8] in its sculpture. It differs from the latter species in having higher shell.

Cythara tabatensis (TOKUNAGA)[9] differs from *Mangelia deshayesii* DUNKER in its sculpture.

Mangelia makiyamai OTUKA[9] has a lower spire than DUNKER's species.

Mangelia semicarinata PILSBRY[10] has 16 axial ribs.

18. *Mangelia gracilenta* (REEVE) var.

Fig. 5, 6.

This specimen colsely identical with *Mangelia gracilenta* (REEVE),[11] but the former has longer shell. Rg. No. 2592, Coll. E. R. I.

19. *Mangelia makiyamai* OTUKA

1935 *Mangelia makiyamai* OTUKA, Bull. Earthq. Res. Inst. Imp. Univ. Tokyo, **13**, 4, p. 874, Pl. 54, fig. 94.

Geol. age.—Lower Pleistocene. Geogr. distr.—Noto, Saitama. Homoeotype: Rg. No. 2545, Coll. E. R. I.

20. *Etrema fortilirata* (SMITH)

1879 *Drillia fortilirata* SMITH, Proc. Zool. Soc., p. 195, Pl. 19, fig. 22; 1927 *Drillia fortilirata*, YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10, p. 410, Pl. 46, fig. 20.

7 specimens were collected. Rg. No. 2587, Coll. E. R. I.

21. *Terebra (Strioterebrum) bathyraphe* SMITH

1875 *Terebra bathyraphe* SMITH, Ann. Mag. Nat. Hist., (4), **15**, p. 415; 1927 *Terebra edoensis* YOKOYAMA, Jour. Fac. Sci. Imp. Univ. Tokyo, (2), **1**, 10, p. 409, Pl. 46, fig. 8.

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8) PILSBRY, *Proc. Acad. Nat. Sci. Philad.*, **56**, (1904), p. 10, Pl. 2, fig. 11.

9) TOKUNAGA, *Jour. Coll. Sci. Tokyo Imp. Univ.*, **21** (1906), p. 15, Pl. 1, fig. 27.

10) OTUKA, *Bull. Earthq. Res. Inst. Imp. Univ. Tokyo*, **13** (1935), p. 874, Pl. 54, fig. 94.

11) PILSBRY, *Proc. Acad. Nat. Sci. Philad.*, **56**, (1904), p. 9, Pl. 2, fig. 16.

12) *M. gracilenta*, YOKOYAMA, *Jour. Fac. Sci. Imp. Univ. Tokyo.*, [2], **1**, (1927), p. 411, Pl. 46, fig. 13.

2 specimens were collected. Rg. No. 2590, Coll. E. R. I.

22. *Ringicula* (*Ringiculella*) *yokoyamai* TAKEYAMA

1922 *Ringicula musashinoensis*, YOKOYAMA, Jour. Coll. Sci. Tokyo Imp. Univ., **44**. 1, p. 30, fig. 16, 17 (not of YOKOYAMA 1920); 1935 *Ringicula yokoyamai* TAKEYAMA, Venus, **5**, 2, 3, p. 74~78, Pl. 5, figs. 19~20, Pl. 6, figs. 21~25.

Geol. age.—Lower Pliocene-Pleistocene. Geogr. distr.—Central Japan.

17 specimens were collected. Rg. No. 2589, Coll. E. R. I.

23. *Rotalia* sp.

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7. 中部關東平野の海成洪積層（摘要）

（關東造盆地運動の一資料）

地震研究所 大塚彌之助

日本鑿泉株式會社の好意により埼玉縣北埼玉郡不動岡町の地下地質系統の性質を知り得た．地表下 106~116 米の間にある含貝化石砂質粘土は多くの貝化石を含み，第1表の如き種を含み，東京層の動物群に比べられる．同貝層下の輕石層（地表下 128~141 米）は東京府，埼玉縣の地下に廣く見られるものと類似し，上記の貝層が東京層たるを知るよき手懸りとなつた．東京層の地上・地下の海拔高度を記すと第1圖の如くになり，曾て青木廉二郎學士が述べた關東造盆地運動を證明する一資料とならう．最後に採集貝化石の表と二，三の種の簡單な記載がしてある．