日本古生物学會
報告・紀事

Transactions and Proceedings
of the
Palaeontological Society of Japan

昭和 14 年　　第 14 號
1939　　No. 14

〔地質學雜誌　第 46 卷　第 544-547 號　拔刷〕
〔Reprinted from Jour. Geol. Soc. Japan, Vol. 46, Nos. 544-547.〕

日本古生物學會
Palaeontological Society of Japan

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日本古生物學會報告
(Transactions of the Palaeontological Society of Japan)

77. *A New Miocene Brachygnatha Crab from Yuda, Iwate Prefecture, Japan*

(Dedicated to Dr. S. Tokunaga)

By

Seizi INAGAKI

(Read June 11 th; received September 30 th, 1938)

The fossil described here is a brachygnatha crab from the Miocene deposits of Yuda, Kintaiti-mura (near Hukuoka-mati), Ninohe-gôri, Iwate Prefecture. From the stratigraphy of the district as worked by Mr. Yanosuke OTUKA[1] in 1934, the horizon from which the material came seems to belong to OTUKA's lower Kadonosawa series and its geological age to the Miocene.

The material consists of a nodule of gray sandy mudstone, containing two fossil crabs, fairly well preserved, the one lying above the other, the lower showing its dorsal surface and the upper its ventral surface. Although the sex of the former is uncertain, the latter is unmistakably female. Both specimens belong to the same species, and probably to the genus *Scylla*. They closely resemble *Scylla serrata* (FORSKÅL)[2], which is now distributed on the Japanese coasts from Sagami Bay to Taiwan (Formosa), but differ slightly from it in the aspects of the carapace. The writer thinks that the fossil specimens should not be identified with *Scylla serrata*, believing it to be a new species or a variety of it. Though the total number of spines at the anterior margin of the merus of the cheliped is unknown, the number of which is important in classifying this group of crab, the writer deems that the fossil specimens deserve a new name.

Scylla miocenica INAGAKI, n. sp.

Pl. 3 (1), Figs. 1–2.

Description:—**Holotype** (Fig. 1). Carapace broadly spindle, somewhat hexagonal shaped; dorsal surface moderately convex, smooth; antero-lateral margin armed with nine teeth; rather acute, arranged closely together. Orbital region has four rostrums, but ill preserved, hence indiscernible, except their basal parts.

1) Y. OTUKA: Tertiary Structures of the North-western End of the Kitakami Mountainland, Iwate Prefecture, Japan. Bull. Earthq. Res. Inst., Tokyo Imp. Univ., Vol. XII. pt. 3, pp. 583–599. 1934.

2) A. ALCOCK: The Brachyura Cyclometopa, Part 2. A Revision of Cyclometopa with an Account of the Famlies Portunidae, Cancridae, and Corystidae, p. 27, 1899.

Shallow groove extends obliquely forward between hepatogastric and branchial regions; meso-gastric and meta-gastric regions moderately elevated, bearing no obvious tubercles; cardiac region comparatively small, almost fuses with meta-gastric region; branchial region fairly large and elevated; cheliped rather large; palm, broadly thickened, slightly shorter than dactylus, and bears distinct spine on basal part; merus also broad, bearing strong, quite obtuse spines on anterior margin, but only two of them visible. Length of caparace 39.5 mm., width 68.0 mm. **Paratype** (Fig. 2). Abdomen rather large, consists of seven distinct segments; sternum may also be clearly separated into eight thoracic somites; fourth somite correspond with cheliped, fifth to eighth with ambulatory legs. These five somites divided symmetrically by median groove; first and second not observable; ambulatory legs fairly large, somewhat compressed, their distal extremities damaged; mouth parts crushed and stretched off the sternum, external maxilliped quite large.

Type specimens are preserved in the Seventh Middle School of Tokyo.

Remarks:—Judging from the very natural position in which they were found, the creatures probably met instantaneous death at the sea-bottom. These fossils strongly resemble *Scylla serrata* in having four rostrums and in the expanded cheliped, in the shape of the carapace, in the arrangement of the antero-lateral teeth, and in the short epibranchial spine, but are discriminated from this species by the outline of the carapace. They are similar to some species of the genus *Portunus*, especially to *P. trituberculatus* MIERS[1], in the general outline of the carapace, but the epibranchial spine is not extended, the proximal part of the fourth ambulatory leg is much slender and the merus of the cheliped is shorter.

The writer wishes to express his warmest thanks to Messrs. Kôiti SUZUKI and Fuyuji TAKAI for their kind advices and to Dr. Isao TAKI for his loan of various literature on the subject. Thanks are also due to Mr. Tatuzô IWAHUNE, whose courtesy made it possible for the writer to study this material.

岩手縣金田一村湯田の中新統產蟹 1 新種（摘要）

稻　垣　誠　二

該化石は岩手縣二戸郡金田一村湯田產で，その產出層位は大塚學士の下部門ノ澤層群である。標本の保存狀態は比較的に良く，2 個體が重なり合つて產す。上部のものは腹部の形態から雌と確認されるが，下部の性別は判然しない。兩標本とも同一種に屬し，相模灣以南臺灣に到る本邦近海に產する *Scylla serrata* (FORSKÅL)「ノコギリガザミ」に酷似して居る。亦甲殼の外形は *Portunus trituberculatus* (MIERS)「ガザミ」のそれにも似て居る。分類上重要な鬚脚長節の前緣に於ける棘數が不明であるが，種々の點より見て本化石標本を新種と認め，之に *Scylla miocenica* INAGAKI なる新名を與へた。

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1) T SAKAI: Crabs of Japan, pp. 133–134, Text-fig. 63, 1936. (in Japanese).
T. SAKAI: Op. cit., p. 129. pl. 37. 1936.

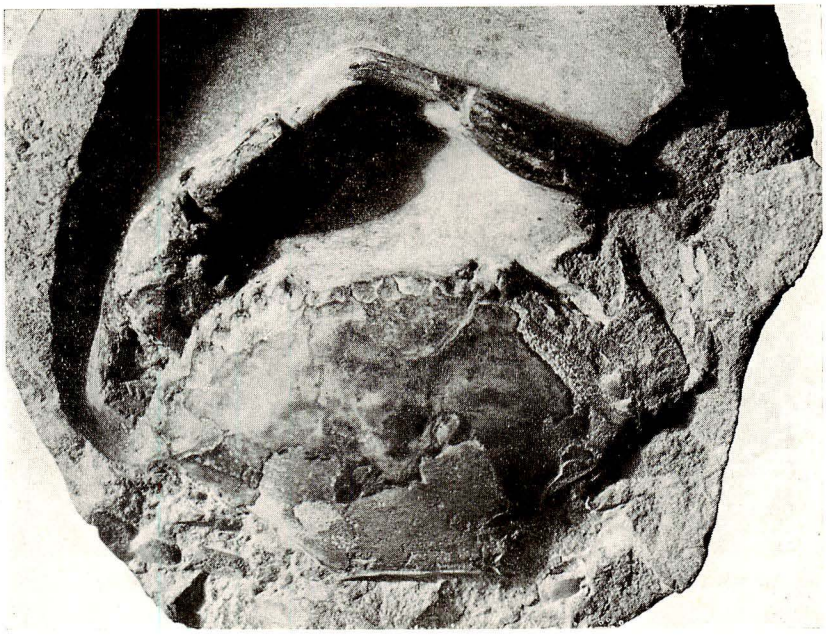


Fig. 1. Dorsal aspect ×1.

Fig. 2. Ventral aspect ×1

78. *Palaeontological Notes on Certain Japanese Scallops*

By

Kotora M. HATAI and Syôzô NISIYAMA

(The Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, Japan. Read Oct. 8th; and Received Oct. 18th, 1938)

In the present note the writers wish to give remarks on certain Japanese species of fossil scallops, which are from the Neogene deposits of the borderland of the Japan Sea in the main, for two reasons, namely, because the species of this genus are of much value in stratigraphy and correlation on the one hand, and because their degree of variation and number of species is remarkable on the other.

Here the writers wish to record their warmest thanks to Prof. H. YABE of the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, where the present work was undertaken, for kindly looking over and giving the writers permission to publish this short note. Acknowledgements are due to the Saito Ho-on Kai, Sendai, for the grant-in-aid, which has made, possible the observations and collections from the regions of Kaga, Noto, and Etigo provinces in the Hokuriku district of the Japan Sea, during the spring vacation of 1938.

In the Neogene deposits of Japan, the genus *Pecten* is very widely distributed both in space and in time, for such reason, it has been considered to be very important both stratigraphically and chronologically. In short some of its characteristic features can be outlined in the few sentences, namely, 1) in the Lower Neogene, living species are outnumbered by the extinct ones, 2) in the Middle Neogene, the number of extinct species is much lessened, and the number of living to the extinct is not much different, 3) in the Upper Neogene the number of species is still lessened, due to the decrease in the number of extinct ones and to the small number of living ones, and, 4) as a result of the palaeontological observations on certain species to be dealt with in this short article, the writers in the summary, will give the characteristics of the treated species from a stratigraphical view and chronological consideration, as can be judged from the different types. And in the following lines, the species will first be treated from a palaeontological view.

Among the species of *Pecten*, probably *Pecten kimurai* YOKOYAMA[1], originally described from the uppermost part of the Zyôban coal-field region, is one of the most widely distributed yet one of the most confusing species when studied in detail. The original description was given by M. YOKOYAMA in the following manner:

1) M. YOKOYAMA:—Molluscan Remains from the Uppermost Part of the Jo-Ban Coal-Field. Jour. Coll. Sci. Imp. Univ., Tokyo, XLV (5), 27–28, pl. 2, fig. 4, pl. 4, figs. 1–6, 1925.

Shell large, moderately thick, oribicular, compressed, inequivalve, nearly equilateral. Surface with radiating ribs; ribs on the right valve usually nine in number, broad, rounded, with a few longitudinal riblets or striae on the back, separated by shallow valleys of about equal breadth which are smooth at bottom and show no sharp demarcation against the ribs; ribs on the left valve also usually nine in number, roof-like, sharp with valleys equally formed, that is to say broadly V-shaped. Ears unequal, the anterior one coarsely and radiately corded, with a shallow rounded byssal notch below, while the posterior one is equally long, but usually smooth. Height slightly greater than length; thickness about one-fourth the height. The largest specimen measures about 100 millim. in height.

This species was most probably described upon the specimens illustrated on Plate 4, Figures 1, 2, and 5; but since M. YOKOYAMA has given no statement as to which of the specimens is the type, one can judge only from a comparison of his description with the illustrations. It may be noticed that the specimen figured on Plate 2, Figure 4, does not agree with the description in a strict sense, and also that on Plate 4, Figures 3, 4, and 6, appear to have the ears with an ornamentation different from the description, and the radial ribs show a tendency to bifurcation; and Figure 4 on the same plate has the ribs different from the description as well as with Figure 5. Figure 3 on the same plate belongs apparently either to the typical *P. kimurai* as described by M. YOKOYAMA, or it must or should be referred to a varietal form.

From the foregoing reasons, the writers find that it may be best to take the specimens agreeing with the description of M. YOKOYAMA as the type species, and to regard the others as belonging to its subspecies or another form. Thus, accepted, the type specimens is taken as Figures 1–2 (left valve), and Figure 5 (right valve) on Plate 4. Figure 4 on the same plate is referred to *Pecten murayamai* YOKOYAMA, a fossils species described by M. YOKOYAMA[1] from the Neogene deposits of Akita Prefecture (Ugo Province), in northern Japan; this species will be dealt with below.

Pecten kimurai was originally compared with *P. tokyoensis* TOKUNAGA,[2] a fossil species which is widely distributed in the Pliocene and Pleistocene deposits of the Kwantô region of Central Japan. However, it was distinguished from TOKUNAGA's species merely by having a more prominent and elevated ribs. However, the subsequently described scallop, *P. murayamai* seems also to be close to *P. kimurai*, and has even been considered to be its synonym by several authors. The original description of *P. murayamai* is as follows:

Shell thick, compressed, orbicular, slightly higher than long. Right valve with nine, strong, broad, rounded, rigid, radiating ribs separated by intervals of about equal breadth. Ears somewhat unequal; anterior ear smaller triangular in outline with anterior border somewhat receding below, provided with a few radiating riblets; byssal notich hardly developed; posterior ear also triangular, with posterior border somewhat convex, oblique, with upper end more anterior in position, radiately ribbed like the anterior. Left valve of the same

1) M. YOKOYAMA:—Fossil Mollusca from the Oil-Fields of Akita. Jour. Fac. Sci. Imp. Univ., Tokyo, Sec. 2, 1 (9), 387, pl. 44, figs. 18–20, 1926.

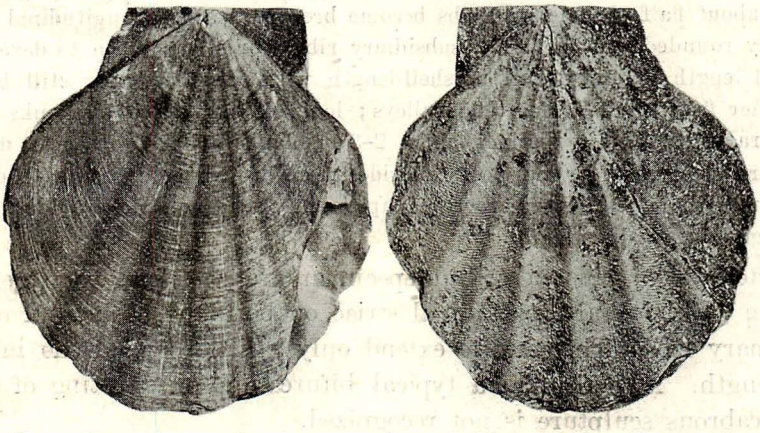
2) S. TOKUNAGA:—Fossils from the Environs of Tokyo. Jour. Coll. Sci. Imp. Univ., Tokyo. XXI (2), 65, pl. 5, figs. 1–10, 1906.

convexity as the right, radiately ribbed; ribs nine, roof-shaped, with ridges sharp; ears triangular, subequal.

From the description of *P. murayamai*, it seems that there is practically no difference of specific value between it and *P. kimurai* above stated. However, it is noticed that in *P. murayamai*, the ribs on the right valve have no longitudinal striae on their backs or in the interspaces, that is to say, on the flanks of the main ribs, and both valves are nearly equally convex; while in *P. kimurai* there are described longitudinal striae on the backs and flanks of the main ribs, and the left valve is less convex than the right, Further, the radial ribs in *P. murayamai* are rigid and elevated while in *P. kimurai* they are gently and flatly rounded.

From the differences above mentioned as existing between *P. kimurai* and *P. murayamai*, it may be best to separate them as subspecies, taking *P. murayamai* as the subspecies of *P. kimurai*. Figure 4 on Plate 2 (YOKOYAMA, 1925) seems to belong to the subspecies and Figure 4 on Plate 4 (YOKOYAMA, 1925) may also included into the subspecies.

By strictly adhering to the description of M. YOKOYAMA and taking only the figures which may exactly correspond to the description, it is noticed that into



Pecten kimurai ugoensis subsp. nov. (nat. size) Loc. Ukibuta, Yazawagi-mura, Ugo Province. Reg. No. 7166, Saito Ho-on Kai Museum, Sendai, Japan.

the *Pecten kimurai*-group, there are following members, namely, *P. kimurai* from the Zyôban coal-field, *P. murayamai* from Akita Prefecture mentioned above, and another one which can be named *P. kimurai ugoensis* n. subsp., which is figured and hitherto included into the species. *P. kimurai ugoensis*[1] is from the Yazawagi

3) This *Pecten* was not figured at the time of the article on the "Fossils from Yanazawagi-mura, Akita Prefecture (Ugo Province), Northeast Honsyu, Japan." Saito Ho-on Kai Mus., Res. Bull., X, 163, 1936. In the Yazawagi beds, *Pecten kimurai ugoensis* n. subsp. is rather common, being found at two localities of the same beds. Although other occurrences are not known to the writers, it seems that it has been reported from other regions under the name of *Pecten kimurai*. And from the fact that migration is one cause of evolution, as well as from other biological considerations, it appears that the subspecific separation of the present one from the typical *P. kimurai* is by no means unreasonable. Also to be added is the fact that the word, 'variation' is not so simple as has hitherto been used, and full consideration of the word should be done.

beds in Akita Prefecture (Ugo Province) and has hitherto been included into the synonymy of *P. kimurai* on grounds that are now recognized to be worthy of subspecific separation, rather than mere variation. *P kimurai ugoensis* has no longitudinal striae as stated to be present in the original *P. kimurai*, and has no strong radial ribs as stated to be present in *P. murayamai*, further it does not attain such a large size as those species. In the shape of the radial ribs it seems to be intermediate between *P. kimurai* and *P. murayamai*, while in surface sculpture it leans towards the latter than to the former.

If the radial striae on the backs of the ribs and on their flanks are taken to be of the true *P. kimurai*, then the abundant specimens of fossil scallops from the Kadonosawa beds[1] of the Ninohe district, Iwate prefecture (Mutu province), may belong here. A typical specimens of *P. kimurai*, as defined in the foregoing page, from the Kadonosawa beds, takes the following description.

Shell of moderate size, about 70 mm long and 78 mm wide, suborbicular, subequilateral, compressed, surface covered with indistinct concentric growth lines and radial sculpture. Right valve with about 8 primary ribs and a few subsidiary ones at sides. Ribs at beak region narrow, unbifurcated, nearly equal to interspaces in width, not high, rounded and smooth; at about half shell length, ribs become broader, develop longitudinal striae on their flanks, gently rounded, and straight; subsidiary riblets or striae begin to develop near three-fourths shell length. Ventral half of shell-length with ribs becoming still broader, gently rounded rather flatly, now wider than valleys; longitudinal striae on flanks and backs of ribs hardly raised, weak but distinct, about 2–3 on flanks and 2–5 on backs, most distinct in marginal portion of anterior and posterior sides of shell. No noduluous, scabrous or splitting of primary ribs indicated. Ears fractured, apparently subequal and provided with 3 or more striae, Hinge-line nearly straight.

Characteristic of this described specimen are the low, very gently rounded radial striae with several longitudinal striae on both the backs and on the flanks of the primary ribs. These striae extend only a little beyond the mid-portion of the shell-length. Also there is a typical bifurcation or splitting of the primary ribs, and scabrous sculpture is not recognized.

Since the originally described *P. kimurai* has radial ribs and longitudinal striae, probably the strengthening or weakening of the radial sculpture by degrees would bring it close to some of the varietal forms of *P. kagamianus* YOKOYAMA,[2] a species originally described from Miocene deposits in Ishikawa prefecture (Kaga province). *P. kagamianus* has radial ribs and longitudinal striae or riblets on the backs and flanks as well as in the valleys. It appears significant that the present one has a smaller number of radial ribs and less distinct longitudinal striae which are less developed, fewer in number, and show no such sculpture as found in that species. However, since the left valve of the described specimen from the Ninohe-district is now lacking from the same locality, its comparison with that of *P.*

1) K. HATAI; Fossil Brachiopoda from the Ninohe District, Mutu Province, Japan. Jap. Jour. Geol. Geogr., XIII, 71–74, 1936.

2) M. YOKOYAMA: Pliocene Mollusca from Izumo. Jap. Jour. Geol. Geogr., 11 (1), 8, pl. 1, fig 1, 1923.

kagamianus cannot be made at this place, although it appears that the number of the radial ribs is much less and shows a different kind of sculpture. In general, it may be said that the typical *P. kimurai* has a shell with smooth surface, radial ribs of low and gently rounded nature and is provided with both concentric growth lines and longitudinal striae. The radial striae are never strong, raised or broken into smaller sculpture or rough nature by the intersection of the concentric growth lines, but remain quite smooth. In *P. kagamianus*, it is well known that the small radial striae or riblets are one of the major features of the shell sculpture. These major features of *P. kagamianus*,[1] serve in distinguishing it from its allied species.

P. murayamai is distinguished from *P. kimurai* by having no radial striae on the ribs of the right valve, the ribs of the right valve are more elevated and rigid instead of low and gently or flatly rounded, or gently undulated as in *P. kimurai*, and the valves are nearly equally convex instead of unequally convex as in that species. *P. kimurai ugoensis* differs from both of the mentioned species in having a smaller shell, with no radial striae, gently rounded flattish radial ribs and subequal convexity of the valves. In fact, it leans towards *P. kimurai* in certain features and to *P. murayamai* in others, thus, it is no doubt an intermediate form between them. In *P. kimurai ugoensis* there are no radial striae on the ribs or in the valleys or even on the flanks of the primary ribs which are low and gently undulating on the right valve as in *P. kimurai*, and shows no bifurcation or splitting of them. Also the valves are nearly equally convex as in *P. murayamai*.

As to the geological age of the aforementioned species, it is recognized that *P. kagamianus* is confined to the Miocene, and most probably does not extend beyond the upper Miocene, being most predominant and characteristic in the middle part. *P. kimurai* is found from the middle Miocene to uppermost Miocene and possibly into lowermost Pliocene. *P. kimurai ugoensis* is a typical Miocene member and probably does not exist in the upper Miocene, while in the middle part it seems to be fairly common. *P. murayamai* extends from the Miocene probably into the lowermost of the Pliocene.

In regard to the interesting relationship thought to exist between the two interesting scallops, *P. kagamianus*[2] and *P. s-hataii* NOMURA,[3] a further additional note should be given.[4] In the former occasion it was stated that the relation existing between the mentioned scallops was probably an interesting case of variation or evolution produced as a result of migration followed by adaptation and localization or difference in latitude. However, it should be stated at this place, that if the stratigraphical horizons of the beds which have yielded that two species, turn out by future studies to be slightly different, it may be that a case of muta-

1) M. YOKOYAMA: Op, cit., 1923.

2) K. HATAI: A Note on *Pecten kagamianus* YOKOYAMA. Bull. Biogeogr. Soc. Jap., VIII (6), 103-110, 1938.

3) S. NOMURA: Mollusca from the Nisi-Tugaru District, Aomori-ken, Northeast Honsyu, Japan. Saito Ho-on Kai Mus., Res. Bull., No. VI, 44-45, pl. 6, fig. 7, 1935.

4) K. HATAI: Op. cit., 1938.

tion is found. This problem, although a very interesting one, well needs further study in the field to confirm either of the opinions.

Probably other cases of evolution produced by migration and followed by localization are represented in the fossil scallops of Japan, but studies along this line are yet to be advanced.[1]

Previously *Pecten swiftii* BERNARD, *P. cosibensis* YOKOYAMA and *P. heteroglyptus* YOKOYAMA were studied and the relationship to allied forms as well as remarks on the differences in the size of the shells from different geological formations were remarked upon.[2] Since the report was published, some additional knowledge concerning them has been obtained, as to be mentioned in the following lines.

In the former occasion it was stated that the size of the shells of both *P. cosibensis* and *P. heteroglyptus* are in good agreement with the geological age of the beds which yielded them. In other words, the older the geological age is, the smaller is the size of the shells, and the younger the beds become, the larger the shells become, until the maximum period of flourishing prior to their extinction. To be made clear is the fact that, although such a general trend can be observed in those two species, it should be recognized that the occurrence of small size shells in young horizons does not suggest or even indicate the invalidity of the foregoing statement. As it is well known and generally accepted that the young forms of nature specimens must certainly have existed in various periods, otherwise we should not except to find the adults. However, in the opinion previously expressed, only full adults were taken into consideration to avoid misinterpretation.

Pecten notoensis YOKOYAMA,[3] a characteristic extinct scallop of the Miocene of Japan, is a variable species and has for its synonyms, *P. natoriensis* MATSUMOTO, *P. natoriensis* var. *subovalis* MATSUMOTO and *P. natoriensis* var. *inequilateralis* MATSUMOTO,[4] all from the Miocene of the Sendai district. The original description of *P. notoensis* was given by M. YOKOYAMA in the following manner:—

Shell of medium size, thick, rather compressed, nearly equivalve, except for ears, radiately ribbed. Ribs usually five or six near the beak, more or less elevated though rounded, generally smooth, sooner or later dichomatizing either once or twice, with interspaces narrower, in which there is usually an intercalary rib either appearing only near the ventral border or higher up, sometimes more than half way up the shell; number of ribs at ventral border varying, but often more than thirty, counting both large and small making inner

1) S. NOMURA and K. HATAI: Pliocene Mollusca from the Daisyaka Shell-beds in the Vicinity of Daisyaka, Aomori-ken, Northeast Honsyû, Japan. Saito Ho-on Kai Mus., Res. Bull No. VI, 97–102, 1935.

2) S. NOMURA and K. HATAI: Fossils from Yazawagi-mura, Ugo Province, Northeast Honshû, Japan. Ibid., No. X, 15–160, 1936.

3) M. YOKOYAMA:—Pliocene Shells from near Nanao, Noto, Rep. Imp. Geol. Surv. Jap., No. 104, 4, pl. 3. pl. 4, pl. 5, figs. 1, 2, 1929.

4) H. MATSUMOTO:—On the Marine Faunae of Three Fossils Zones of the Upper Miocene of Natori District, Province of Rikuzen. Sci. Rep. Tôhoku Imp. Univ., Ser. 2, XIII (3), 104–105, pl. 40, figs. 10–14, 1930. The three forms are described on the two pages, and are from the Moniwa beds in a broad sense.

border unequally serrate. Convexity: presumably nearly equal in both valves of the same individual, but somewhat varying in different ones; equal to from one-fourth to almost one-fifth the height. Ears unequal, anterior larger than posterior, both radiately costellate; byssal notch distinct, acute. Hinge-length less than one-half of shell-height.

This species is fairly widely distributed in the Lower Neogene of Japan, and due to its great variability and different forms, which is particularly noticed according to the number of ribs, resemblance is found to the Northwest American fossil scallop, *Pecten nutteri* ARNOLD,[1] a species of the Upper Miocene and possible Lower Pliocene of California. The resemblance is so great that one would be lead to believe that the Californian species is a descendant of the Japanese one, seeing that the Japanese one occurs in an older horizon than the American one. Should variation be used in its broadest sense, probably the two might be included into the same species. Here it may be added that there are many species in the Neogene deposits of Northern Japan and Northern America that are closely related to one another, in fact so closely related, that species from one region have even been considered as subspecies of the other region. It may be natural to beleive that such similar species have their origin in the same stock, and by diverging in two directions, one to the Northwest coast region of America and the other to Northern Japan, modification or localization may have been a cause of their differences in sculpture. The fact that closely related species are found on both sides of the Northern Pacific Ocean has been stated elsewhere,[3] and our views may be kept to the scallops.

Several specimens of *Pecten crassivenius* YOKOYAMA were found at Kamoura near Wazima-mati on Noto Peninsula, this being a new locality for this species. In association with it were found, *Pecten murayamai* YOKOYAMA, *Lucina acutilineata* CONRAD and *Dentalium yokoyamai* MAKIYAMA. The Miocene age of this new locality is quite certain, seeing that the fossils are common in deposits of that age. The original description of *Pecten crassivenius* was given by M. YOKOYOMA as follows:

Shell medium-sized, thick, compressed, orbicular, slightly higher than long, subequilateral, radiately ribbed. Ribs nine, strong, rounded, trichotomous with the middle branch somewhat larger than the lateral ones, coarsely scaly, with interspaces broader and filled with four to five equal or unequal scaly riblets. Innner border crenate. Height 64 millim. Length 62 millim. Depth 12.3 millim.

The occurrence of this Miocene fossil in the sedimentary rocks at Kamoura near Wazima-mati, is of considerable interest because it extends the known geol-

1) R. ARNOLD:—Paleontology of the Coalinga District, Fresno and Kings Counties, California, Bull. U.S. Geol. Surv., No. 396, 31, pl. 27, figs, 4, 3, 1909.

2) S. NOMURA and K. HATAI:—Pliocene Mollusca from the Daisyaka Shell-Beds in the Vicinity of Daisyaks, Aomori-ken, Northeast Honsyû, Japan. Saito Ho-on Kai Mus., Res. Bull., VI, 100–102, 1935

3) M. YOKOYAMA:—Pliocene shells from Near Nanao, Noto, Rep. Imp. Geol. Surv Jap., No. 104, 6, pl. 6, fig. 1, 1929.

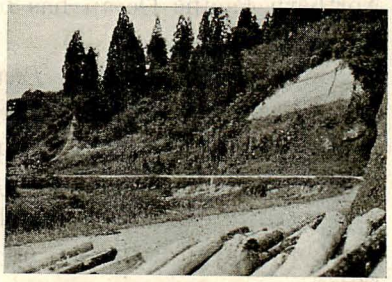
gical distribution on the one hand and helps in settling the geological age of the strata developed in and around the vicinity of Wazima-mati on the tip of the Peninsula. The characters of the shell readily serve in distinguishing it from any of the known allied species from Japan.

Another interesting fossil which was collected from Noto province, is *Pecten kurosawensis* YOKOYAMA,[1] a species which was first described by M. YOKOYAMA from Kurosawa in the Akita Oil-field, Ugo province. The present specimens were found embedded in a coarse sandstone of a cliff behind Zyûnityô village near Himi-mati. No other species were found in association with it, where it occurs abundantly, but at another locality near the one above mentioned, *Hemithyris psittacea* (GMELIN), was found. The original description of this species is as follows:

Shell rather small, orbicular, of moderate thickness, compressed, radiately ribbed. Ribs twenty-seven to thirty-two, straight, rigid, with interspaces varying in breadth, sometimes equal, sometimes narrower, sometimes broader. One of the specimens is covered with a fine mesh-like structure. Ears unequal, with a few radiating riblets. Byssal notch shallow, rounded.

Probably *P. kurosawensis* is a species which flourished well in the Pliocene and upper Miocene of Japan, as it seems to be rare in middle Pliocene or middle Miocene of Japan. Further, it appears that the geological age of occurrence of this species is not much different, especially where it can be said to have luxuriantly flourished.

At the type locality of this species, Kurosawa in the outskits of Akita city, Ugo province, as shown in the text-figure, the number of individuals which can be found in the small exposure is remarkable. In fact the number is so great that good specimens are generally obtained by spoiling others. The size of the shell, individual number, degree of development of the specimens from the type locality, seem to point to the fact that this period was its time of maximum development, and then after or prior to that time of the age of this type locality, a marked decline was indicated, as the individual number markedly decreases and the size of the shell of the individuals that can be obtained suggest a trend towards extinction, if the word may so be used.



A photograph taken at Kurosawa, the type locality. In the middle is seen conglomeratic sandstone, and above is sandy shale. The conglomeratic sandstone is the horizon of this species (=Beds B of M. Yokoyama).

In regard to the associated fossils of *Pecten kurosawensis* YOKOYAMA, at the type locality, and also at another locality nearby, a paper will be shortly published by S. NOMURA and K. HATAI,[2] and further remarks will be withheld at this place.

1) M. YOKOYAMA:—Fossil Mollusca from the Oil-Flelds of Akita. Jour. Fac. Sci. Imp. Univ. Tokyo. Sec. 2, 1 (9), 388, pl. 45, fig. 3, 1926.

2) A large collection of fossils was made by K. HATAI from Kurosawa, the type locality of *P. kurosawensis* YOKOYAMA, and also at another locality nearby, which belongs to the same beds (Beds B of M. YOKOYAMA), and the alternation beds of S. NOMURA and K. HATAI. These fossils are treated with and several important remarks are given in their paper which will be published in "Saito Hoon Kai Museum, Research Bulletin" (now in press). The readers are referred to that article.

To see the geological and stratigraphical significance of the foregoing species, the following lines are devoted.

The species of *Pecten* so far mentioned in the present article are the following ones, namely:

Pecten kimurai YOKOYAMA
P. murayamai YOKOYAMA
P. kagamianus YOKOYAMA
P. swiftii BERNARDI
P. heteroglyptus YOKOYAMA
P. crassivenius YOKOYAMA
Pecten kimurai ugoensis new subspecies
P. tokyoensis TOKUNAGA
P. s-hataii NOMURA
P. cosibensis YOKOYAMA
P. notoensis YOKOYAMA
P. kurosawensis YOKOYAMA

Since *Pecten natoriensis*, *P. natoriensis* var. *subovalis* and *P. natoriensis* var. *inequilateralis* all described by H. MATSUMOTO are synonyms of *P. notoensis* YOKOYAMA, they are left out of consideration, and further, since *P. nutteri* ARNOLD is not known in the Japanese Neogene deposits, it is also left out of consideration. And in the following, *P. swiftii* BERNARDI which is a living species, will also be left from the following consideration.

The geological ranges of each of the species to be dealt with is given in the following table.

Genus and species \ Geological range	L M	M M	UL MP	L P	M P	U P	L PL	M PL	U PL
Pecten kimurai YOKOYAMA		×	×	×					
P. kimurai ugoensis n. subsp.		×							
P. murayamai YOKOYAMA		×	×	×					
P. kagamianus YOKOYAMA		×	×						
P. heteroglyptus YOKOYAMA		×	×	×	×				
P. cosibensis YOKOYAMA		×	×	×	×				
P. crassivenius YOKOYAMA		×	×	?					
P. tokyoensis TOKUNAGA				×	×	×	×	×	
P. s-hataii NOMURA		×							
P. notoensis YOKOYAMA		×	×						
P. kurosawensis YOKOYAMA			×	×					

In the above table the abbreviation of UL/MP stands for the alternation beds, which belong stratigraphically to the overlying sedimentaries but in age possibly to the Miocene, this is the transitional formation of the writers.

Since definite Upper Miocene deposits are not well known, the writers provisionally include into the transitional beds, the deposits which may become Upper Miocene in age. With such procedure, it is found that where *P. kagamianus* and *P. notoensis* find their upper limit, *P. tokyoensis* finds its lowest limit. Also *P. kimurai* and *P. murayamai* find their upper limit in the age where *P. tokyoensis* finds its lowest limit. In short the above table shows that in the chronological distribution of the mentioned species of scallops, there is found several important features, such as, 1) overlapping in succession, 2) extinction in succession, 3) extinction at equal levels, and 4) appearance at equal levels but extinction at different and the same levels.

Determination of the geological age of the strata by means of the scallops only seems quite possible, providing that several species occur in the same locality. The previously studied *Dosina* and *Cancellaria*, seem to lead to the same or similar conclusions, as outlined in this article.

In regard to the above interesting yet quite difficult problems, further studies are expected to be advanced in both the field and laboratory, and the present article is merely preliminary to a more comprehensive one, to appear at a later date.

或る日本產帆立貝類の古生物學的記事 (摘 要)

畑 井 小 虎　西 山 省 三

日本產帆立貝類中，層位學的並に時代的に興味ありと思はれる或種に關する古生物學的記事である。即ち

Pecten kimurai YOKOYAMA
P. murayamai YOKOYAMA
P. kagamianus YOKOYAMA
P. swiftii BERNARDI
P. heterolyptus YOKOYAMA
P. crassivenius YOKOYAMA
Pecten tokyoensis TOKUNAGA
P. s-hataii NOMURA
P. cosibensis YOKOYAMA
P. notoensis YOKOYAMA
P. kurosawensis YOKOYAMA

の 11 種及び之等に關係あると考へられる或る種に就て言及し，尙ほ *Pecten kimurai ugoensis* HATAI et NISIYAMA なる 1 新亞種を記した。

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79. 北支那新生代非海棲貝類資料

第 1 篇　河北省井陘及石家莊產第四紀非海棲貝類

MATERIALS FOR THE KNOWLEDGE OF THE CENOZOIC NON-MARINE MOLLUSCA OF NORTH CHINA (Part 1)

——恩師德永重康博士に捧ぐ——

鈴　木　好　一

Koiti SUZUKI

（昭和 11 年 9 月 26 日講演・昭和 13 年 10 月 15 日受理）

緒　　言

北支那には新生代各時期を通じて種々の含貝化石陸成層が廣く發達し（第 1 表參照），非海棲貝化石の研究には誠に好適な地域である。然るに，その古生物學的研究は未だ乏しく[1]，層位學的にも不明な點が頗る多い。

筆者は昭和 10 年滿洲國哈爾濱郊外顧鄉屯の更新世貝化石の研究に手を染めて以來，北支那方面にも注意を向け，常に資料の蒐集に努めて來た。もとより得た所は未だ甚だ貧弱であるが，今後の研究の礎石とする意味で，記載的な事項のみでも逐次報告して行くことゝした。尙新生代貝化石の研究に必要不可缺な支那現生貝類の文獻は，歐米支各國人の手になる關係上非常に散亂して居り，本邦の研究者にはその大要を知ることすらも容易でない事情にある。よつて各種類につき一度だけは，

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1) Max SCHLOSSER (1906): Über Fossile Land- und Süsswassergastropoden aus Centralasien und China, Annales Musei Nationalis Hungarici, vol. 4, pp. 372–405, pl. 10.

Nils Hj. ODHNER (1922): Lacustrine Mollusca from Eocene Deposits in China, Bulletin of the Geological Survey of China, no. 4, pp. 119–135, pl. 1.

Nils Hj. ODHNER (1925): Shells from the Sanmen Series, Palaeontologia Sinica, ser. B, vol. 6, fasc. 1, 20+3 pp., 5 pls.

Sohtsu G. KING (1926): Notes on the Fossil Shells of the Sanmen Series, Bulletin of the Geological Society of China, vol. 5, pp. 157–159.

Chi PING (1929): Fossil Terrestrial Gastropods from North China, Palaeontologia Sinica, ser. B, vol. 6, fasc. 5, 25+7 pp., 2 pls.

Chi PING (1931): Tertiary and Quaternary Non-Marine Gastropods of North China, Palaeontologia Sinica, ser. B, vol. 6, fasc. 6, 32+8 pp., 2 pls.

以下現生貝類と共に黃土その他の化石を取扱つたもの（主要なものゝみ）。

Vincenz HILBER (1882): Recente and im Löss gefundene Landschnecken aus China, Sitzungsberichte der Math.-Naturwiss. Classe der Kais. Akademie der Wissenschaften, Bd. 86, pp. 313–352, pls. 1–3, pp. 1349–1394, pls. 4–6.

Vincenz HILBER (1898): Recente und im Löss gefundene Landschnecken, Wissenschaftliche Ergebnisse der Reise des Grafen Béla SZÉCHENYI in Ostasien, Bd. 2, pp. 583–626, pls. 1–4.

Rudolf STURANY (1900): W. A. OBRUTSHEW's Mollusken-Ausbeute aus Hochasien, Denkschriften der Math.-Naturwiss. Classe der Kais. Akademie der Wissenschaften, Bd. 70, pp. 17–48, pls. 1–4.

A. ANDREAE (1913): Land- und Süsswasserschnecken aus Zentral- und Ostasien, in FUTTERER, Durch Asien, Bd. 3, pp. 43–90, 1 pl.

第 1 表 北支那及滿洲國の新生代層

Table 1. Cenozoic formations in North China and Manchuria.

	北支那 North China		滿洲 Manchuria
更新世 Pleistocene	段丘層 Terrace deposits (再積黃土 Redeposited Loess)		黃土 Loess
	黃土 Loess		
	周口店裂罅堆積層 Choukoutien formation	燕東層* Yentung formation*	顧鄉屯層 Kuhsiangtung formation
鮮新世 Pliocene	泥河灣層 Nihowan formation	榆社統 Yüshê series	
	三趾馬層 Hipparion red clay formation		
中新世 Miocene	山旺統 Shanwang series		
漸新世 Oligocene			撫順統 Fushun series
始新世 Eocene	垣曲統 Yüanchü series	官莊統 Kuanchuang series	

* 北京・天津附近の黃土直下に廣く發達する含貝化石湖成層は從來三門系とされてゐたが，玆ではこれを模式の三門系と區別して燕東層と呼ぶ。その模式露出地は唐山。

New name for the lacustrine formation which is widely developed in the Peking-Tientsin district and has hitherto been referred to the "Sanmen series."

氣がついた文獻全部を列擧する。但し各篇著の詳しい表題は，何れ內容の抄錄・解說を附けた"支那貝類文獻集"として別に公表したいと思つてゐるから，玆には單に揭載雜誌又は書籍名を略記するに止める。

筆者に滿洲及び北支那の非海棲貝化石研究の機會を與へられ，且つ終始懇切に御指導下さつた德永重康先生に，深甚なる感謝の意を表すると共に謹んで本篇を捧げる。種々有益な助言を與へられた黑田德米・瀧 庸兩氏，京都帝大地質學鑛物學教室所藏の豐富なる文獻及び標本の借覽を許された中村新太郎教授並にその際種々便宜を計られた池邊展生・平山 健兩氏，貴重な標本を提供された柴田秀賢氏及び北支那新生代層序表の作製に協力された高井冬二氏にも厚く感謝する。又圖版及び挿入の寫眞は凡て植木忠三郎氏の撮影による。記して謝意を表する。

河北省井陘の黄土層産貝化石

脇水鐵五郎博士が嘗て井陘車站の西の黄土層中から採集された標本を，柴田秀賢氏の好意により研究することが出來たもので，次の 3 種を含む。

Bradybaena (*Manchurohelix* TAKI MS) *lavrushini* (COCKERELL) マンシウマイマイ（瀧，未發表）2 個

Cathaica fasciola (DRAPARNAUD) チウカマイマイ（新稱）4 個

Cathaica pulveratrix (von MARTENS) コウドマイマイ（新稱）2 個（1 個は螺塔上部を缺損す）

これら 3 種の蝸牛は現在何れもこの地方に棲息し，特に *Cathaica* の 2 種は黄土中の化石としても最も普通なものである。保存狀態は頗る良好で，生存當時の殼色すら多分に殘つてゐる。尙この附近の雪花山の三趾馬 (Hipparion)? 紅土層からも *Cathaica fasciola* が報告されてゐるが（秉志 1929），此處の標本に比較して遙に保存狀態が惡い。

河北省石家莊の“再積”? 黄土産貝化石

同じく脇水博士の採集品を柴田氏の好意によつて提供されたもので，採集地は石家莊車站の東方。地層は正確なことは判らないが，或ひは段丘堆積層卽ち所謂再積黄土層ではないかと思はれる。識別し得た種類は次の 5 種である。

Lymnaea (*Galba*) *pervia* von MARTENS ヒメモノアラガヒ 約 10 個

Lymnaea (*Radix*) *plicatula* BENSON シナモノアラガヒ（新稱）3 個

Anisus (*Gyraulus*) sp. 1 個

Opeas pyrgula SCHMACKER and BOETTGER ホソヲカチャウジガヒ 7 個

Metodontia yantaiensis (CROSSE and DEBEAUX) ヨツバマイマイ（新稱）6 個

以上 5 種の中，最初の 3 種は淡水棲，後の 2 種は陸棲の貝であつて，何れも現在この地方に分布してゐる。*Metodontia* 以外の標本は可成り破損して居り，完全なものは甚だ少い。又前記井陘の黄土産化石とは一つも共通種がない。

種　の　記　載

Genus *Lymnaea* Lamarck モノアラガヒ屬

1799. *Lymnoea* LAMARCK, Mém. Soc. Hist. Nat. Paris, tome 1, p. 75 (misprint!; *Lymnaea* in page 91). Monotype: *Helix stagnalis* LINNAEUS.

1801. *Limneus* DRAPARNAUD, Tabl. Moll. terr. fluv. France, An. 9, p. 30. Different spelling of *Lymnaea*.

1804. *Lymnea* RENIER, Prodromo Osserv. sop. alc. Esseri viv. Classe Vermi abit. Adriatico Lagune Litorali Veneti, (2), 8 Different spelling of *Lymnaea*.

1810. *Lymnus* Denys de MONTFORT, Conchyl. systém. Classific. méthod. Coquilles, tome 2, p. 262. Monotype: *Helix stagnalis* LINNAEUS.

1812. *Lymneus* FERUSSAC, Ann. Mus. Hist. Nat. Paris, tome 19, p. 252. Different spelling of *Lymnaea*.

1812. *Limnaea* DESMAREST, Rapp. Soc. Philomatique Paris. Different spelling of *Lymnaea*.

1817. *Lymnaeus* CUVIER, Regne Animal distribue Organisat., tome 2, p. 4 2. Different spelling of *Lymnaea*.

1819. *Lymnula* RAFINESQUE, Journ. Physique Chimie Hist. nat. Arts, tome 88, p. 423. Sub-

stitute for *Lymnaea*. Type by designation of PILSBRY (1917, Nautilus, vol. 30, p. 113): *Helix stagnalis* LINNAEUS.

1821. *Limnaeus* C. PFEIFFER, Naturg. deutsch. Land- Süsswasser-Moll., Abt. 1, pp. 14, 84, 85. Different spelling of *Lymnaea*.

1822. *Limnea* G.B. SOWERBY, Genera Shells, no. 7, VI, 29. Different spelling of *Lymnaea*.

1833. *Leachia* "RISSO" JEFFREYS, Trans. Linn. Soc. London, vol. 16, p. 519. Type by original designation: *Limneus major* JEFFREYS (=*Helix stagnalis* LINNAEUS).

1834. *Lymnoeus* GRIFFITH, English Edition of CUVIER'S Animal Kingdom, vol. 12, p. 598. Different spelling of *Lymnaea*.

1875. *Limneus* subgenus *Eulimneus* SANDBERGER, Land- Süsswasser-Conch. Vorwelt, pp. 787, 844. Monotype: *Helix stagnalis* LINNAEUS.

1903. *Limnus* DYBOWSKI, Bull. Acad. Imp. Sci. St. Pétersbourg, tome 18, p. 113. Different spelling of *Lymnus*.

(本屬名は上掲の如く實に多様に綴られてゐるが，正しい綴字法に從へば疑もなく *Limnaea* である。近來は原著者の綴を尊重して *Lymnaea* を用ひる者が多い。)

Subgenus *Galba* SCHRANK ヒメモノアラガヒ亞屬

1803. *Galba* SCHRANK, Fauna Boica, Bd. 3, pp. 262, 285. Monotype: *Galba pusilla* SCHRANK (=? *Buccinum truncatulum* MÜLLER)[1].

1881. *Limnaea* subgenus *Truncatuliana* SERVAIN, Hist.Malac. Lac Balaton, p. 63. Type by original designation: *Buccinum truncatulum* MÜLLER.

1885. *Fossaria* WESTERLUND, Fauna Paläarct. Reg. leb. Binnenconch., Bd. 5, p. 49. Type by original designation: *Buccinum truncatulum* MÜLLER.

Section *Galba* s. s. ヒメモノアラガヒ區

Lymnaea (*Galba*) *pervia* von MARTENS ヒメモノアラガヒ

第 4(2) 圖版，第 7-11 圖 Plate 4 (2), figures 7-11.

1867. *Limnaeus pervius* MARTENS, Malakoz. Bl., Bd. 14, p. 221. Type locality: 山東省芝罘 Chefoo (Tshifu), Shantung Province, China.

1871. *Limnaea davidi* DESHAYES, Nouv. Archiv Mus. Hist. Nat. Paris. Type locality: トルキスタン Turkestan.

1876. *Limnaea goodwinii* SMITH, Quart. Jour. Conch., vol. 1, p. 125. Type locality: 横濱 Yokohama, Japan.

1877. *Limnaea pervia* MARTENS, Sitzungsber. Gesell. Naturf. Freunde p. 113 (17).

1879. *Limnaea pervia* KOBELT, Abh. Senckenberg. Naturf. Gesell., Bd. 11, p. 105, pl. 15, fig. 6.

1879. *Limnaea goodwinii* KOBELT, ibid., p. 106.

1882. *Limnaea pervia* GREDLER, Malakoz. Bl., N. F., Bd. 5, p. 180.

1882. *Limnaea pervia* MARTENS, Mém. Acad. Imp. Sci. St. Pétersbourg, ser. 7, tome 30, p. 40, pl. 4, fig. 11.

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1) 通常 *Buccinum truncatulum* MÜLLER を *Galba* の模式種と認めてゐる。事實 SCHRANK の書にはこの種も取扱はれてはゐるが，*Galba* の模式且つ唯一種は *Galba pusilla* SCHRANK で，最初から *Buccinum truncatulum* MÜLLER とされたのではない。*Galba pusilla* は粟粒より小さく，3 螺層を有するとのことで，明に若い貝であり，圖示もなく，從來稍々樂觀的に *Lymnaea truncatula* に同定されてゐたのである。從つてこの同定は確證することも決定的に反駁することも出來ない。P. HESSE (1923, Archiv f. Moll.-kunde., Bd. 55, p. 195) は定義不充分との理由で *Galba* の廢棄を主張した。

1883. *Limnaea davidi* JORDAN, Nova Acta K. Leop.-Carol.-Deutsch. Akad. Naturf., Bd. 45, Nr. 4, table 4, sp. no. 225.
1883. *Limnaea pervia* JORDAN, ibid., table 14, suppl. sp. no. 13.
1885. *Limnaeus pervius* MÖLLENDORFF, Jour. Asiat. Soc. Bengal, vol. 54, p. 66.
1886. *Limnaeus pervius* CLESSIN, Syst. Conch. Cab., Bd. 1, Abt. 17, p. 388, pl. 53, fig. 6.
1886. *Limnaeus goodwinii* CLESSIN, ibid., p. 389.
1887. *Limnaea pervia* GREDLER, Malakoz. Bl., N. F., Bd. 9, p. 151.
1887. *Limnaea davidi* GREDLER, ibid.
1887. *Limnaea pervia* WESTERLUND, Vega-Exped. Vetensk. Iakttag. Fierde bandet, p. 182.
1890. *Limnaeus pervius* SCHMACKER and BOETTGER, Nachr.-Bl. D. Malakoz. Gesell., Bd. 22, p. 117.
1895. *Limnaea goodwinii* PILSBRY, Cat. Mar. Moll. Japan, p. 158.
1895. *Limnaea pervia* PILSBRY, ibid., p. 161.
1898. *Limnaeus pervius* NEUMAYER, Wissensch. Ergebnisse Reise Graf. Béla Széchenyi Ostasien, Bd. 2, p. 656.
1901. *Limnaea* (*Fossaria*) *pervia* MÖLLENDORFF, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, Bd. 6, p. 96.
1904. *Limnaea* (*Gulnaria*) *shantungensis* JONES and PRESTON, Proc. Malac. Soc. London, vol. 6, p. 142, text-fig. 4. Type locality: 山東省威海衛 Weihaiwei, Shantung Province, China.
1908. *Lymnaea pervia* OKAMI 大上宇一, 介類雜誌, 第 2 卷, 第 205 頁.
1908. *Lymnaea pervia* KURODA 黒田德米, 介類雜誌, 第 2 卷, 第 208 頁; Conch. Mag., vol. 2, p. 28.
1910. *Lymnaea pervia* HIRASE 平瀨與一郎, 日本千貝目錄, 第 14 頁.
1911. *Limnaea* (*Gulnaria*) *pervia* ANDREAE, FUTTERER's Durch Asien, Bd. 3, p. 76.
1916. *Lymnaea* (*Lymnophysa*) *pervia* YAGURA 矢倉和三郎, 兵庫縣產貝類目錄, 第 58 頁.
1919. *Limnaea pervia* IWAKAWA 岩川友太郎, 日本產貝類標本目錄 Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus., p. 175.
1921. *Limnaea pervia* KANAMARU 金丸但馬, 三重縣產貝類調查報告, 第 9 頁.
1924. *Lymnaea pervia* MATUDA 松田英二, 臺灣博物學會會報 (Trans. Nat. Hist. Soc. Formosa), 第 71 號.
1927. *Lymnaea pervia* SUGITANI 杉谷房雄, 沖繩縣產貝類目錄 Cat. Luchu Shells, p. 37.
1927. *Lymnaea* (*Galba*) *pervia* HIRASE 平瀨信太郎, 日本動物圖鑑 (Figuraro de Japanaj Bestoj), 第 1478 頁, 挿圖第 2843 圖.
1928. *Lymnaea* (*Galba*) *pervia* KURODA 黒田德米, 奄美大島產貝類目錄 Cat. Shell-bearing Moll. Amami-Ôshima, p. 84.
1931. *Lymnaea* (*Galba*) *pervia* YOKOYAMA, Cat. Mar. Freshw. Land Shells Japan Miner. Mus. Imp. Geol. Surv. Japan, p. 56.
1931. *Lymnaea pervia* KAWABATA 川端重五郎, 琵琶湖產魚貝類, 第 132, 159 頁, 第 3 圖版, 第 20 圖.
1932. *Lymnaea* (*Galba*) *pervia* YAGURA 矢倉和三郎, 增訂改版兵庫縣產貝類目錄, 第 54 頁.
1933. *Limnaea kingi* PING and YEN, Bull. Fan. Mem. Inst. Biol., vol. 4, p. 294, text-fig. 26. Type locality: 新疆省阿克蘇 Aksu, Sinkiang Province, China.
1933. *Limnaea exilis* PING and YEN, ibid., p. 296, text-fig. 27. Type locality: 新疆省阿克蘇 Aksu, Sinkiang Province, China.
1933. *Limnaea truncatula tenua* PING and YEN, ibid., p. 298, text-fig. 29. Type locality: 新疆省阿克蘇 Aksu, Sinkiang Province, China.
1933. *Lymnaea pervia* ASANO 淺野彥太郎, 分類水產動物圖說, 第 385 頁, 挿圖第 777 圖.
1933. *Lymnaea* (*Galba*) *pervia* KURODA 黒田德米, 福井縣生物目錄, 第 192 頁.
1934. *Lymnaea* (*Galba*) *pervia* SHIBA 芝 昇, 朝鮮博物學會雜誌 Jour. Chosen Nat. Hist. Soc.,

no. 18, p. 26.

1934.1 *Lymnaea* (*Galba*) *pervia* HIRASE 平瀬信太郎, 日本貝類圖譜 A Coll. Jap. Shells Illust. Nat. Colours, p. 94, pl. 122, fig. 94.

1934. *Lymnaea* sp. c TOKUNAGA and NAORA 德永重康・直良信夫, 第一次滿蒙學術調査研究團報告, 第 2 部, 第 1 篇, 第 41 頁, 第 10 圖版, 第 10, 10a 圖; Rep. First Sci. Exped. Manchoukuo, sect. 2, pt. 1, p. 3, pl. 10, figs. 10, 10a.

1934. *Lymnaea* (*Galba*) *pervia* HIRASE 平瀬信太郎, 群馬縣天覽成績品目錄其三特殊博物之部, 第 57 頁.

1935. *Lymnaea pervia* HORIKAWA 堀川安市, ヴェナス (Venus), 第 5 卷, 第 30 頁.

1935. *Lymnaea* (*Galba*) *pervia* SUZUKI 鈴木好一, 地質學雜誌 (Jour. Geol. Soc. Japan), 第 42 卷, 第 209 頁.

1935. *Lymnaea pervia* HORIKAWA 堀川安市, 臺灣博物學會會報 (Trans. Nat. Hist. Soc. Formosa), 第 25 卷, 第 142 號, 第 227 頁.

1935. *Lymnaea* (*Galba*) *pervia* KURODA 黑田德米, 宮崎縣天覽成績品目錄其二 (博物之部), 第 58 頁.

1936. *Lymnaea pervia* YEN, China Journal, vol. 24, p. 46.

1937. *Galba truncatula* YEN, Publ. Mus. Hoangho Paiho Tien Tsin, no. 46, p. 17, pl. 1, figs. 17, 17a (not MÜLLER).

1937. *Galba laticallosiformis* YEN, ibid., p. 18, pl. 1, figs. 18, 18a. Type locality: 山西省馬家浦 Makiapu, North Shansi, China.

1937. *Galba pervia* YEN, Bull. Mus. Roy. Hist. Nat. Belgique, tome 13, no. 26, p. 26.

1937. *Lymnaea pervia* OKADA and ITO 岡田彌一郎・伊東祐一, 植物及動物 (Botany and Zoology), 第 5 卷, 第 2006 頁.

1938. *Lymnaea* (*Galba*) *pervia* TAKI 瀧 巖, 廣島縣產貝類目錄, 第 24 頁.

產地 Locality:—河北省石家莊の黃土層もしくは段丘層 (再積黃土) Loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province. (約 10 標本, 殆ど全部破損 Many specimens, more or less broken. 登錄番號 ANM 84.)

現生分布 Recent Distribution:—西南隅の一部を除く全支那 Whorl China. 西藏東部 East Tibet. 中央亞細亞東部トルキスタン East Turkestan. 蒙古 Mongolia. 滿洲國 Manchoukuo. 北海道以外の日本全土 Japan (except Hokkaidô).

化石產地 Fossil Occurrence:—河北省順義縣及び懷柔縣の燕東層 Yentung formation at Shunyi-hsien and Hwaiju-hsien, Hopei Province. 滿洲國哈爾濱郊外の顧鄉屯層 Kuhsiangtung formation in the vicinity of Harbin, Manchoukuo. 察哈爾省錫林郭勒盟の湖成段丘層 Lacustrine terrace deposit in Silingol-meng, Chahar Province.

附記:—石家莊產の標本, 特に大形のものは著しく損傷を受けてゐるが, 各地の現生標本と比較して少しも差異を認めない。

本種はその分布非常に廣く, 本邦に於ても極く普通に見られる。殼小さく; 螺塔比較的大きく, 可成り高い圓錐形; 螺層は 5 階でよく脹れ, 縫合直下で多少段狀をなし; 縫合は深く; 殼口卵形で軸脣捩れず; 臍孔は完全に開いてゐる。歐洲產の *Lymnaea* (*Galba*) *truncatula* (MÜLLER) に近緣なものであるが, 殼の外形は *Lymnaea* (*Radix*) *peregra* (MÜLLER) にも相當似た所がある。從つて兩種と分布の接し重なり合ふ地方では, 時に同定上の困難を生ずるやうである。

JONES 及び PRESTON (1904) が山東省威海衛から記載した *Limnaea* (*Gulnaria*) *shantungensis*, 閻敦建氏 (1937) が山西省馬家浦から記載した *Galba laticallosiformis* 並びに同氏が *Galba truncatula* (MÜLLER) に同定記載した鄂爾多斯南部の標本は凡て疑もなく本種である。又秉志・閻敦建兩

氏(1933)が新疆省阿克蘇から記載した *Limnaea truncatula tenua* 及び *Limnaea kingi*(これは少くとも *tenua* の幼貝であらう)も同様本種と認められる。尙兩氏の *Limnaea exigua*[1] なるものこそ *Lymnaea* (*Galba*) *truncatula* (MÜLLER) に外ならない。

Subgenus ***Radix*** Denys de MONTFORT ヒロクチモノアラガヒ亞屬

1810. *Radix* Denys de MONTFORT, Conchyl. systém. Classific. méthod. Coquilles, tome 2, p. 266. Monotype: *Radix auri ulatus* Denys de MONTFORT (=*Helix auricularia* LINNAEUS).
1831. *Gulnaria* "LEACH" TURTON, Manual Land Fresh-Water Shells British Isl., p. 117. Type by designation of GRAY (1847, Proc. Zool. Soc. London, vol. 15, p. 180; as a synonym of *Radix*): *Helix auricularia* LINNAEUS.
1855. *Neritostoma* H. and A. ADAMS, Genera Rec. Moll., vol. 2, p. 253. Type: *Helix auricularia* LINNAEUS.
1859. *Neristoma* CHENU, Man. Conchyl., tome 1, p. 479. Type by present designation: *Helix auricularia* LINNAEUS.
1881. *Limnaea* subgenus *Auriculariana* SERVAIN, Hist. Malac. Lac. Balaton, p. 49. Type by original designation: *Helix auricularia* LINNAEUS.
1881. *Limnaea* subgenus *Limosiana* SERVAIN, ibid., p. 52. Type by original designation: *Helix limosa* LINNAEUS (not MONTAGU) (=*Limnaea ovata* DRAPARNAUD).
1881. *Limnaea* subgenus *Peregriana* SERVAIN, ibid., p. 56. Type by original designation: *Bucinum peregrum* MÜLLER.

Lymnaea* (*Radix*) *plicatula BENSON シナモノアラガヒ(新稱)

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1842. *Limnaea plicatula* BENSON, Ann. Mag. Nat. Hist., ser. 2, vol. 9, p. 487. Type locality: 舟山列島 Chushan Is., China.
1856. *Limnaea plicatula* BENSON, Jour. Asiat. Soc. Bengal, vol. 24, p. 128.
1867. *Limnaeus plicatulus* MARTENS, Malakoz. Bl., Bd. 14, p. 221.
1875. *Limnaea plicatula* MARTENS, Jahrb. D. Malakoz. Gesell., Bd. 2, p. 131.
1878. *Limnaeus plicatulus* NEVILL, Hand List Moll. Indian Mus., pt. 1, p. 233.
1881. *Limnaea plicatula* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 8, p. 42.
1882. *Limnaea plicatula* GREDLER, Jahrb. D. Malakoz. Gesell., Bd. 9, p. 50.
1882. *Limnaea plicatula* GREDLER, Malakoz. Bl., N.F., Bd. 5, p. 180.
1885. *Limnaea plicatula* GREDLER, Jahrb. D. Malakoz. Gesell., Bd. 12, p. 234.
1886. *Limnaeus chefouensis* CLESSIN, Syst. Conch. Cab., Bd. 1, Abt. 17, p. 391, pl. 55, fig. 6. Type locality: 山東省芝罘 Chefoo (Chihfu), Shantung Province, China.
1886. *Limnaeus möllendorffianus* CLESSIN, ibid., p. 394, pl. 55, fig. 5. Type locality: 舟山列島 Chushan Is., China.
1886. *Limnaeus plicatulus* CLESSIN, ibid., p. 404, pl. 55, figs. 1-4.
1887. *Limnaea plicatula* GREDLER, Malakoz. Bl., N.F., Bd. 9, p. 151.
1887. *Limnaea chefuensis* GREDLER, ibid.
1887. *Limnaea möllendorffiana* GREDLER, ibid.
1890. *Limnaeus plicatulus* SCHMACKER and BOETTGER, Nachr.-Bl. D. Malakoz. Gesell., Bd. 22, p. 115.

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1) C. PING and T. C. YEN (1933): Bull. Fan Mem. Inst. Biol., vol 4, p. 298, text-fig. 28. 模式產地: 新疆省阿克蘇。

1898. *Limnaeus plicatellus* NEUMAYER, Wissensch. Ergebnisse Reise Graf. Béla SZÉCHENYI Ostasien, Bd. 2, p. 657.
1901. *Limnaea plicatula* MÖLLENDORFF, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, tome 6, p. 96.
1904. *Limnaea mars* JONES and PRESTON, Proc. Malac. Soc. London, vol. 6, p. 141, text-fig. 2. Type locality: 山東省 Liushitao, north-east promontory of Shantung, China.
1904. *Limnaea (Gulnaria) whartoni* JONES and PRESTON, ibid., p. 142, text-fig. 1. Type locality: 山東省 Liushitao, north-east promontory of Shantung, China.
1904. *Limnaea plicatula* JONES and PRESTON, ibid., p. 143.
1918. *Lymnaea clessini* ANNANDALE, Mem. Asiat. Soc. Bengal, vol. 6, p. 303.
1922. *Lymnaea plicatula* HAAS, Abh. Ber. Mus. Natur- Heimatkunde, Magdeburg, Bd. 3, Hft. 4, pp. 1–3.
1925. *Limnaea plicatula* BLUME, Archiv f. Moll.-kunde, Bd. 57, p. 11.
1934. *Lymnaea* sp. b TOKUNAGA and NAORA 德永重康・直良信夫, 第一次滿蒙學術調査研究團報告, 第 2 部, 第 1 篇, 第 40 頁; Rep. First Sci. Exped. Manchoukuo, sect. 2, pt. 1, p. 2.
1935. *Lymnaea (Radix) plicatula* SUZUKI 鈴木好一, 地質學雜誌 (Jour. Geol. Soc. Japan), 第 42 卷, 第 209 頁.
1937. *Radix clessini* YEN, Publ. Mus. Hoangho Paiho Tien Tsin, no. 46, p. 14, pl. 1, figs. 13, 13a (not NEUMAYER).
1937. *Radix ovata* YEN, ibid., p. 15, pl. 1, figs. 14, 14a (not DRAPARNAUD).
1937. *Radix plicatula* YEN, ibid., p. 16, pl. 1, figs. 15, 15a.
1937. *Radix plicatula* YEN, Bull. Mus. Roy. Hist. Nat. Belgique, tome 13, no. 26, p. 25.

産地 Locality:—河北省石家莊の黃土層もしくは段丘層（再積黃土）Loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province. (破損せる 3 標本 Three broken specimens. 登錄番號 ANM 85.)

現生分布 Recent Distribution:—全支那及び滿洲國 Whorl China and Manchoukuo.

化石産地 Fossil Occurrence:—河北省順義縣及び懷柔縣の燕東層 Yentung formation at Shun-yi-hsien and Hwaiju-hsien, Hopei Province. 滿洲國哈爾賓郊外の顧鄉屯層 Kuhsiangtung formation in the vicinity of Harbin, Manchoukuo.

附記:—石家莊産の標本は保存狀態甚だ良好でないが, 尙且つ附近の現生標本とよく一致する。本種は支那のモノアラガヒの最も代表的なものであつて, 本邦に於ける *Lymnaea (Radix) japonica* JAY に相當した地位を占め, 共に歐洲の *Lymnaea (Radix) ovata* DRAPARNAUD の系統に屬する。本種の殼は非常に變異に富んでゐるが, その特徵を要約すれば次の如くである。

大きさは中等; 螺塔は比較的高く, 常に尖り, 圓錐狀; 螺層は通常 4 階で; 縫合は淺く; 體層は急に增大してよく脹れ; 殼口は大きく, 逆耳形を呈し, 上端狹く, 下部圓く, 外緣は外方に伸びるも折返へらず; 殼軸は捩れ; 臍孔は軸脣に被はれて狹い隙間を殘すのみ。

山東省 Liushitao 産の *Limnaea mars* JONES and PRESTON (1904) 及び *Limnaea (Gulnaria) whartoni* JONES and PRESTON (1904) は本種の細長い型に過ぎず 同じく山東省芝罘からの *Limnaeus chefouensis* CLESSIN (1886) 並びに舟山列島からの *Limnaeus möllendorffianus* CLESSIN (1886) も亦本種の異名と認められる。

閻敦建氏 (1937) は, ANNANDALE が *Lymnaea clessini* NEUMAYER として記載した太湖産の標本は本種なるべきことを指摘してゐるが, 同氏が *clessini* に同定記載したものも, 少くとも圖示さ

れた個體に關する限り，NEUMAYER の *clessini*[1] とは著しく趣を異にし，矢張り本種中の 1 型と考へられる。

尙琉球に廣く棲息するコモノアラガヒも，殼學的には本種に酷似し，容易に區別し得ない。從來本邦の研究者はこの貝を *Limnaea minor* BENSON[2] に同定して來た。然し眞に *minor* か否か甚だ疑問のやうに思はれる。*minor* は *plicatula* と共に舟山列島から記載されたのであるが，その記載は頗る瞬昧で，大きさの指示もなく，僅に 歐洲の *Lymnaea* (*Galba*) *truncatula* (MÜLLER) に著しく類似する旨が附記してある。この種は爾來支那よりは一度も報告されたことなく，獨り我が琉球のコモノアラガヒがその名を冠せられてゐるのみである。コモノアラガヒと *plicatula* との關係については，目下瀧 庸氏が解剖學的研究を行つてゐるから，遠からず正確なことが判明するものと期待される。

Genus ***Opeas*** ALBERS ヲカチヤウジガヒ屬

1850. *Opeas* ALBERS, Heliceen, p. 175. Type by designation of HERMANNSEN (1852, Indic. Gener. Malac., Suppl., p. 96): *Bulimus subula* PFEIFFER (=*Bulimus gracilis* HUTTON).

Section *Opeas* s. s. ヲカチヤウジガヒ區

Opeas pyrgula SCHMACKER and BOETTGER ホソヲカチヤウジガヒ

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?1868. *Opeas pyrgula* A. ADAMS, Ann. Mag. Nat. Hist., ser. 4, vol. 1, p. 459 (nude name; no locality).

?1878. *Stenogyra* (*Opeas*) *pyrgula* NEVILL, Hand List Moll., Indian Mus., pt. 1, p. 164 (nude name).

?1879. *Opeas pyrgula* KOBELT, Abh. Senckenberg Naturf. Gesell. Bd. 11, p. 63 (nude name).

?1885. *Stenogyra* (*Opeas*) *pyrgula* MÖLLENDORFF, Jour. Asiat. Soc. Bengal, vol. 54, pt. 2, p. 61 (no description).

1891. *Opeas pyrgula* SCHMACKER and BOETTGER, Nachr.-Bl. D. Malakoz. Gesell., Bd. 23, p. 179. Type locality: 神戸丸山 Kobe, Japan.

1903. *Opeas pyrgula* HIRASE, Cat. Land Shells Japan, p. 21.

1905. *Opeas pyrgula* PILSBRY and HIRASE, Proc. Acad. Nat. Sci. Philad., vol. 57, p. 737.

1906. *Opeas pyrgula* PILSBRY, Man. Conch., ser. 2, vol. 18, p. 173, pl. 21, figs. 8–10.

1908. *Opeas pyrgula* HIRASE 平瀨與一郎，介類雜誌，第 2 卷，第 169 頁；Conch. Mag., vol. 2, p. 20.

1909. *Opeas pyrgula* OTAKI 大瀧五百太，介類雜誌，第 3 卷，第 95 頁；Conch. Mag., vol. 3, p. 21.

1910. *Opeas pyrgula* HIRASE 平瀨與一郎，日本千貝目錄，第 10 頁.

1916. *Opeas pyrgula* YAGURA 矢倉和三郎，兵庫縣產貝類目錄，第 56 頁.

1919. *Opeas pyrgula* IWAKAWA 岩川友太郎，日本產貝類標本目錄 Cat. Jap. Moll. Nat. Hist. Dept. Tokyo Imp. Mus., p. 213.

1921. *Opeas pyrgula* KANAMARU 金丸但馬，三重縣產貝類調査報告，第 11 頁.

1927. *Opeas pyrgula* KURODA, in PILSBRY, Proc. Acad. Nat. Sci. Philad., vol. 78, p. 473.

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1) M. NEUMAYER (1898): Wissenschaftliche Ergebnisse der Reise des Grafen Béla SZÉCHENYI in Ostasien, Bd. 2, p. 657, pl. 4, figs. 4, 5.

2) W. H. BENSON (1842): Ann. Mag. Nat. Hist., ser. 2, vol. 9, p. 487.

1927. *Opeas pyrgula* HIRASE 平瀨信太郎, 日本動物圖鑑 (Figuraro de Japanaj Bestoj), 第 1496 頁, 挿圖第 2879 圖.
1929. *Opeas fragilis* PING, Palaeont. Sinica, ser. B, vol. 6, fasc. 5, p. 21, text-figs. 13a–f, pl. 2, figs. 13a–c. Type locality: 河北省周口店の裂罅堆積層 Cave deposit of Choukoutien, Hopei Province, China.
1930. *Opeas pyrgula* SOWERBY, Naturalist in Manchuria, vol. 5, p. 50.
1930. *Opeas pyrgula* KURODA 黒田德米, 小笠原諸島生物相, 第 135 頁.
1931. *Opeas fragilis* PING, Palaeont. Sinica, ser. B, vol. 6, fasc. 6, p. 29, text-figs. 16a, b, pl. 2, fig. 16.
1931. *Opeas pyrgula* YOKOYAMA, Cat. Mar. Freshw. Land Shells Japan Miner. Mus. Imp. Geol. Surv. Japan, p. 69.
1932. *Opeas pyrgula* YAGURA 矢倉和三郎, 增訂改版兵庫縣產貝類目錄, 第 57 頁.
1933. *Opeas pyrgula* KURODA 黒田德米, 福井縣生物目錄, 第 193 頁.
1934. *Opeas pyrgula* SHIBA 芝昇, 朝鮮博物學會雜誌 Jour. Chosen Nat. Hist. Soc., no. 18, p. 28.
1934. *Opeas pyrgula* HIRASE 平瀨信太郎, 日本貝類圖譜 A Coll. Jap. Shells Illust. Nat. Colours, p. 98, pl. 123, fig. 36.
1934. *Opeas pyrgula* HIRASE 平瀨信太郎, 群馬縣天覽成績品目錄其三特殊博物之部, 第 63 頁.
1934. *Opeas pyrgula* OKADA 岡田彌一郎, ヴェナス (Venus), 第 4 卷, 第 362 頁.
1935. *Opeas pyrgula* KURODA 黒田德米, 宮崎縣天覽成績品目錄其二 (博物之部), 第 60 頁.
1936. *Opeas pyrgula* INOUYE 井上光雄, 紀州動植物, 第 3 卷, 第 6 頁.
1936. *Opeas pyrgula* OKADA 岡田彌一郎, 日光の植物と動物, 第 500 頁.
1937. *Opeas pyrgula* KIKUCHI 菊池勘左衞門, 富山高等學校博物同好會會誌, 第 3 號, 第 38 頁.
1938. *Opeas pyrgula* TAKI 瀧 巖, 廣島縣產貝類目錄, 第 25 頁.
1938. *Opeas pyrgula* KURODA 黒田德米, 臺灣地學記事, 第 9 卷, 第 68 頁.

記載:—殼は細長く小形, 亞披針形, 薄質脆弱。螺塔は狹くて高く, 略々圓筒狀。殼頂は甚だ小さく, 鈍く, 圓味を帶び, 側方よりは殆ど認め難い。胎殼は約 2 層より成り, 平滑で脹れる。螺層は全部で 6 層內外, 極めて徐々に增大し, 多少脹れ; 縫合は深く切れ込み, 縱脈のため微かに鋸齒狀を呈する。體層は相當大きくて平たく, 周緣角張らず; 底面は幾分脹む。臍孔は頗る小さく, 淺い。胎殼以後の殼表は, 微弱且つ稍々不規則な縱脈で刻まれ; 脈は幾分斜走しつゝ可成り前曲し, 縫合直下では特に明瞭。殼口は殆ど垂直, 小橢圓形, 上端は銳角をなし, 下部は少しく圓まる。外脣は單純で薄く, 銳く尖り; 內脣は稍々厚く, 反曲して臍孔を被ふ。

測定値 Measurements (單位粍 in mm.):—最大の標本は殼高 Height 5.5, 殼徑 diameter 1.6; 口高 height of aperture 1.7 (largest specimen).

產地 Recent Locality:—河北省石家莊の黃土層もしくは段丘層 (再積黃土) Loess or terrace deposit ("redeposited loess" of Shihkiachwang, Hopei Province. (大小數標本 Several specimens, adult and young. 登錄番號 ANM 87.)

現生分布 Recent Distribution:—南•中•北支那 South, Central and North China; 澳門•海口•福州•北京•天津•山海關及び湖南省 Macao, Hoihow, Foochow, Peking, Tientsin, Shanhaikwang and Hunan Province. 滿洲國南部 Southern part of Manchoukuo; 錦州 Kinchow. 日本 Japan; 本州•四國•九州•父島•臺灣•朝鮮 Honsyû, Sikoku, Kyûsyû, Titi-zima (Bonin Is.), Taiwan (Formosa) and Tyôsen (Korea).

化石產地 Fossil Occurrence:—河北省唐山の燕東層 (從來三門系とされてゐたもの) Yentung formation ("Sanmen series") at Tangshan, Hopei Province. 河北省周口店の裂罅堆積層 Cave deposit of Choukoutien, Hopei Province. 滿洲國錦州省朝陽の黃土層 Loess at Chaoyang, Kinchow Province, Manchoukuo.

附記:—本種は分布の非常に廣い種類で,本邦に於ても極く普通に見られる。石家莊產の化石標本は北支那及び本邦の現生標本とよく一致する。秉志氏 (1929) が周口店の裂罅堆積層から記載した *Opeas fragilis* は本種に外ならない。又滿洲國錦州省朝陽の黃土層からも,松澤勳氏によつて本種が採集されてゐる。

Genus ***Bradybaena*** BECK **オナジマイマイ屬**

1837. *Bradybaena* BECK, Index Moll., p. 18. Type by designation of GRAY (1847, Proc. Zool. Soc. London, vol. 15, p. 173): *Helix similaris* FÉRUSSAC.

1891. *Eulotella* MARTENS, Zool. Ergebnisse Reise Niederländisch. Ost-Indien, Bd. 2, p. 235. Type by original designation: *Helix similaris* FÉRUSSAC.

Subgenus ***Manchurohel x*** TAKI (MS) **マンシウマイマイ亞屬** (未發表)

Bradybaena (***Manchurohelix***) ***lavrushini*** (COCKERELL)
マンシウマイマイ (瀧 庸, 未發表)

第 6 (4) 圖版, 第 1,2 圖 Plate 6(4), figures 1, 2

1926. *Eulotella lavrushini* COCKERELL, Ann. Mag. Nat. Hist., ser. 9, vol. 17, p. 227. Type locality: 滿洲國吉林省穆林河分岐點 Middle fork of the Muren River, Kirin Province, Manchoukuo.

記載:—殼は球形, 中大, 薄質半透明で絹絲樣の光澤を帶びる。螺塔は低い圓錐形, その高さは殼高の約 2/3。殼頂は圓く, 多少隆起する。胎殼は 2 層弱より成り, 脹れ, 初層は顯微鏡的な顆粒で, 次層は同樣極く微細な線で被はれる。螺層は全部で 5 層半, よく脹れ, 甚だ急速に增大し; 縫合は深く切れ込む。體層は頗る大きへ, 著しく脹れ, 前端殆ど下降しない。底面脹れ; 臍孔は內脣の延長によつて被覆されるが, 尙明に孔を認め得る。胎殼以後の殼の表面には細密な螺條が現はれ, 細かな成長線と直交して碁盤目狀となる。殼口は僅に斜行し, 略々半圓形, 上部は稍々狹まる。口緣は單一で薄く, 鋭く尖り; 內脣は殼軸下端で著しく外方へ擴がる。殼色は淡い朽葉色。

測定値 Measurements (單位粍 in mm.):—

番號 No.	螺層の數 Number of whorls	殼高 Height	殼徑 Diameter	口高 Height of aperture	口徑 Diameter of aperture
1	5½	17.0	19.2	13.3	10.5
2	5	16.7	18.8	12.8	10.0

產地 Recent Locality:—河北省井陘の黃土層 Loess at Tsingsing, Hopei Province. (2 標本 specimens; 登錄番號 ANM 88.)

現生分布 Recent Distribution:—北支那 North China; 河北・山西・察哈爾 3 省 Hopei, Shansi and Chahar Provinces. 熱河地方及び北滿 Jehol and North Manchuria. 呼倫貝爾 Daaria. 關東州 (大連附近) Liaotung.

附記:—本種に就いては瀧 庸氏の詳細な研究報告[1] があるから參照されたい。同氏によれば,井

1) 瀧 庸: 熱河省產軟體動物, 第一次滿蒙學術調査研究團報告, 第 5 部, 第 1 區, 第 1 篇, 第 4 輯, 229 頁, 22 圖版 (本種に關する部分は 132-137, 196-201 頁; 第 18-22 圖版)。この報告書は夙に校正を完了し, 昭和 11 年 7 月 30 日を以て公刊される筈であつた所, 諸種の事情により未だ刊行を見るに至らない。(本年 3 月末頃迄には出版されるらしい。) 校正刷の借覽と引用とを許された瀧博士に厚く感謝の意を表する。

陘の化石標本は熱河省産の現生標本と比較して少しも差異を見出すことが出來ないさうである。

"本種は生殖器の構造を明にするまでは嘗て GERSTFELDT (1859) 及び SCHRENCK (1867) が同定した様に *Acusta ravida* BENSON であると考へてゐた。MÖLLENDORFF (1899) は上述の兩人が認めた *Acusta ravida* は *Acusta lineolata* と同種であり, PHILIPPI の *Acusta helvacea* は BENSON の *A. ravida* の異名であると斷定した。併し更に文獻を詳細に取調べて見ると PHILIPPI の *A. helvacea* は MÖLLENDORFF の *A. lineolata* の要徴と全く一致するものの様であるから, 後者は前者の名に代へらるべきもので, PHILIPPI の *A. helvacea* は BENSON の *A. ravida* とは別種と考へられる。" "本種は *A. helvacea* に殼の構造が非常によく似てゐることは既にSCHRENCK によつて指摘された所であるが, 殼の小形なこと, 薄質で更に螺塔の低いこと, 臍孔の著しく狹いことで區別が出來るから別種と認むべきものと考へられる。之れに對して COCKERELL は *Eulota lavrushini* と命名した。" (瀧 133, 134 頁)

尙瀧氏は, 殼表の狀態・殼の構造及び色・特に生殖器の構造に基き, 本種に對して *Bradybaena* 屬中に亞屬 *Manchurohelix* を創設してゐる。

Genus *Cathaica* MÖLLENDORFF チウカマイマイ屬

1884. *Helix* group *Cathaica* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 11, p. 339. Type by original designation: *Helix pyrrhozona* PHILIPPI (=*Helix fasciola* DRAPARNAUD). Not *Cathaicus* BATES, 1870 (coleoptera).

Subgenus *Cathaica* s. s. チウカマイマイ亞屬

Section *Cathaica* s. s. チウカマイマイ區

1900. *Cathaica* subgenus *Eucathaica* ANDREAE, Mittheil. Roemer-Mus., Hildesheim, No. 12, p. 2. Type by original designation: *Helix fasciola* DRAPARNAUD.

Cathaica fasciola (DRAPARNAUD) チウカマイマイ (新稱)

第 5 (3) 圖版, 第 1–10 圖 Plate 5 (3), figures 1–10

1774. *Helix striatula* MÜLLER, Verm. terr. fluv. Hist, vol. 2, p. 24 (not LINNÉ). Type locality: 支那 China?
1805. *Helix faciola* (mistake!) (*Helix fasciola* on explanation of plate) DRAPARNAUD, Hist. Nat. Moll. terr. fluv. France, p. 110, pl. 6, figs. 22–24. Type locality: 支那 China?
1845. *Helix pyrrhozona* PHILIPPI, Abbild. Beschreib. neuer od. wenig bekannter Conch., Bd. 2, Teil 9, p. 2, *Helix* pl. 6, fig. 4. Type locality: 支那 China.
1848. *Helix pyrrhozona* PFEIFFER, Monogr. Helic., Bd. 1, p. 350.
1850. *Helix* (*Fruticicola*) *pyrrhozona* ALBERS, Heliceen, p. 70.
1852. *Helix pyrrhozona* PFEIFFER, Syst. Conch. Cab., Bd. 1, Abt. 12, p. 73, pl. 79, figs. 7–9.
1854. *Helix pyrrhozona* REEVE, Conch. Icon., *Helix* sp. 455, pl. 85, fig. 455.
1859. *Helix pyrrhozona* PFEIFFER, Monogr. Helic., Bd. 4, p. 124.
1860. *Helix pyrrhozona* MARTENS, Heliceen (ALBERS'), II Aufl.
1863. *Helix pyrrhozona* DEBEAUX, Journ. de Conchyl., tome 11, pp. 243, 248.
1867. *Helix* (*Camaena*) *pyrrhozona* MARTENS, Preuss. Exped. Ost-Asien, Zool., Bd. 2, p. 48.
1868. *Helix pyrrhozona* PFEIFFER, Monogr. Helic., Bd. 5, pp. 198, 480.
(?) 1868. *Helix* (*Camaena*) *pyrrhozona* A. ADAMS, Ann. Mag. Nat. Hist., ser. 4, vol. 1, p. 461 (parts).
(?) 1870. *Helix* (*Camaena*) *pyrrhozona* A. ADAMS, Travels of a Naturalist in Japan and

Manchuria. (parts).

1872. *Helix fasciola* MABILLE, Rev. Mag. Zool., tome 23, p. 49.

1875. *Helix pyrrhozona* MARTENS, Jahrb. D. Malakoz Gesell., Bd. 2, p. 129.

1875. *Helix* (*Camena*) *pyrrhozona* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 2, p. 217.

1875. *Helix* (*Camena*) *pyrrhozona montana* MÖLLENDORFF, ibid.

1876. *Helix pyrrhozona* PFEIFFER, Monogr. Helic., Bd. 7, pp. 220, 555.

1878. *Helix fasciola* (=*pyrrhozona*) WIMMER, Sitzungsber. K. K. Zool.-Bot. Gesell. Wien, Bd. 28, p. 44.

1878. *Helix* (*Camena*) *pyrrhozona* NEVILL, Hand List Moll. Indian Mus., pt. 1, p. 72.

1878. *Helix pyrrhozona* GREDLER, Nachr.-Bl. D. Malakoz. Gesell., Bd. 10, p. 104.

1881. *Helix pyrrhozona* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 8, p. 38.

1882. *Helix pyrrhozona* GREDLER, Jahrb. D. Malakoz. Gesell., Bd. 9, p. 47.

1882. *Helix pyrrhozona* GREDLER, Malakoz. Bl., N.F., Bd. 5, p. 174.

1882. *Helix pyrrhozona* HEUDE, Mém. Conc. Hist. Nat. Empire Chinois, p. 43, pl. 16, figs. 7, 8.

1882. *Helix* (*Camena*) *pyrrhozona* HILBER, Sitzungsber. Math.-Naturwiss. Classe K. Akad. Wissensch., Bd. 86, p. 345, pl. 3, fig. 8.

1884. *Helix pyrrhozona* GREDLER, Archiv f. Naturg., Jahrgang 50, Bd. 2, p. 261.

1884. *Helix* (*Cathaica*) *pyrrhozona* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 11, p. 341.

1887. *Helix* (*Cathaica*) *pyrrhozona* GREDLER, Malakoz. Bl., N.F., Bd. 9, p. 133.

1887. *Helix* (*Dorcasia*) *fasciola* TRYON, Man. Conch., ser. 2, vol. 3, p. 208, pl. 47, figs. 57–59.

1887. *Helix* (*Dorcasia*) *fasciola* TRYON, ibid.

1892. *Helix* (*Cathaica*) *pyrrhozona* PILSBRY, Man. Conch., ser. 2, vol. 8, p. 204, pl. 47, figs. 60–63.

1894. *Eulota* (*Cathaica*) *fasciola* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 206.

1898. *Helix* (*Camena*) *pyrrhozona* HILBER, Wissensch. Ergebnisse Reise Graf. Béla SZÉCHENYI Ostasien, Bd. 2, p. 599, pl. 2, fig. 12.

1899. *Cathaica fasciola* MÖLLENDORFF, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, tome 4, p. 103.

1899. *Cathaica transitans* MÖLLENDORFF, ibid., p. 60, pl. 7, fig. 14. Type locality: 甘肅省 Tantschang, Kansu Province, China.

1900. *Cathaica fasciola* STURANY, Denkschriften Math.-Naturwiss. Classe K. Akad. Wissensch., Bd. 70.

1900. *Cathaica obrutschewi* STURANY, ibid., p. 25, pl. 2, figs. 10–12. Type locality: 寧夏省阿拉善額魯特旗 Alashan, Ningsia Province, China.

1900. *Cathaica* (*Eucathaica*) *fasciola* ANDREAE, Mittheil. Roemer-Mus., Hildesheim, No. 12, p. 2.

1900. *Cathaica* (*Eucathaica*) *subtilistriata* ANDREAE, ibid., p. 3, text-fig. 3. Type locality: 陝西省西安附近 Litschüan-hsien northwest of Singan-fu, Shensi Province, China.

1901. *Cathaica* (*Eucathaica*) *fasciola* MÖLLENDORFF, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, tome 6, p. 5.

(?) 1902. *Helix* (*Camaena*) *pyrrhozona* [=*Eulota* (*Cathaica*) *fasciola*] PILSBRY, Proc. Acad. Nat. Sci. Philad., vol. 54, p. 240.

1902. *Cathaica* (*Eucathaica*) *fasciola* GUDE, Jour. Malac., vol. 9.

1904. *Eulota fasciola* JONES and PRESTON, Proc. Malac. Soc. London, vol. 6, p. 5.

1908. *Eulota* (*Cathaica*) *fasciola* HIRASE 平瀬與一郎, 介類雜誌, 第 2 卷, 第 168 頁; Conch. Mag., vol. 2, p. 20.

1911. *Cathaica (Eucathaica) fasciola* ANDREAE, FUTTERER'S Durch Asien, Bd. 3, p. 59, pl. 1, figs. 1, 2.
1911. *Cathaica (Eucathaica) subtilistriata* ANDREAE, ibid., p. 59, pl. 1, figs. 3, 67, 68.
1925. *Cathaica pyrrhozona* BLUME, Archiv f. Moll.-kunde, Bd. 57, p. 11.
1929. *Helix pyrrhozona* PING, Palaeont. Sinica, ser. B, vol. 6, fasc. 5, p. 7, text-figs. 1a-d, pl. 1, figs. 1a-d.
1930. *Cathaica (Eucathaica) fasciola* SOWERBY, Naturalist in Manchuria, vol. 5, p. 48.
1931. *Eulota (Cathaica) pyrrhozona* PING, Palaeont. Sinica, ser. B, vol. 6, fasc. 6, p. 20, text-figs. 9a-e, pl. 2, figs. 9a-e.
1933. *Cathaica (Cathaica) fasciola* HAAS, Senckenbergiana, Bd. 15, p. 316.
1933. *Cathaica (Cathaica) transitans* HAAS, ibid.
1935. *Cathaica fasciola* YEN, Publ. Mus. Hoangho Paiho Tien Tsin, no. 34, p. 24, pl. 2, figs. 1, 1b.
1937. *Cathaica fasciola* YEN, Bull. Mus. Roy. Hist. Nat. Belgique, tome 13, no. 26, p. 13.

記載:—殼は低平な圓錐狀，中等の大きさを有し，可成り薄質なるも堅固，幾分透明で光澤を帶びる。螺塔は低い圓錐形，通常殼高の $\frac{2}{3}$ 位を占める。殼頂は圓く，低く，僅に隆起するのみ。胎殼はよく脹れた $1\frac{1}{2}$ 乃至 $1\frac{3}{4}$ 層より成り，顯微鏡的な顆粒によつて密に被はれる。螺層は全部で 5-6 を數へ，よく脹れ，速に增大し，深く切れ込んだ縫合によつて境される。體層は著しく擴がり，周緣少しく角張り，前端は殆ど下降しない。底面よく脹れ；臍孔は廣くはないがよく開き，急激に狹く深い孔となる。胎殼以後の殼の表面は多數の放射脈を備へ；脈は最初細密なるも，次第に粗となり，强くなる。但し底面では著しく弱い。平頂で脈間よりも狹く，脈間には微細な成長線が認められる。殼口は多少斜行し，橫卵形，內面肥厚して乳白色を呈し，屢々底部に低平な隆起を生ずる。外層は上端では單一で薄く，鋭く尖るが，下部では僅に反曲する。內層は薄い滑層を成し，殼軸の下端で反轉して臍孔の一部を被ふ。殼の色は相當褪せてゐるが，胎殼は光澤ある褐色を呈し，螺塔も淡い褐色味を帶びる。底面は大體白色。周緣には 1 條の明瞭なチョコレート色の色帶があり，更に縫合の直下に今 1 條の淡褐色帶が極めて不明瞭ながら認められる。

測定値 Measurements (單位粍 in mm.):—

番號 No.	螺層の數 Number of whorls	殼高 Height	殼徑 Diameter	口高 Height of aperture	口徑 Diameter of aperture
1	$6\frac{1}{4}$	9.7	13.9	6.8	7.6
2	6	9.0	13.9	6.4	7.5
3	6	8.5	13.6	6.3	7.3
4	6	7.8	13.1	6.4	7.2

產地 Locality:—河北省井陘の黃土層 Loess at Tsingsing, Hopei Province. (4 標本 specimens; 登錄番號 ANM 89.)

現生分布 Recent Distribution:—北・西・中支那 North, West and Central China; 河北・山東・山西・察哈爾・綏遠・寧夏・甘肅・四川・陝西・湖北・湖南・河南・安徽・江蘇各省 Province Hopei, Shantung, Shansi, Chahar, Suiyüan, Ningsia, Kansu, Szechwan, Shensi, Hupei, Hunan, Honan, Anhwei, and Kiangsu. 滿洲國 Manchoukuo; 熱河地方一帶及び吉林 Jehol and Kirin. (?) 沿海州浦鹽附近(?) Olga and Vladimir Bays, Maritime Province.

化石產地 Fossil Occurrence:—河北省井陘縣雪花山の Hipparion? 紅土層 Hipparion? red clay of Shueh-hua-shan, Tsingsing, Hopei Province. 山西省汾河の所謂三門系 "Sanmen series"

at Fenho, Shansi Province. 各地の黄土層 Loess at many places.

附記:—井陘の化石は強い放射脈で飾られた典型的な *fasciola* である。本種は支那の蝸牛類中最も普通なものゝ一つで，黄土の發達する地域を中心に廣く各地に分布し，黄土中の化石としても到る所に產する。

手許にある北支那各地の現生標本の中，北京（第 5 (3) 圖版，第 8, 9 圖）及び察哈爾省宣化（第 5 (3) 圖版，第 10 圖）產のものは，井陘の化石よりも螺塔低く且つ放射脈細密で，*Cathaica transitans* MÖLLENDORFF (1899) に酷似する。又滿洲國錦州省朝陽の現生標本はこれら 2 ケ所のものと井陘產化石との中間の形狀を示す。*transitans* は最初彫刻の弱いことゝ，外脣下部の齒狀突起を缺くことゝによつて *fasciola* とは別種とされた。然し齒狀の突起の有無が問題とするに足りないことは，既に HAAS (1933) も指摘した所である。筆者は *transitans* は *fasciola* の亞種といふよりは寧ろ一つの型にすぎないと考へる。

尙 A. ADAMS (1868) は沿海州浦鹽附近の Olga, Vladimir 2 灣及び北海道函館から本種を報告した。北海道からの產出は，PILSBRY[1] の注意に俟つまでもなく何等かの誤である。沿海州に棲息することにも可成り疑問があるが，今の所何とも決定し得ない。

Section *Pliocathaica* ANDREAE コウドマイマイ區

1900. *Cathaica* subgenus *Pliocathaica* ANDREAE, Mittheil. Roemer-Mus., Hildesheim, No. 12, p. 3. Type by original designation: *Helix pulveratrix* MARTENS.

Cathaica pulveratrix (von MARTENS) コウドマイマイ（新稱）

第 6 (4) 圖版，第 7, 8 圖 Plate 6 (4), figures 7, 8

1882. *Helix pulveratrix* MARTENS, Mem. Acad. Imp. Sci. St. Pétersbourg, ser. 7, tome 30, p. 16, pl. 2, fig. 8. Type locality: 甘肅省 (?) Kansu Province (?), China.
1882. *Helix schensiensis* HILBER, Sitzungsber. Math.-Naturwiss. Classe K. Akad. Wissensch., Bd. 86, p. 333, pl. 1, figs. 10–13. Type locality: 陝西省西安の 黄土層 Loess of Singan-fu in the valley of Wei-ho 渭水, Shensi Province, China.
1883. *Helix pulveratrix* HILBER, ibid., p. 1352, pl. 4, fig. 1.
1884. *Helix bizona* GREDLER, Archiv f. Naturg., Jahrgang 50, Bd. 2, p. 262. Type locality: 綏遠省 (?) Hoang-ho District, China.
1884. *Helix bizona schensiaca* GREDLER, ibid. Type locality: 綏遠省 (?) Hoang-ho District, China.
1884. *Helix* (*Cathaica*) *schensiensis* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 11, p. 348.
1884. *Helix* (*Cathaica*) *pulveratrix* MÖLLENDORFF, ibid.
1887. *Helix* (*Cathaica*) *schensiensis* GREDLER, Malakoz. Bl, N. F., Bd. 9, p. 134.
1887. *Helix* (*Cathaica*) *bizona* GREDLER, ibid.
1887. *Helix* (*Cathaica*) *bizona schensiaca* GREDLER, ibid.
1890. *Helix bizona* GREDLER, Nachr.-Bl. D. Malakoz. Gesell., Bd. 22, p. 149.
1890. *Helix bizona schensiaca* GREDLER, ibid.
1892. *Helix* (*Cathaica*) *schensiensis* PILSBRY, Man. Conch., ser. 2, vol. 8, p. 211, pl. 47, figs. 90–95.
1892. *Helix* (*Cathaica*) *pulveratrix* PILSBRY, ibid., p. 211, pl. 48, figs. 10, 14, 15.
1894. *Eulota* (*Cathaica*) *pulveratrix* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 206.
1894. *Eulota* (*Cathaica*) *schensiensis* PILSBRY, ibid.
1898. *Helix s hensiensis* HILBER, Wissensch. Ergebnisse Reise Graf. Béla SZÉCHENYI Ostasien,

1) H. A. PILSBRY (1902): Proc. Acad. Nat. Sci. Philad., vol. 54, p. 234.

Bd. 2, p. 590, pl. 1, figs. 10–13.

1898. *Helix pulveratrix* HILBER, ibid., p. 591, pl. 1, fig. 14.

1899. *Cathaica pulveratrix* MÖLLENDORFF, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, tome 4, p. 63.

1900. *Cathaica pulveratrix* STURANY, Denkschriften Math.-Naturwiss. Classe K. Akad. Wissensch., Bd. 70, p. 24.

1900. *Cathaica* (*Pliocathaica*) *pulveratrix* ANDREAE, Mittheil. Roemer-Mus., Hildesheim, No. 12, p. 3, text-figs. 4–6.

1901. *Cathaica* (*Pliocathaica*) *pulveratrix* MÖLLENDORFF, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, tome 6, p. 6.

1902. *Cathaica* (*Pliocathaica*) *pulveratrix* GUDE, Jour. Malac., vol. 9.

1902. *Cathaica* (*Pliocathaica*) *pulveratrix bizona* GUDE, ibid.

1911. *Cathaica* (*Pliocathaica*) *pulveratrix* ANDREAE, FUTTERER's Durch Asien, Bd. 3, p. 61, pl. 1, figs. 4, 5.

1911. *Cathaica* (*Pliocathaica*) *pulveratrix strigillata* ANDREAE, ibid., p. 61, pl. 1, figs. 69–71. Type locality: 西藏東北部 South of Wansaong, North-East Tibet.

1929. *Helix schensiensis* PING, Palaeont. Sinica, ser. B, vol. 6, fasc. 5, p. 16, text-figs. 8a–c, pl. 2, figs. 8a–c.

1930. *Cathaica* (*Pliocathai a*) *pulvetrix* SOWERBY, Naturalist in Manchuria, vol. 5, p. 49.

1930. *Cathaica* (*Pliocathaica*) *pulvetrix bizona* SOWERBY, ibid.

1931. *Eulota* (*Cathaica*) *schensiensis* PING, Palaeont. Sinica, ser. B, vol. 6, fasc. 6, p. 22, text-figs. 10a–c, pl. 2, figs. 10a–c.

1933. *Eulota* (*Cathaica*) *pulveratrix* PING and YEN, Bull. Fan Mem. Inst. Biol., vol. 4, p. 270, text-figs. 9, 10.

1937. *Cathaica pulveratrix* YEN, Publ. Mus. Hoangho Paiho Tien Tsin, no. 34, p. 28, pl. 2, figs. 5, 5a, 5b.

1937. *Cathaica pulveratrix conispira* YEN, ibid., p. 29, pl. 2, figs. 6, 6a, 6b. Type locality: 綏遠省鄂爾多斯南部 Siaokiao-pan, southeast of Hotau, China.

1937. *Cathaica schensiensis* YEN, ibid., p. 29, pl. 2, figs. 7, 7a, 7b.

1937. *Cathaica teilhardi* YEN, ibid., p. 30, pl. 2, figs. 8, 8a, 8b. Type locality: 綏遠省鄂爾多斯南部 Hoamatche, south of Hotau, China.

1937. *Cathaica robertsi* YEN, ibid., p. 31, pl. 2, figs. 9, 9a, 9b. Type locality: 綏遠省鄂爾多斯南部 Siaokiao-pan, southeast of Hotau, China.

記載:—殼は亜球形，中等の大きさを有し，殼質厚くはないが堅固，多少光澤を帶びる。螺塔は低い圓錐形で殼高の約半ばを占め；殼頂は圓く，僅に隆起するも第一層中に少しく沈む。胎殼は 1 層半より成り，脹れ，顯微鏡的な顆粒で被はれる。螺層は全部で 5¾，非常によく脹れ，可成り速に增大する。縫合は深く切れ込み；體層は大きく，周緣圓く，前端幾分下降する。底面はよく脹れ，頗る不明瞭な鈍角をなして臍孔に移る。臍孔は深くて稍々狹く，反曲した軸脣下に一部隱蔽される。胎殼以後の殼の表面は多數の稍々不規則な成長線條によつて刻まれ；これらの線條は最初は微細，漸次粗大となり，體層では特に顯著であるが，底面では少しく弱い。更に體層には極めて細かな螺線が，成長線條に横切られつゝ現はれる。殼口は多少斜行し，四角張つた卵形，內面肥厚し，底部に不明瞭な低平な隆起を有する，外脣極く僅に反曲し；內脣は薄い滑層を成し，殼軸の下端で著しく反轉する。色彩は全く褪せてゐるが，體層周緣部に 2 條の狹い色帶の痕跡が認められ，螺塔上部に於ては上の 1 條が縫合の直上に露はれる。

測定値 Measurements (單位粍 in mm.):—殼高 Height 11.0, 殼徑 diameter 14.5; 口高 height of aperture 7.6, 口徑 diameter of aperture 7.6.

產地 Locality:—河北省井陘の黃土層 Loess at Tsingsing, Hopei Province. (完全な標本及び

螺塔上部の缺損した標本各 1 個 A perfect specimen and an imperfect one represented by only the last whorl. 登錄番號 ANM 90.)

現生分布 Recent Distribution:—北・西支那 North and West China; 河北・河南・山西・綏遠・陝西・甘肅各省 Hopei, Honan, Shansi, Suiyüan, Shensi and Kansu Provinces. 西藏北東部 North-East Tibet.

化石産地 Fossil Occurrence:—陝西省榆林の "Polycene" 層 "Polycene" beds at Yulin, Shensi Province. 河北省周口店の裂罅堆積層 Cave deposit of Choukoutien, Hopei Province. 各地の黄土層 Loess at many places.

附記:—井陘産化石標本は完全なのは僅 1 個に過ぎず, HILBER が圖示した *Helix schensiensis* 中の或もの (1882, pl. 1, fig. 11; 1898, pl. 1, fig. 11.) に頗るよく一致する。

MÖLLENDORFF (1899) 及び ANDREAE (1911) に從へば, 本種は甚だ變異に富み, *Helix schensiensis* HILBER, *Helix bizona* GREDLER (1884) 並びに *H. bizona schensiaca* GREDLER (1884) は皆この異名に過ぎない。最近閻敦建氏 (1935) は綏遠省鄂爾多斯南部より本種とその新亞種 *conispira* とを記載し, 同時に *Cathaica schensiensis* (HILBER) に近緣なものとして *Cathaica teilhardi*, *C. robertsi* の 2 種を創設し, 更に *schensiensis* そのものをも河南・山西兩省から報告した。然しこれらは凡て本種中に含まれるべきものである。

廣く各地より多數の標本を集めて仔細に檢討すれば, 或は幾つかの種類に區分する必要を生ずるに至るかも知れないが, 目下の所資料が甚だ少いので, 暫く本種のみを認めておく。

Genus *Metodontia* MÖLLENDORFF ヨツバマイマイ屬

1886. *Helix* group *Metodontia* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 13, p. 191. Monotype: *Helix* (*Metodontia*) *hemipleuris* MÖLLENDORFF (=*Helix honaiensis* CROSSE).
1887. *Tetrodontia* ANCEY, Conch. Exch., tome 1, p. 64. Type by original designation: *Helix tetrodon* MÖLLENDORFF (=*Helix yantaiensis* CROSSE and DEBEAUX).

Metodontia yantaiensis (CROSSE and DEBEAUX) ヨツバマイマイ (新稱)

第 6(4) 圖版, 第 3-6 圖 Plate 6 (4), figures 3-6

1863. *Helix yantaiensis* CROSSE and DEBEAUX, Journ. de Conchyl., tome 11, p. 387. Type locality: 山東省芝罘 (煙臺) Chefoo (Chihfu), Shantung Province, China.
1864. *Helix yantaiensis* CROSSE and DEBEAUX, Journ. de Conchyl., tome 12, p. 317, pl. 12, fig. 2.
1867. *Helix yantaiensis* MARTENS, Preuss. Exped. Ost-Asien, Zool., Bd. 2, p. 50.
1868. *Helix yantaiensis* PFEIFFER, Monogr. Helic., Bd. 5, p. 356.
1875. *Helix tetrodon* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 2, p. 218. Type locality: 察哈爾省張家口 Kalgan, Chahar Province, China.
1876. *Helix yantaiensis* PFEIFFER, Monogr. Helic., Bd. 7, p. 410.
1876. *Helix tetrodon* PFEIFFER, ibid, p. 588.
1881. *Helix* (*Perforatella*) *yantaiensis tetrodon* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 8, p. 36, pl. 1, fig. 8.
1882. *Helix yantaiensis* GREDLER, Jahrb. D. Malakoz. Gesell., Bd. 9, p. 43.
1882. *Helix yantaiensis* GREDLER, Malakoz. Bl., N. F., Bd. 5, p. 175.

1882. *Helix yantaiensis tetrodon* GREDLER, ibid.
1882. *Helix yantaiensis* HEUDE, Mém. Conc. Hist. Nat. Empire Chinois, p. 46, pl. 17, fig. 5.
1884. *Helix (Triodopsis) yentaiensis* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 11, p. 312.
1884. *Helix (Triodopsis) yentaiensis tetrodon* MÖLLENDORFF, ibid.
1886. *Helix (Metodontia) yentaiensis* MÖLLENDORFF, Jahrb. D. Malakoz. Gesell., Bd. 13, p. 193.
1886. *Helix (Metodontia) yentaiensis tetrodon* MÖLLENDORFF, ibid.
1887. *Helix (Triodopsis) yantaiensis* GREDLER, Malakoz. Bl., N. F., Bd. 9, p. 129.
1887. *Helix (Triodopsis) yantaiensis tetrodon* GREDLER, ibid.
1887. *Helix (Triodopsis) yantaiensis* TRYON, Man. Conch., ser. 2, vol. 3, p. 149, pl. 30, figs. 35, 36.
1887. *Helix (Triodopsis) yantaiensis tetrodon* TRYON, ibid., p. 149, pl. 30, figs. 37–39.
1894. *Hygromia (Metodontia) yantaiensis* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 279.
1894. *Hygromia (Metodontia) yantaiensis tetrodon* PILSBRY, ibid.
1935. *Metodontia yentaiensis tetradon* YEN, Publ. Mus. Hoangho Paiho Tien Tsin, no. 34, p. 50.

記載:—殼は亜球形, 中等の大きさを有し, 相當薄質。螺塔は低い圓錐形で殼高の約2/5を占め; 殼頂は圓く, 低く, 僅に隆起するのみ。胎殼はよく脹れた 1 層半より成り, 顯微鏡的な顆粒で被はれる。螺層は全部で6層內外, よく脹れ, 徐々に增大し; 縫合は深く切れ込む。體層は大きく, 多少肩を張り, 周緣少しく鈍角をなし, 殼口の近くではその中央淺い溝狀に凹み, 前端は下降しない。底面は圓く脹み; 臍孔は小さく, 內脣の延長によつて殆ど被はれるが, 尙明に孔を殘す。殼の表面は略々平滑, 體層には甚だ微細な螺線が現はれて, 細かな成長線に橫切られ; 成長線は屢々斷絕して顆粒狀となる。殼口は極く僅に斜行し, 亜四角形, 內部に 4 齒を備へる。2 齒は外脣內面に在つて, 低く狹い稜で連結され, 他の 2 齒は內脣上部に位置する。後者の中, 上位の 1 齒は下位のものよりも長くて大きい。外脣は內面肥厚し, 上部は薄く單純, 下部は幾分反曲する。內脣は殼軸下端で擴張反轉して臍孔を被ふ。殼の色は褪せてゐるが, 螺塔の部分は褐色味を帶び, 底面は白色。體層周緣部には極めて不明瞭ながら 1 條の線的な色帶の痕跡が認められる。

測定値 Measurements (單位粍 in. mm.):—

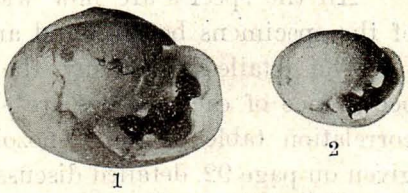
番號 No.	螺層の數 Number of whorls	殼高 Height	殼徑 Diameter	口高 Height of aperture	口徑 Diameter of aperture
1	6	6.3	8.0	4.0	4.6
2	$5\frac{3}{4}$	5.6	7.2	3.5	4.3
3	$5\frac{1}{2}$	5.0	6.6	3.2	3.7
4	$4\frac{1}{4}$	3.4	4.5	—	—
5	4	3.3	4.3	—	—
6	$3\frac{1}{2}$	2.7	3.7	—	—

產地 Locality:—河北省石家莊の黃土層もしくは段丘層 (再積黃土) Loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province. (大小 6 標本 Six specimens, adult and young. 登錄番號 ANM 91.)

現生分布 Recent Distribution:—北支那山東・河北・察哈爾・甘肅各省 Shantung, Hopei, Chahar and Kansu Provinces, North China.

附記:—殼口內の齒の中では, 內脣上の 2 齒の方が外脣內面のものよりも初期から現はれ, 外脣上位の齒が最も遲く生ずるやうである (挿圖第 1, 2 圖參照)。

MÖLLENDORFF の *tetrodon* は從來一般に *yantaiensis* の變種と認められてゐた。然し兩者の相違は，單に *tetrodon* の方が背高く且つ幾分小さいといふに過ぎない。この外 MÖLLENDORFF は，*yantaiensis* には外脣內面の 2 齒を結ぶ稜がないとしたが，これは HILBER[1] も注意してゐるやうに，CROSSE and DEBEAUX の原圖の不備から來た誤解で，明に原記載と矛盾する。*yantaiensis* の產出報告は *tetrodon* 設定以前に限られ，その後は *tetrodon* のみが報告されてゐるのは面白いことである。筆者は *tetrodon* を全く *yantaiensis* の異名と認める。



1 2

第 1, 2 圖 Text-Figs. 1, 2
石家莊產 *Metodontia yantaiensis* (CROSSE and DEBEAUX) from Shihkiachwang. ×4. 1. 標本第 2 號 Specimen no. 2; 2. 標本第 4 號 specimen no. 4.

秉志氏[2] が *Hygromia* (*Metodontia*) *tetrodon* として記載した山西省汾河の三門系產化石は，形狀及び粗い彫刻より見て，*Metodontia houaiensis* (CROSSE)[3] に同定さるべきものと考へる。氏はこの化石と共に，同じく汾河の三門系及び陝西省潼關の黃土層から *Hygromia* (*Metodontia*) *houaiensis* をも記載してゐる[4]。

yantaiensis と *houaiensis* との關係についても尙考究を要する點が多いやうに思はれる。

SUMMARY

The fossil gastropods dealt with in the present paper were collected by Dr. Tetsugorô WAKIMIZU from the loess at Tsingsing and Shihkiachwang (the socalled "redeposited loess"?), both in Hopei Province.

The material from Tsingsing comprises only three species as follows:—

Bradybaena (*Manchurohelix*) *lavrushini* (COCKERELL) (2 specimens)
Cathaica fasciola (DRAPARNAUD) (4 specimens)
Cathaica pulveratrix (von MARTENS) (2 specimens)

Bradybaena lavrushini still lives in this district and the two species of *Cathaica* are most common snails in North China, both fossil and living. The state of preservation of the fossils is very excellent.

The collection from Shihkiachwang contains three species of fresh-water gastropods and two of land snails, as listed below:—

Lymnaea (*Galba*) *pervia* von MARTENS (about 10 specimens)
Lymnaea (*Radix*) *plicatula* BENSON (3 specimens)
Anisus (*Gyraulus*) sp. (1 specimen)
Opeas pyrgula SCHMACKER and BOETTGER (7 specimens)
Metodontia yantaiensis (CROSSE and DEBEAUX) (6 specimens)

1) Vincenz HILBER (1882): Sitzungsber. Math.-Naturwiss. Classe K. Akad. Wissensch, Bd. 86, p. 15; (1898), Wissensch. Ergebnisse Reise Graf. Béla SZÉCHENYI Ostasien, Bd. 2, p. 586.
2) C. PING (1931): Palaeont. Sinica, ser. B, vol. 6, fasc. 6, p. 18, text-figs. 8a-c, pl. 2, figs. 8a-c.
3) H. CROSSE (1882): Journ. de Conchyl., tome 22, p. 136.
4) C. PING (1931): op. cit., p. 15, text-figs. 7a-i, pl. 1, figs. 7a-i.

All the species are now widely distributing throughout North China. Most of the specimens before hand are not well preserved.

The detailed synonymy, the dimensions, the recent distribution and the fossil occurrence of each species are shown in the foregoing pages. Further, a tentative correlation table of the Cenozoic formations in North China and Manchuria is given on page 92, detailed discussion of which, however, will be reserved for another occasion.

The results of the taxonomic studies are summarised as follows:—

1) *Limnaea (Gulnaria) shantungensis* JONES and PRESTON (1904), *Limnaea kingi* PING and YEN (1933), *Limnaea truncatula tenua* PING and YEN (1933) and *Galba laticallosiformis* YEN (1937) are all synonyms of *Lymnaea (Galba) pervia* von MARTENS. The specimens of *Lymnaea* from South Ordos being referred to *Galba truncatula* (MÜLLER) by YEN (1937) are also identifiable with *pervia*, while *Limnaea exigua* PING and YEN (1933) described from Aksu evidently belongs to *Lymnaea (Galba) truncatula* (MÜLLER).

2) *Limnaeus chefouensis* CLESSIN (1886), *Limnaeus möllendorffianus* CLESSIN (1886), *Limnaea mars* JONES and PRESTON (1904) and *Limnaea whartoni* JONES and PRESTON (1904) may be synonymous with *Lymnaea (Radix) plicatula* BENSON. Further, the specimens from Tai-hu being assigned to *Limnaea clessini* NEUMAYER by ANNANDALE (1918) undoubtedly belong to *plicatula*, and the shells referred to *clessini* by YEN in his recent paper (1937) on gastropods of North China seem more closely related to *plicatula* than to NEUMAYER's species.

In the Ryûkyû Islands, there is inhabiting a form of *Lymnaea* which can hardly be distinguished from *plicatula*. Many Japanese authors have referred it to *Limnaea minor* BENSON, but this identification does not seem reliable. In his description of *minor*, BENSON has given neither its illustration nor dimensions and has stated that it strongly resembles *Lymnaea (Galba) truncatula* (MÜLLER). This species has never been reported from the Asiatic Continent, since it was first described from the Chusan Islands.

3) *Opeas fragilis* PING (1929), a fossil species from the Choukoutien formation, is nothing but a synonym of *Opeas pyrgula* SCHMACKER and BOETTGER.

4) A detailed description of *Bradybaena lavrushini* (COCKERELL) is given by Isao TAKI in a paper entitled "Mollusca of Jehol" (Report of the First Scientific Expedition to Manchoukuo, section 5, division 1, part 1, article 4) which will be published in the near future. A new subgenus, *Manchurohelix*, is proposed by him for this species basing upon the shell characters and the composition of the genital system.

5) *Cathaica transitans* von MÖLLENDORFF may be understood as an extremity of the individual variation, or at most as a subspecies, of *Cathaica fasciola* (DRAPARNAUD).

6) According to von MÖLLENDORFF (1899) and ANDREAE (1911), *Helix schensiensis* HILBER (1882), *Helix bizona* GREDLER (1884) and *Helix bizona schensiaca* GREDLER (1884) are synonyms of *Cathaica pulveratrix* (von MARTENS).

YEN has recently (1935) described *Cathaica pulveratrix* (von MARTENS), *C. pulveratrix conispira* YEN, *C. teilhardi* YEN and *C. robertsi* YEN from South Ordos and *C. schensiensis* (HILBER) from Honan and Shansi Provinces. However, they should be united into a single species, *C. pulveratrix* (von MARTENS).

7) *Metodontia tetrodon* (von MÖLLENDORFF) may be a synonym of *Metodontia yantaiensis* (CROSSE and DEBEAUX), though the former has generally been considered to be a subspecies of the latter.

The fossil specimens from Fenho, Schensi Province, which have been referred by PING (1931) to *Metodontia yantaiensis tetrodon*, seem to belong to *Metodontia houaiensis* (CROSSE).

第 4(2)-6(4) 圖版說明

Explanation of Plates 4 (2)–6 (4)

第 4(2) 圖版 Plate 4 (2)

1–6, 12. *Lymnaea* (*Radix*) *plicatula* BENSON シナモノアラガヒ (稱新)
- 1, 2. 北京現生 (京都帝國大學理學部地質學鑛物學教室所藏) Peking (living) ×2
- 3. 天津現生 (ANM 97) Tientsin (living) ×2
- 4. 滿洲國本溪湖現生 (ANM 60) Penhsihu, Manchoukuo (living) ×2
- 5, 6. 滿洲國遼陽現生 (京都帝國大學理學部地質學鑛物學教室所藏) Liaoyang, Manchoukuo (living) ×2
- 12. 河北省石家莊の黃土層もしくは段丘層 (再積黃土) 產化石 (ANM 85) Fossil from the loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province ×3

7–11. *Lymnaea* (*Galba*) *pervia* von MARTENS ヒメモノアラガヒ ×3
- 7, 8. 滿洲國本溪湖現生 (ANM 58) Penhsihu, Manchoukuo (living)
- 9, 10. 滿洲國哈爾濱現生 (ANM 20) Harbin, Manchoukuo (living)
- 11. 河北省石家莊の黃土層もしくは段丘層 (再積黃土) 產化石 (ANM 84) Fossil from the loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province

13–23. *Opeas pyrgula* SCHMACKER and BOETTGER ホソヲカチヤウジガヒ ×4
- 13–16. 河北省石家莊の黃土層もしくは段丘層 (再積黃土) 產化石 (ANM 87) Fossils from the loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province
- 17. 滿洲國錦州現生 (ANM 109) Kinchow, Manchoukuo (living)
- 18, 19. 北京現生 (京都帝國大學理學部地質學鑛物學教室所藏) Peking (living)
- 20, 21. 天津現生 (ANM 110) Tientsin (living)
- 22. 山形縣現生 Yamagata-ken, Japan (living)
- 23. 滿洲國朝陽の黃土層產化石 (ANM 79) Fossil from the loess at Chaoyang, Manchoukuo

第 5(3) 圖版 Plate 5 (3)

All figures ×2

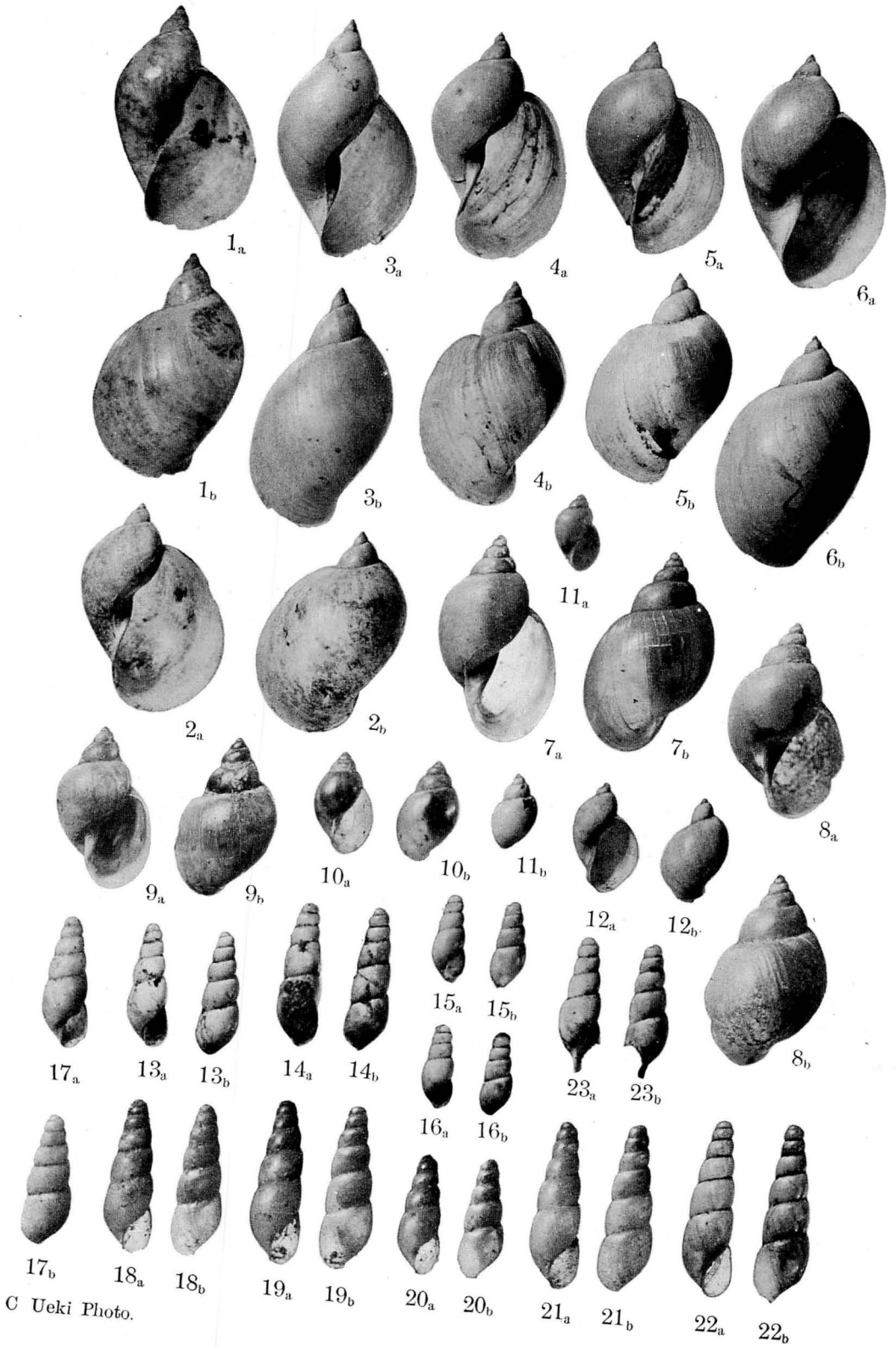
1–7. *Cathaica fasciola* (DRAPARNAUD) チウカマイマイ (新稱)
- 1–4. 河北省井陘の黃土層產化石 (ANM 89) Fossils from the loess at Tsingsing, Hopei Province
- 5–7. 滿洲國朝陽現生 (ANM 80) Chaoyang, Manchoukuo (recent)

8–10. *Cathaica fasciola transitans* (von Möllendorff) ホソスジチウカマイマイ (新稱)
8, 9. 北京現生 (ANM 112) Peking (living)
10. 察哈爾省宣化縣現生 (ANM 81) Süanhwa-hsien, Chahar Province (living)

第 6 (4) 圖版 Plate 6 (4)

1, 2. *Bradybaena* (*Manchurohelix*) *lavrushini* (Cockerell) マンシウマイマイ
河北省井陘の黄土層產化石 (ANM 88) Fossils from the loess at Tsingsing, Hopei Province ×2
3–6. *Metodontia yantaiensis* (Crosse and Debeaux) ヨツバマイマイ (新稱)
河北省石家莊の黄土層もしくは段丘層 (再積黄土) 產化石 (ANM 91) Fossils from the loess or terrace deposit ("redeposited loess") of Shihkiachwang, Hopei Province ×3
7, 8. *Cathaica pulveratrix* (von Martens) コウドマイマイ (新稱)
河北省井陘の黄土層產化石 (ANM 90) Fossils from the loess at Tsingsing, Hopei Province ×2

〔地質學雜誌所載のものに多少の訂正增補を行つた〕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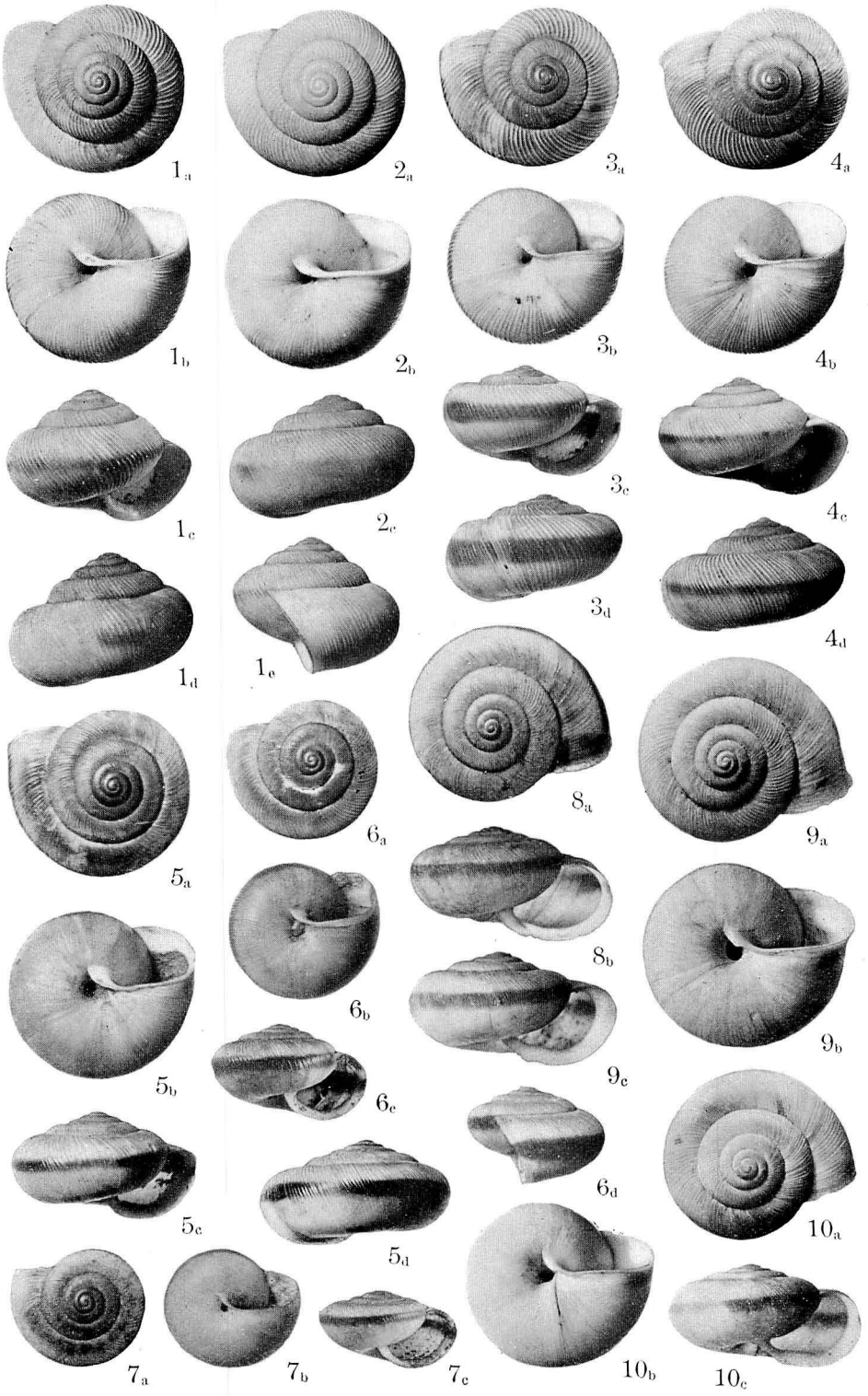
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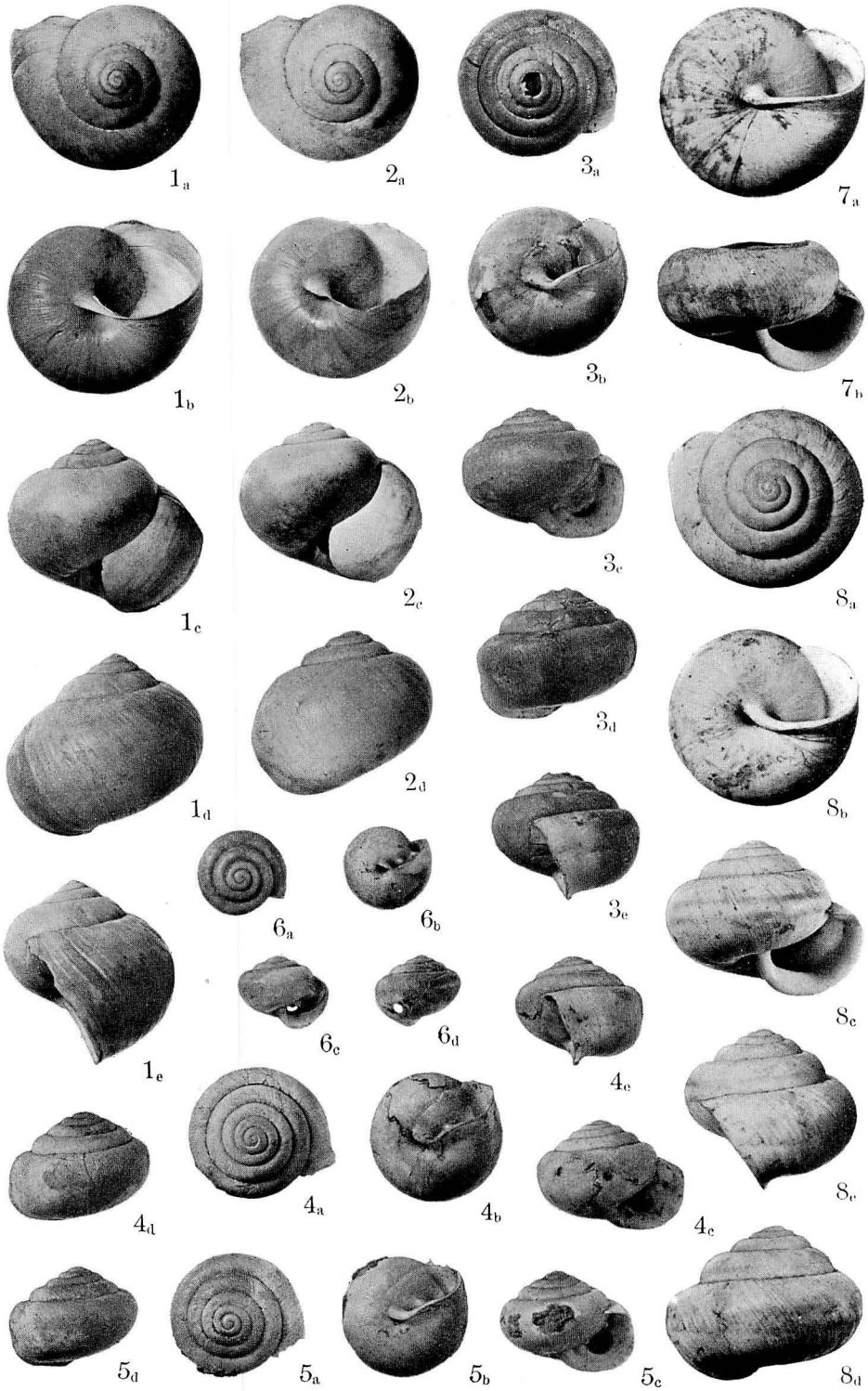
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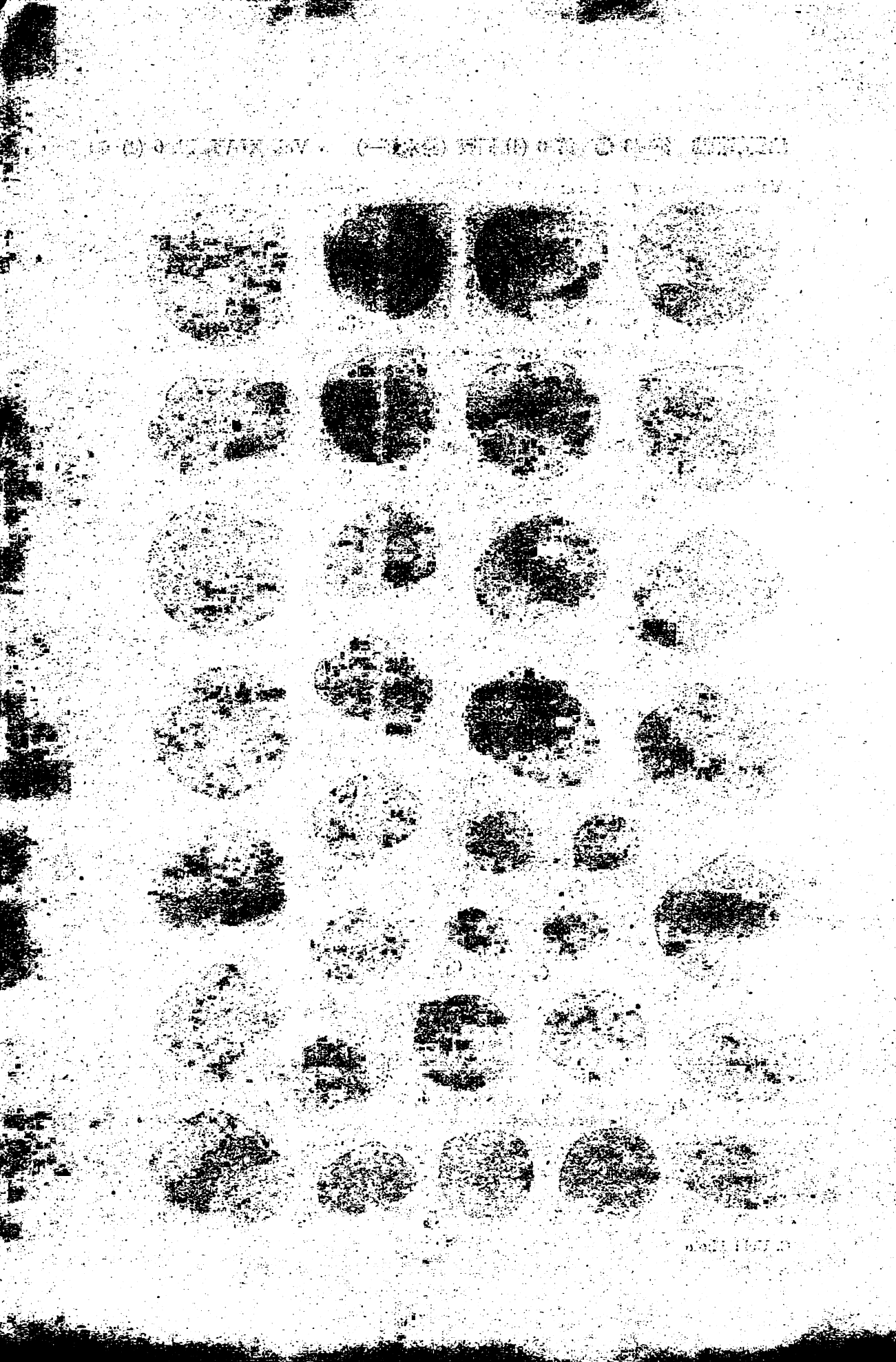

80. *Two New Interesting Tertiary Hydrozoa from the Philippine Islands*

By

Hisakatsu YABE and Toshio SUGIYAMA

(Contribution from the Institute of Geology and Palaeontology, Tohoku Imperial University, Sendai, Japan. Read October, 8th, received 18th, 1938)

Very recently Mr. Wataru HASIMOTO, a graduate of our Institute, collected two interesting fossils of the hydractinoid Hydrozoa from Marinduque, Philippine Islands. One of them is from a dark grey limestone of Cabuyo Barrio, Trijos, Marinduque. Though fragmental, it exhibits very characteristic features reminding us strongly of the genus *Circopora*, which W. WAAGEN and J. WENTZEL[1] established in 1887 on *Circopora faveolata* W. & W., from the Middle *Productus* limestone of the Salt Range, India; for a while it is referred to the same genus with query. The other is derived from a conglomerate bed exposed along the Hinalogan river, Boac, Marinduque. In its superficial aspect it is more or less similar to *Ellipsactinia* STEINMANN[2], 1878, with the genotype *Ellipsactinia ellipsoidea* STEINMANN from the Tithonian of Stramberg, Moravia, but the two diverge in some essential details and cannot be generically identical, as will be explained below, and a new genus *Philippinactinia* is proposed for the Philippine Hydrozoa.

At this place we wish to express our sincere thanks to Mr. HASIMOTO for his kind offer of these fossils to our study.

Genus *Circopora* WAAGEN and WENTZEL

Circopora ? laminata YABE and SUGIYAMA, sp. nov.

Pl. 9 (5); Figs. 1-3.

Coenosteum laminar in growth, 2.5 cm thick and extending over 14 cm: probably minutely porous on weathered surface.

Coenosteum composed of numerous parallel lamellae connected with one another by numerous vertical processes. Concentric lamellae gently undulated, very thin, 0.07–0.1 mm thick, pierced by a few mostly round pores, which are 0.25–0.3 mm broad and scattered at irregular and usually wide intervals; interlamellar spaces very wide, 0.7–1 mm or more broad, divided by vertical processes into numerous somewhat rectangular compartments in vertical section

1) W. WAAGEN and J. WENTZEL: Salt Range Fossils. Palaeont. Indica, ser. 13, vol 7, p. 957, 1887.

2) G. STEINMANN: Ueber fossile Hydrozoen aus der Familie der Coryniden. Palaeontogr. vol. 25. 116, 1878.

of coenosteum. Vertical elements usually pillar-like, seldom more or less lamellar, variable in vertical extension, usually confined in one interlamellar space, but sometimes continuous through two or more: thin, as broad as or slightly broader than concentric lamellae; appearing as isolated, mostly round or subangular dots in tangential section. Microstructure of skeletal elements unknown.

Excluding growth form, the present fossil has its coenosteum similary built as in *Circopora*. While the coenosteum is always cylindrical and built of concentric lamellae arranged in very regular manner in the typical and other species of this genus, it is thick laminar in growth with its concentric lamellae undulated arranged not much regularly, and bearing round pores relatively few in number in the present form. According to WAAGEN and WENTZEL, *Circopora* has vertical elements also perforated, but this seems not to be the case in our form. In addition to these structural differences of coenosteum, there is wide gap of geological age between the present form and those fossils hitherto recorded of *Circopora*, which are as follows:

Circopora faveolata WAAGEN and WENTZEL Permian; Salt Range, India, and Permian; Japan.

Circopora tubulosa WAAGEN and WENTZEL[1] Permian; Salt Range, India.

Circopora sp.[2] Triassic; Timor.

Circopora? sp.[3] Lower Cretaceous; Sikoku, Japan.

The last mentioned questionable form from Japan included, the genus has a range from the Permian to the Lower Cretaceous. On the other hand, the present fossil is Oligocene? in age, as indicated by foraminifera, *Nephrolepidina sumatrensis* (BRADY), *Sorites martini* DOUVILLÉ, etc., in its association. Its reference to *Circopora* is thus only provisional.

The present fossil stands nearest to *Circopora faveolata* than to any other species, but is easily distinguished from it by laminar growth habit instead of columnar and broader interspaces of concentric lamellae.

Locality: Found in a dark-grey limestone at about 1 km south of Cabuyo Barrio, Trijos, Marinduque, Philippine Islands. Stored in the Institute of Geology and Palaeontology, Tôhoku Imperial University, Reg. No. 63030.

Philippinactinia YABE and SUGIYAMA, gen. nov.

Philippinactinia hasimotoi YABE and SUGIYAMA, sp. nov.

Pl. 9 (5), Figs. 4-7.

A Single fragmental specimen fairly good in preservation. Monotypic at present.

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1) W. WAAGEN and J. WENTZEL: Op. cit., p. 960.

2) P. VINASSA de REGNY: Triadische Algen, Spongien, Anthozoen und Bryozoen aus Timor, Palaeont. v. Timor, vol. 4, p. 108, 1915.

3) H. YABE and T. SUGIYAMA: *Circopora* found in Japan. Japan. Jour. Geol. & Geogr., vol. 12, nos. 1-2, p. 13-15, 1935. *Circopora*? sp. was first recorded by the writers from a limestone at Okuminodani near Ryôseki, Kuredamura, Nagaoka-gun, Sikoku, Japan, which is thought for a long time to be a Torinosu limestone, the writers now tend to regard this limestone as a member of the Lower Cretaceous Monobegawa series.

Coenosteum probably hemisphaerical, attaining over 3 cm in diameter. Surface character unknown. Composed of concentric lamellae supported on pillarlike vertical elements; lamellae parallel, only occasionally coabescing one another, usually 0.2–0.25 mm broad, 7–8 counted in 2 mm; interspaces as broad as or a little broader than lamellae, rarely traversed by extremely thin oblique, irregularly arranged partitions; vertical elements perpendicular to lamellae, stalactitic, tapering downwards, variable in extension, only a few crossing through one interlamellar space, 0.25–0.5 mm broad at top, 5 or 6 counted in 2 mm; appear as isolated round dots in tangential section.

Under high magnification the skeletal elements reveal abundant minute pores arranged almost vertically or more or less oblique to concentric lamellae, round in tangential section, 0.018–0.025 mm broad, generally 0.06–0.08 mm, occasionally more apart, or sometimes very crowded.

All its superficial aspects render its reference to the Sphaeractinidae most probable, particularly resembling *Ellipsactinia* STEINMANN; it is, however, easily distinguished not only from this genus, but also more in general from all other members of the Sphaeractinidae by its concentric lamellae being traversed densely by minute micropores. In *Ellipsactinia*, the lamellae are traversed by pores, which are considerably larger and of different nature; furthermore, they are connected by less numerous, much oblique connecting process. Our from approaches *Sphaeractinia* STEINMANN[1] only in the numerous regular vertical elements.

On the other hand, it is comparable to *Cyclactinia* VINNASA de REGNY[2] in the general arrangement of skeletal elements; however, *Cyclactinia* seems to possess compact, non-perforated skeletal elements.

The specific name is dedicated to Mr. W. HASIMOTO, who collected this and a great many other fossils during his one year stay in the Philippine Islands.

Locality; Found in a grey limestone-boulder of a conglomerate exposed along tha Hinalogan river (a tributary of the Boac river), Boac, Marinduque. Mr. HASIMOTO found *Spiroclypeus vermiculare* TAN SIN HOK, *Biplanispira mirabilis* UMBGROVE, *B.* sp., etc. in other limestone-boulders of the same source. The geological age of the limestone-boulder with the present fossil may probably be of the same age with the other fossiliferous boulders cited above. Stored in the Institute of Geology and Palaeontology, Tôhoku Imperial University, Reg. No. 62550.

Explanation of Plate 9 (5)

Circopora? laminata YABE and SUGIYAMA, sp. nov.

Loc, Cabuyo Barrio, Trijos, Marinduque, Philippine Islands. Reg. No. 63030.

Fig. 1. Weathered surface; ×0.86

Fig. 2. Vertical section; ×4.3

Fig. 3. Tangential section of the same specimen; ×4.3

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1) G. STEINMANN: Op. cit., p. 115.

2) P. VINASSA de REGNY: Studi sulle Idractinie fossili. Atti della R. Accademia dei Lincei. Mem. della Classe di Sc. fis. mat. nat., vol. 3, p. 34, 1899.

Philippinactinia hasimotoi YABE and SUGIYAMA, gen. and sp. nov.

Loc. Hinalogan River, Boac, Marinduque, Philippine Islands. Reg. No. 62550.
Fig. 4. Vertical section; ×7.7
Fig. 5. A part of the same enlarged to show fine perforation of lamina; ×ca. 34.5
Fig. 6. Partly tangential and partly oblique section of the same specimen; ×7.7
Fig. 7. A part of the same enlarged; ×34.5

フィリッピン産の興味ある第三紀ハイドロゾア2新種に就いて（摘要）

矢部長克・杉山敏郎

最近理學士橋本亙氏がフィリッピンの第三紀石灰岩から採集した資料中に興味ある2型のハイドロゾアが見出された。共に Hydractinoid に入る可き内部構造を示し，一つは *Circopora* に他は *Ellipsactinia* 及び *Cyclactinia* に多少類似の性質を夫々有する。前者は骨格の内部構造に不鮮明の點があり又地質學的位置が甚だ異つてゐるので，假りに *Circopora* に入れて置いたが，後者は疑ひもなく新屬で *Philippinactinia* なる種屬名を玆に提案しておいた。

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81. *Notes on Some Foraminifera Described by Schwager from the Pliocene of Kar Nicobar**

By

JOSEPH A. CUSHMAN

(Received November 30th; read December 17th, 1938)

In his work on the "Fossile Foraminiferen von Kar-Nicobar" (Novara-Exped., Geol. Theil, vol. II, 1866, pp. 187–268, pls. IV–VII) SCHWAGER described and figured many species from the Pliocene. Some of these species are recognized in the later literature while others have hardly been referred to or have been placed in the synonymy of other species. A small amount of rather fine material has been made available for study, coming from the locality from which SCHWAGER's material was described. As these are topotypes it is possible to interpret some of the species described by SCHWAGER a little more accurately than from his figures and description alone. The following notes are given for a few of the species. The figures have been drawn by Miss Patricia G. EDWARDS from the topotypes.

"*Nodosaria fistuca* SCHWAGER"

P. 10 (6), Figs. 1a, b.

Nodosaria fistuca SCHWAGER, Novara-Exped., Geol. Theil, vol. II, 1866, p. 216, pl. 5, figs. 36, 37.

The original figures show specimens with the chambers uniserial and arranged in a linear series, rapidly increasing in diameter as added and the base with an initial spine. The chambers are longer than broad and distinctly overlap. The surface as shown is hispid or spinose and if the two original figures represent one species, subject to considerable variation. The aperture is extended with a distinct neck with a collar-like expansion at the outer end. The aperture has a distinct tooth in the opening.

From a study of this material the species should be known as *Ellipsonodosaria fistuca* (SCHWAGER) based on the character of the aperture as is also the case with some of the following species. The distinction between this species as represented by figure 1 on our plate and the series shown in figures 4–6 is not great, the chambers being somewhat different in shape and the apertural characters still more distinct.

"*Nodosaria tosta* SCHWAGER"

Pl. 10 (6), Fig.e 2.

Nodosaria tosta SCHWAGER, l. c, p. 219, pl. 5, fig. 42.

This is a very long slender species, the proloculum elongate oval and the

* Dedicated to the memory of the late Dr. Y. OZAWA (1899–1929), Professor of Historical Geology and Palaeontology in the Imperial University on the occasion of the tenth anniversary of his demise.

following chambers several times as long as broad. The wall has several high, plate-like, longitudinal costae about six in number, crossing the sutures usually without a break, those of the proloculum and second chamber often somewhat twisted. SCHWAGER mentions in his description that the apertural characters are unkown. Our specimens do not show them nor do any of the other figured specimens referred to this species. Material from the later Tertiary of widely separated areas have been referred to SCHWAGER's species but until the apertural characters are known it is difficult to definitely place it generically.

"*Nodosaria lepidula* SCHWAGER"

Pl. 10 (6), Figs. 3a, b.

Nodosaria lepidula SCHWAGER, l. c., p. 210, pl. 5, figs. 27, 28.

The two figures referred by SCHWAGER to this species are somewhat different but in general represent a species with pyriform chambers, enlarging rather rapidly as added, the middle of each chamber with short spines in the early portion, gradually changing to short, longitudinal costae in the adult, although in one of SCHWAGER's original figures the chambers become smooth. A specimen figured on our plate has the general characters corresponding to SCHWAGER's species. The base has a distinct spine which is developed up and along the proloculum. The apertural characters are interesting. There is a short neck with a sort of expanded collar as shown in SCHWAGER's figure but the aperture is not radiate but circular with a distinct tooth in the opening. The species should be know as *Ellipsonodosaria lepidula* (SCHWAGER).

Specimens have been referred to this specific name from the Pliocene of Japan, New Guinea, Java and the Philippines, and Recent material from the Pacific area especially.

"*Nodosaria grandigena* SCHWAGER"

Plate 10 (6), Figs. 4-6.

Nodosaria glandigena SCHWAGER, l. c., p. 219, pl. 5, fig. 46.

Our three figures show a series in which the surface ranges from smooth and polished to decidedly hispid, or even finely spinose. Such specimens from the literature seem to be rather indiscriminately placed under both "*Nodosaria glandigena* SCHWAGER" and "*N. koina* SCHWAGER". It is possible that the specimens figured by SCHWAGER under these two specific names really form a single series. An examination of the literature shows all these forms recorded from the later Tertiary of the Pacific region especially, and from the Recent of the same area. The microspheric forms are much more tapering, and in the megalospheric the final chambers may be even less in diameter than the earlier ones. An examination of the aperture shows that it is circular with a slight tooth and the species should probably be known as *Ellipsonodosaria glandigena* (SCHWAGER).

"*Uvigerina hispida* SCHWAGER"

Pl. 10 (6), Figs. 7, 8.

Uvigerina hispida SCHWAGER, l. c., p. 249, pl. 7, fig. 95.

The original figure of this species shows an apparently very spinose specimen but the description gives the impression that the surface is more fitting to the specific name. There is a tendency among the specimens studied to have the later chamber loosely spiral as shown in our figure 7. The aperture is distinct with a short cylindrical neck. Such specimens have been recorded very rarely under this name probably on account of the very spinose appearance of the type figure. Specimens have been recorded by KOCH from the late Tertiary of Java and I have recorded specimens from the Pliocene of Vitilevu, Fiji (Bernice P. Bishop Museum, Bull. 119, 1934, p. 126, pl. 15, fig. 9) which seem to be typical. Ii will probably be found to be well distributed in the late Tertiary ofthe Pacific region and perhaps elsewhere.

"*Uvigerina nitidula* SCHWAGER"

Pl. 10 (6), Fig. 12.

Uvigerina nitidula SCHWAGER, l. c., p. 248, pl. 7, fig. 93.

Specimens have been very rarely referred to this species. KOCH has recorded it from the late Tertiary of Java and I have had it from the Pliocene of Vitilevu, Fiji. It is a species with distinct chambers and sutures, the apertural neck prominent but slender and easily broken. The surface is covered with low, longitudinal costae, well separated from one another. It is probable that this species has a much wider range in the later Tertiary of the Pacific region than is indicated by the few records add it may also be found to be living in the Prcific.

SCHWAGER's figure of *U. gemmaeformis* does not show the apertural characters and is drawn in rear view. It is possible that it may represent the same species as *U. nitidula*.

"*Uvigerina proboscidea* SCHWAGER"

Pl. 10 (6), Fig. 13.

Uvigerina proboscidea SCHWAGER, l. c., p. 250, pl. 7, fig. 96.

This is a rather well marked species, fusiform in shape, with a very distinct, somewhat tapering, elongate neck. The whole test is somewhat short and broad and the later chambers especially, inflated and distinct. The surface is finely hispid.

Such specimens occur in the late Tertiary, recorded from the islands of the Pacific and from the coast of California. It also occurs as a living species in the Pacific. Our figured specimen shows an extremely rough specimen with the surface spinose rather than hispid. The range of coarseness of the surface is considerable, but the general form and apertural characters remain rather constant.

"*Dimorphina striata* Schwager"

Pl. 10 (6). Fig. 9.

Dimorphina striata Schwager, l. c., p. 251, pl. 7, fig. 99.

Under this name Schwager figures and describes a very slender, elongate species, triserial in the young stages and uniserial in the adult, with a terminal aperture, elongate neck and phialine lip. The initial end has a distinct spine and the surface is finely costate longitudinally. While no perfect specimens were found in our limited amount of material, the specimen figured on our plate is evidently the same as that of Schwager and serves to place it in its proper generic position. It should be known as *Siphogenerina striata* (Schwager).

From an examination of the literature it is very evident that most, if not all, of the specimens referred by later authors to this species are not really identical with it but belong to the varietal form I have called var. *curta* with a very short neck (proc. U. S. Nat. Museum, vol. 67, Art. 25, 1926, p. 8, pl. 2, fig. 5; pl. 5, figs. 5, 6). It is possible that this form with the short neck and large aperture is specifically distinct.

"*Fissurina staphyllearia* Schwager"

Pl. 10 (6), Fig. 10.

Fissurina staphyllearia Schwager, l. c., p. 209, pl. 5, fig. 24.

Our figure shows a specimen with five spines rather than three as in the typical but all in a single plane. Various forms have been assigned to this species. It apparently has an integral tube and should be known as *Entosolenia staphyllearia* (Schwager). It is well distributed in the later Tertiary of the Pacific region and living in the same general area.

"*Pleurostomella alternans* Schwager"

Pl. 10 (6), Fig. 11.

Pleurostomella alternans Schwager, l. c., p. 238, pl. 6, figs. 79, 80.

Under this name Schwager figures two specimens, the first evidently microspheric with a pointed initial end, many chambers, those in the adult rather short and inflated, and the apertural face nearly circular. The second is evidently megalospheric with a rounded initial end, few chambers, those in the adult longer than broad and not greatly inflated, and the apertural face longer than broad. It is possible that these represent extreme forms of one species. In our material and in other available material from the same general region there are specimens that seem to fill in the gap between these two extremes and make it apparent that they may all represent a single species. Our figured specimen is of the more common form represented by Schwager's figure 80.

There have been many things referred to this species but a study of the literature will show that many of them are not identical. In the *Challenger* report Brady figured two quite distinct forms under this name and later authors

have still further increased the disparity from SCHWAGER's original figures and description.

"*Pleurostomella brevis* SCHWAGER"

Pl. 10 (6), Figs. 14-16.

Pleurostomella brevis SCHWAGER, l. c., p. 239, pl. 6, fig. 81.

While SCHWAGER gives but a single figured specimen for the species, the material at our disposal shows that there may be considerable variation. Our figures show the range in form from the very broad, megalospheric form to the more elongate and more slender microspheric one. The general shape of the adult chamber in all three specimens is very similar, as is the apertural face.

There are numerous records for the species but only those from the Recent and late Tertiary of the Pacific region seem to be identical with those from Kar Nicobar.

"*Discorbina sacharina* SCHWAGER"

Pl. 10 (6), Figs. 17, 18.

Discorbina sacharina SCHWAGER, l. c., p. 257, pl. 7, fig. 106.

This form is fairly common in the Kar Nicobar material. It is closely allied to *Globorotalia menardii* (D'ORBIGNY) and seems to be a variety of that species. Two specimens are figured on our plate. The form has a thicker wall and margin than in the typical and it is uniformly smaller than the average of a large series of typical *G. menardii* from the Pacific and elsewhere. There are normally six or seven chambers in the adult whorl and the aperture is smaller. It may be known as *Globorotalia menardii* (D'ORBIGNY), var. *sacharina* (SCHWAGER). The variety occurs in the Pliocene of the Pacific region and perhaps has persisted in the present ocean although rather typical *G. menardii* occurs in the Pacific.

"*Anomarina cicatricosa* SCHWAGER"

Pl. 10 (6), Figs. 19a-c.

Anomalina cicatricosa SCHWAGER, l. c., p. 260, pl. 7, fig. 108.

From our available material from Kar Nicobar, SCHWAGER's figure of this species would seem to have been somewhat conventionalized. The large depressions of the surface both on the dorsal and ventral sides are larger and less uniform, the chambers not nearly as distinct and the sutures very indistinct. This is a highly ornamented species and has hardly been recorded in the literature. I have had the same species from the Pliocene of Vitilevu, Fiji (Bernice P. Bishop Museum, Bull. 119, 1934, p. 137, pl. 18, figs. 1 a-c) as a comparison of the figures will show. It is probably well distributed in the late Tertiary of the Pacific and may be found to be still living in that area. It should be recorded as *Cibicides cicatricosa* (SCHWAGER).

Explanation of Plate 10 (6)

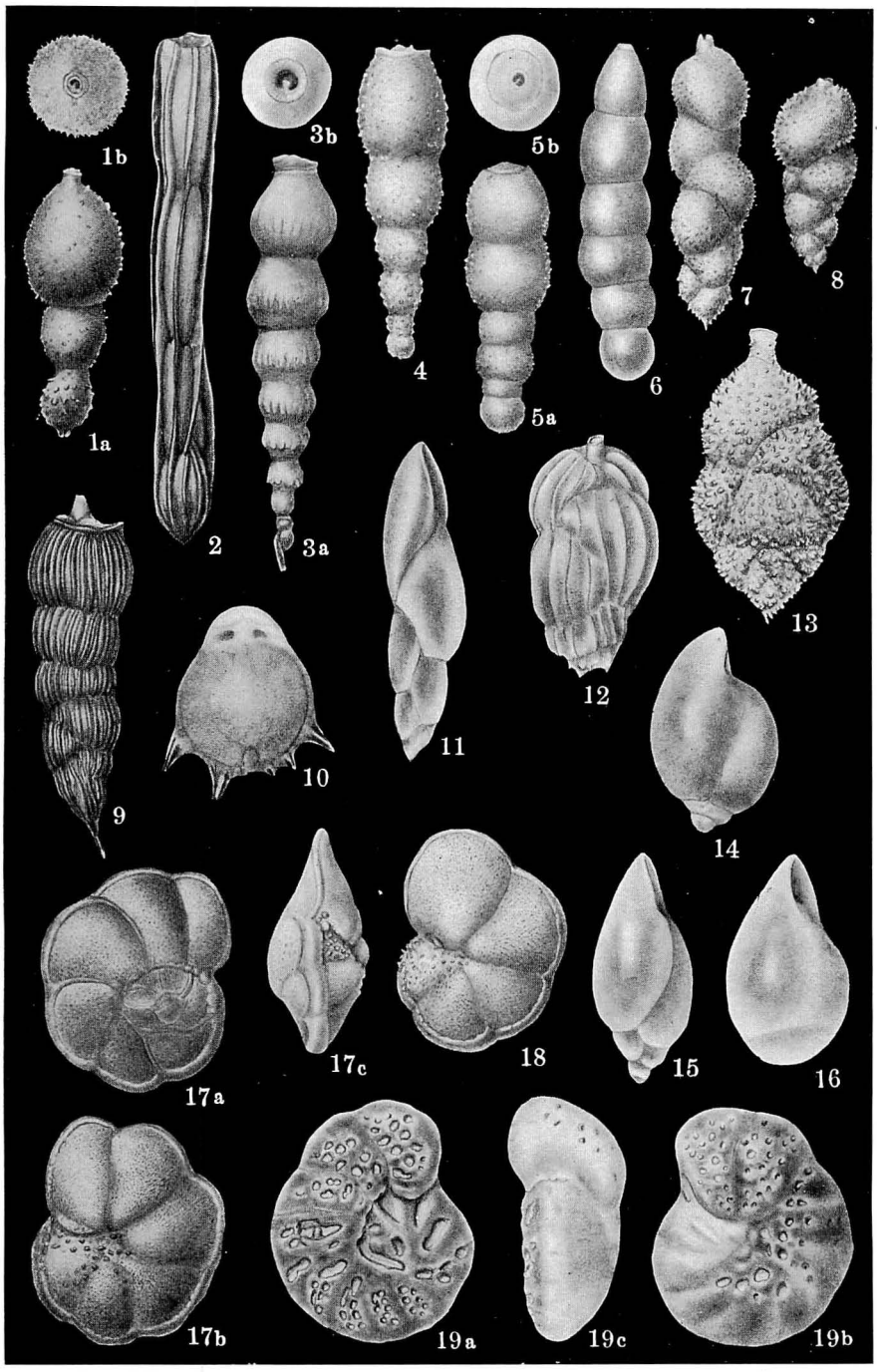
Figs. 1 a, b. "*Nodosaria fistuca* SCHWAGER" ×80. a, front view; b, apertural view.
Fig. 2. "*Nodosaria tosta* SCHWAGER" ×80.
Figs. 3 a, b. "*Nodsaria lepidula* SCHWAGER" ×80. a, front view; b, apertural view.
Figs. 4–6. "*Nodosaria glandigena* SCHWAGER" ×80. 5a, front view; 5b, apertural view.
Figs. 7, 8. "*Uvigerina hispida* SCHWAGER" ×80.
Fig. 9. "*Dimorphina striata* SCHWAGER" ×80.
Fig. 10. "*Fissurina staphyllearia* SCHWAGER" ×80.
Fig. 11. "*Pleurostomella alternans* SCHWAGER" ×80.
Fig. 12. "*Uvigerina nitidula* SCHWAGER" ×70.
Fig. 13. "*Uvigerina proboscidea* SCHWAGER" ×80.
Figs. 14–16. "*Pleurostomella brevis* SCHWAGER" ×80. Fig. 16, extreme megalospheric form.
Figs. 17, 18. "*Discorbina sacharina* SCHWAGER" ×70. 17a, dorsal view; 17b, ventral view; 17c. peripheral view.
Figs. 19a–c. "*Anomalina cicatricosa* SCHWAGER" ×70. a, dorsal view; b, ventral view; c, peripheral view.

カール・ニコバールの鮮新層よりシュワーガー氏により記載せられた種類の有孔蟲に就て（摘要）

Joseph A CUSHMAN

シュワーガーはカール・ニコバールの鮮新層から多數の有孔蟲を記載したが其中或種類を除いては其後殆ど引用されないか或は同物異名として他の種名に移されて來た。本研究の材料は其模式產地より得たる者でシュワーガーの者の topotypes である。シュワーガーの圖及び記載よりは稍々正確に或種を說明する事が出來る。

Nodosaria fistuca は口孔の性質から今日 *Ellipsonodosaria fistuca* と爲す可き者である。*Nodosaria tosca* 本種に同定される者は新第三紀層に廣く產するが口孔の性質が不明で正確に其屬を決定する事が困難である。*Nodosaria lepidula* 之は今日 *Ellipsonodosaria lepidula* と呼ぶ可き者である。*Nodosaria glandigena* 之も恐らく *Ellipsonodosaria glandigena* と稱す可き者である。*Uvigerina hispida* 此の記載は其名稱に適合する樣に小突起で蔽はれて居る印象を與へるが，原圖が棘狀突起を有する樣に畫かれてあるので本種に同定された者は稀であるが太平洋地域及び他地域の新第三紀層中にも廣く分布する者の樣である。*Uvigerina nitidula, Uvigerina gemmaeformis* は口孔の性質が不明であるが恐らく之と同種であり，此者は瓜哇及びフィジーの新第三紀層中にも產する。*Uvigerina proboscidea* 之は太平洋中の島嶼及び米國加州の新第三紀層中に產する。*Dimorphina striata* 本種は今日 *Siphogenerina striata* と稱す可き者である。*Fissurina staphyllearia* 本種は *Entosolenia staphyllearia* と呼ばる可き者である。*Pleurostomella alternans* 從來本種に同定されて來たが其同定が正しくない者が多い。チャレンヂャー報告に於てもブラディーがシュワーガーの原圖及び記載とは矛盾する樣な者を同定して居る。*Pleurostomella brevis* 今日迄本種に同定された者が多々あるが正しくカール・ニコバールの者に同定し得る者は太平洋地域の現生及び新第三紀層所產の者のみである。*Discorbina sacharina* 之は *Glaborotalia menardi* var. *sacharina* とすべき者で太平洋地域の鮮新期より現生期に亙つて產出する者である。*Anomarina cicatricosa* 之は *Cibicides cicatricosa* と改稱す可き者である。（摘要 半澤正四郎）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19b

82. *On the Occurrence of Acervulina, an Encrusting Form of Foraminifera in the Jurassic Torinosu Limestone from the Kwantô Mountainland, Central Japan*

By

Shôshirô HANZAWA

(Contribution from the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, Japan: Read Oct. 8th; received Oct. 24th, 1938)

In one of the thin slices of the Upper Jurassic Torinosu limestone which is very prolific of fossils, mostly reef-builders,[1] collected by Dr. H. HUZIMOTO from Hukazawa near Itukaiti, Musasi Province (in the Kwantô Mountainland), Central Japan, is found *Acervulina*, an encrusting foraminifera, by Prof. H. YABE, who kindly submitted it to me for scrutiny. Although the living representatives of

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1) T. HARADA: Die Japanischen Inseln, Eine Topographisch-Geologische Uebersicht, 1890, pp. 95-96.

S. SHIMIZU: 1) Remarks on Two Ammonites, *Harpoceras japonicum* NEUMAYR and *Arpadites sakawanus* MOJSISOVICS from the Sakawa Basin in Shikoku. 2) A Tithonian Species of *Perisphinctes* from the Torinosu Limestone of Koike, Province of Iwaki, Japan. Jour. Geol. & Geogr. vol. 5, no. 4, 1926-1927, pp. 215-222.

S. SHIMIZU: Note on Two Tithonian Species of *Perisphinctes* from the Torinosu Limestone of Koike, Province of Iwaki, Ibid. vol. 7, no. 2, 1930, pp. 45-48, pl. 6.

S. SHIMIZU: Note on a Species of Tithonian Genus *Streblites* from the Torinosu Limestone of Koike, Iwaki Province, Ibid. vol. 9, nos. 1, 2, 1931, pp. 13-15.

H. YABE: Cretaceous Stratigraphy of the Japanese Islands, Sci. Rep. Tôhoku Imp. Univ. Sendai, Japan, 2nd Ser. (Geol.). vol. 11, no. 1, 1927, p. 92.

H. YABE and S. TAYAMA: 1) *Cladocoropsis mirabilis* FELIX from the Torinosu Limestone of Japan. 2) *Milleporidium remesi* STEINMANN? from the Torinosu Limestone of Itsukaichi, Province of Musashi, Japan. Jour. Geol. & Geogr. vol. 5, no. 3, 1927, pp. 107-110, pls. 8-9, pp. 117-119, pl. 12.

H. YABE and S. HANZAWA: *Choffatella* SCHLUMBERGER and *Pseudocyclammina*, a New Genus of Arenaceous Foraminifera, Sci. Rep. Tôhoku Imp. Univ. Sendai, Japan, 2nd Ser. (Geol.), 1926, vol. 9, no. 1, pp. 9-11, pl. 2.

H. YABE and T. SUGIYAMA: Stromatoporoids and Related Forms from the Jurassic of Japan, Japan. Jour. Geol. & Geogr. vol. 8, nos. 1-2, 1930, pp. 23-28, table 1.

H. YABE and T. SUGIYAMA: On Some Spongiomorphoid Corals from the Jurassic of Japan, Sci. Rep. Tôhoku Imp. Univ. 2nd Ser. (Geol.), vol. 14, no. 2A, 1931, pp. 103-195, pls. 34-35.

H. YABE and T. SUGIYAMA: Jurassic Stromatoporoids from Japan, Ibid. vol. 14, no. 2 B, 1935, pp. 135-192, pls. 40-70.

T. KOBAYASHI: Contributions to the Jurassic Torinosu Series of Japan, Japan. Jour. Geol. & Geogr. vol. 12, nos. 3-4. 1935, pp. 69-91, pls. 12, 13.

the genus *Acervulina* are very common in the warm and shallow waters of the Pacific, Atlantic, Indian, and Mediterranean and its fossil examples are also commonly found in various deposits of the Neogene, there is apparently no record of its occurrence as a fossil in deposits older than the Cretaceous,[1] and its discovery in a Jurassic rock of Japan is important and noteworthy.

The fossil now in question is not comon in the Torinosu limestone, and we have met with only one specimen of it in numerous thin slices of the rock. It is intergrown with calcareous algae and 16 mm in size, resembles *Acervulina inhaerens* SCHULTZE (including var. *plana* CARTER)[2] in every respect. The latter is attached to a certain substratum and over-growing itself, consists of numerous chambers in more or less concentric arrangement around a coiled nucleoconch, later irregularly disposed, moreover superposed in vertical lines as to make successive layers. The chambers are variable in size even in one and the same specimen, and also variable in form, usually polygonous with straight edges, sometimes round or irregular with curved edges in tangential section; depressed, nearly rectangular in transverse section; typically the roofs and floors of the chambers which are cribrated by numerous pores are convex, curved downward along their peripheries, though usually flat at tops. The vertical walls of the chambers are compact and as thick as the roofs and floors. Compared with *Acervulina inhaerens* SCHULTZE, the present form stands close to the latter in every respect as already mentioned. But, in tangential section the vertical wall of chambers are always sinuous and 12–16 μ thick in the latter being remarkably thicker than in the former. Moreover, the roofs and floors are never vaulted. As shown in the following table the chambers of the present form is much inferior in height to those of *Acervulina inhaerens* SCHULTZE. Therefore, I propose a new name *huzimotoi* for the present form in honour of Dr. H. HUZIMOTO, who found the present specimen, and place it as a variety of *Acervulina inhaerens* SCHULTZE. The type specimen of *Acervulina inhaerens huzimotoi* nov. var. is placed in the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, Japan. I.G.P.S.J. Cat. No. 21446.

I wish, herewith, to express my cordial thanks to Prof. H. YABE who kindly gave valuable advice and criticism for the present study and to Dr. H. HUZIMOTO, who kindly supplied me the present specimen.

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1) J. J. GALLOWAY: A Manual of Foraminifera, 1933, p. 308.

2) M. S. SCHULTZE: Ueber den Organismus der Polythalamien (Foraminiferen) nebst Bemerkungen über die Rhizopoden im Allgemeinen, 1854, p. 68, pl. 6, fig. 12.

H. YABE: Notes on a *Carpenteria*-Limestone from B.N. Borneo, Sci. Rep. Tôhoku Imp. Univ. 2nd Ser. (Geol.), vol. 5, no. 1, 1918, p. 22, pl. 4, fig. 4; pl. 6, figs 3, 4.

H. YABE and S. HANZAWA: Geological Problem Concerning the Raised Coral Reefs of the Riukiu Islands and Taiwan; etc., Ibid. vol. 7, no, 2, 1925, pp. 46, 47, pl. 9, figs. 1, 8, 9; pl. 10, fig. 3.

H. YABE and S. HANZAWA: Tertiary Foraminiferous Rocks of the Philippines, Ibid. vol. 11, no. 3, 1929, p. 179, pl. 16, fig. 6.

H. YABE and S. HANZAWA: Tertiary Foraminiferous Rocks of Taiwan (Formosa). Ibid. vol. 14, no. 1, 1929, p. 37, pl. 1, fig. 6; pl. 5, fig. 7; pl. 9, fig. 12; pl. 10, fig. 8.

S. HANZAWA: Notes on Tertiary Foraminiferous Rocks from the Kwantô Mountainland, Japan, Ibid vol 12, no. 2A, 1931, p 156, pl. 26, fig. 4.

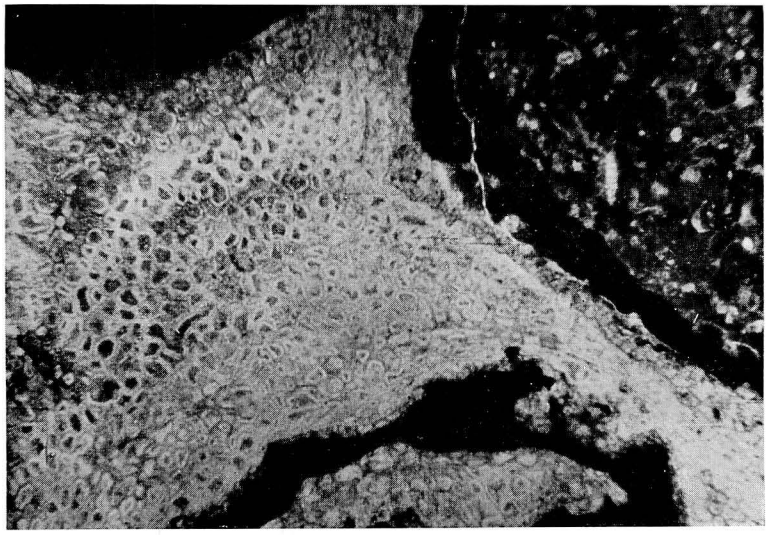

Fig. 1

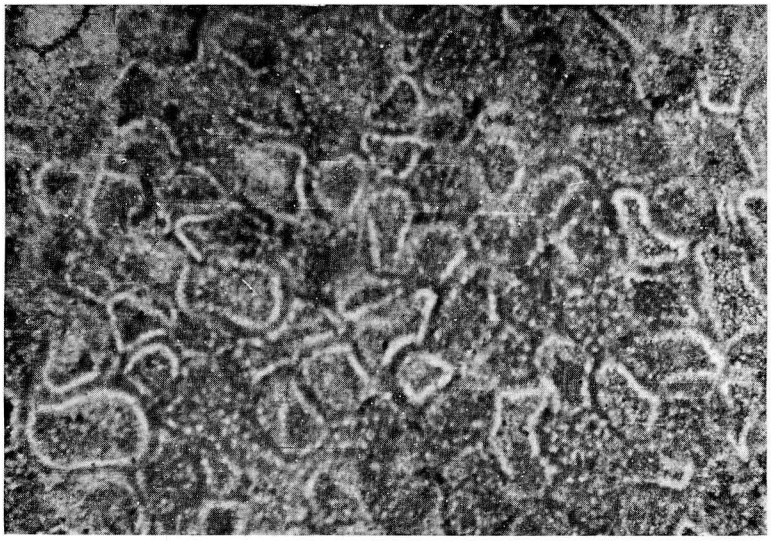

Fig. 2

Acervulina inhaerens huzimetoi nov. var.

Fig. 1. Trangential and transvers sections. ×23

Fig. 2. Trangential section. ×100

Table of dimensions of *Acervulina inhaerens* and its varieties for comparison.

	Width of chambers	Height of chambers	Thickness of roofs & floors	Thickness of vertical walls	Diameter of pores
A. inhaerens plana (living)[1]	49-230 μ	26-93 μ 80 μ as usual	5 μ	5 μ	5-7 μ
A. inhaerens (living)[2]	70-90 μ				
A. inhaerens (living)[3]	60 μ				1 μ
A. inhaerens plana (Miocene)[4]	74-140 μ	32-34 μ			
A. inhaerens plana (Oligocene)[5]	70-230 μ	30-70 μ			
A. inhaerens plana (Eocene)[6]	66-80 μ				
A. inhaerens huzimotoi nov.	55-154 μ	25 μ	5 μ	12-16 μ	5 μ

關東山地鳥ノ巢石灰岩中に皮殼構造有孔蟲 *Acervulina* の產出する事に就て (摘要)

半 澤 正 四 郎

本文は藤本治義博士が關本山地五日市附近深澤の侏羅紀鳥ノ巢石灰岩中より採集せし*Acervulina*の記載である。

Acervulina は今日溫暖なる淺海に極めて普通なる種屬で新第三紀層中にも夥多產する，化石として最も古い者は白堊紀より知られて居るのみであるから今回侏羅紀層から發見せられた事は特記に値する。

鳥ノ巢石灰岩の *Acervulina* は現生種 *Acervulina inhaerens* SCHULTZE に類似するが垂直壁が著しく厚く，房の輪廓が常に不規則でまた房の高さが *Acervulina inhaerens* の者の平均より低い。故に玆に本化石に對し *Acervulina inhaerens huzimotoi* なる新變種名を提議する。

1) M. LINDSEY: On *Gypsina plana* CARTER, and the Relations of the Genus, Trans. L. Soc., London, Zoöl. vol. 16, pt. 1, 1913, pp. 45-51.

2) M. LINDSEY: Ibid.

3) M. S. SCHULTZE: loc. cit.

4) S. HANZAWA: loc. cit.

5) H. YABE: loc. cit. 1918.

6) F. TRAUTH: Das Eozänvorkommen bei Radstadt im Pongau u.s.w. Denkschr. K. Akad. Wiss. Wien, Mat. Nat. Kl. vol. 95, 1918, pp. 70, 71, pl. 9, figs. 17, 18.

83. *A Pleistocene Flora from Kagoshima, Kyûsyû, Japan*

By

Seidô ENDÔ

[Read and received Dec. 17 th, 1938]

The collection of fossil plants which form the basis of the present article was made by Prof. K. YAMAGUCHI of the Matue High School and kindly forwarded by him to the writer for study. The bulk of the material is from a white diatomaceous tuffite which is exposed at the river-cliff of the Honna-gawa at the south of Gotanda, Yosida-mura, Kagosima-gun, Kagosima-ken, southern Kyûsyû, while smaller lots of specimens are from the six other localities in the same prefecture, enumerated below; as to the occurrence of the fossiliferous deposits YAMAGUCHI informed the writer as follows;

Table I.

1. River-cliff of the Honna-gawa, at the south of Gotanda, Yosida-mura, Kagosima-gun. There are exposed in descending order:
   Pumice and sand
   White diatomaceous tuffite with plant impressions: strike N 70°E, dip 5° to NW.
   Agglomerate of basaltic andesite.
2. Valley between Yamanokuti and Zyôgase, Sigetomi-mura, Aira-gun. There are exposed in descending order:
   Two pyroxene andesite
   Hypersthene andesite
   Basaltic andesite
   Tuff and tuffite with plant impressions; strike N 50°E, dip 10 to SE. The base of the plant bed is aboue 50 m. high above the present sea-level.
3. South-western cliff of the Kôtotu-gawa between Kogasira and Oyamata, Isiki-mura, Kagosima-gun, where observed in descending order are:
   Pumice and sand
   Trachy-andesite
   Tuff and tuffaceous shale with plant impressions.
4. Nunobikinotaki, Haze-yama, Sigetomi-mura, Aira-gun, where observed in descending order are:
   Agglomerate of basalt
   Basalt
   Tuff with plant impressions; Strike N 15°E, dip 15° to SE.
   Conglomerate.
   Altogether some 20 m. thick; the base of the exposure is about 70 m. high above sea level.
5. A branch of the Kôtotu-gawa, about 800 m. north of Kogasira, Isiki-mura, Kagosima-gun. There are exposed in descending order:

Pumice and sand
Trachy-andesite
Shale with plant impressions; strike N 15°E, dip 5° to NW.
Sandstone
Shale
Conglomerate.
The total thickness from shale to conglomerate is ca. 30 m; the base of the exposure is about 50 m. high above sea level.

6. A valley about 400 m. WSW of Haginozyô, Funatu, Sigetomi-mura, Aira-gun, where are observed in descending order:
Pumice and sand
(unconformity)
Tuff and tuffaceous shale with plant impressions; strike N 20° E. dip 10 to SE.

7. Miyazono, Tyôsa-mura, Aira-gun. There are exposed in descending order:
Pumice and sand
(unconformity)
Tuff and tuffaceous shale with plant impressions: strike N 20°W, dip 10°NE.

Notwithstanding a considerable number of fossil samples examined, the species discriminated of them are few as follows, and it shows the fossil flora is very simples in its constitution.

Acer sp.
Fagus crenata BLUME
Quercus sp.
Zelkowa serrata MAKINO
Carpinus laxiflora BLUME
Phyllites sp.
Salix sp.

The plant bed of the Honna-gawa is richly diatomaceous and contains such forms as

Cyclotella cf. *comta* (EHRENBERG) KÜTZ
Cyclotella cf. *striata* GRUM.
Epithemia cf. *hyndmannii* W. SM.
Synedra sp.

These are the forms common in the Pleistocene Siobara plant beds of Siobara Spa in Totigi-ken and the Pleistocene diatomaceous earth of Enda-mura, Katta-gun, Miyagi-ken, both in northern Honsyû.

Among the tree leaves, those of *Fagus crenata* outnumber of others partaking over 90 % of the total specimens examined, and the original forests which have supplied fossil remains to the plant beds can be regarded as almost pure beech forests. The tree *Fagus crenata*[1] is now exist in the mountains of Kyûsyû and is growing at the altitude of about 1000 m. or more; it does not at present exist in

1) WATANABE, F.: Grundsätzliches über die Buchenwald-wirtschaft Japans. V. Mitteilung. (Horizonta'e und Vertikale Verbreitung des Buchenwaldes) (Japanese) Nippon Ringakukai-Zassi, 19, 1937.

YOSIOKA (ARIKAWA), K.: The Vegetation of Mt. Zaô, (Japanese) Seitai-gaku-kenkyû, I, 1935.

YOSIOKA, K.: Montane Forests on Mt. Hakkoda. I. On the Forests of Fagussasa Climax Zone. Seitai-gaku-kenkyû, III, IV, 1937–1938.

HORIKAWA, Y.: The Vegetation of Mt. Hakkoda, Sci. Rep. Tohoku, Imp. Univ. Biol., 5, 1930.

TAKEDA, K.: Mt. Fuji. Nippon Tiri-taikei (Special Volume), 1931.

INOKUMA, T.: Preliminary Notes on the Ligneous Plants indigenous in the "Chichibu" University Forest and its Adjacent District. (Japanese) Bull. of the Tokyo Imp. Univ. Forests. No. 14, 1931.

southern Kyûsyû with except of Mt. Takakuma. In the main island, Honsyû, it enjoys now luxuriant growth in the Cfb conditions of Köppen climatic formula,[1] while the fossil localities mentioned above are in his Cfa climatic field ; it involves therefore a climatic change from Cfa to Cfb occured there between the geological date indicated by the fossil flora and the present day.

Now as to the geological age of the fossil flora, there is almost no doubt about its being Pleistocene in age, because it consists entirely of living species and there is none which finds itself living in a remote land only and it shows a climate fairly colder than the present day climate of the district.

Fagus crenata is very common in the younger Tertiary and Pleistocene deposits of Japan,[2] and there are a great many material stored in the Institute of Geology and Palaeontology, Tôhoku Imperial University, Sendai, which have been collected by the former and present members of the Institute, including the writer, from various localities extending from the middle of Hokkaidô to southern Kyûsyû now in concern which includs the southernmost localities of the plant hitherto known. The localities are as follows :

Table II.

1. Takikawa bed (Pliocene) of Numata-mura, Uryû-gun, Isikarino-kuni, Hokkaido.
2. Setana bed (Pliocene) of Setana, Setana-gun, Siribesino-kuni, Hokkaido.
3. Akakura plant bed (Pleistocene?) of Akakura hot-spring district, Mogami-gun. Yamagata-ken, Honsyû.
4. Nagasawa lignite bed (Pliocene) of Nagasawa, Funakata-mura, Mogami-gun, Yamagata-ken, Honsyû.
5. Lower Umoregi beds (Pliocene) of Sendai, Miyagi-ken, Honsyû.
6. Nenosiroisi plant beds (Upper Mioceue) of Nenosiroisi, Miyagi-gun, Miyagi-ken, Honsyû.
7. Nisi-yama, Nakamura-mati, Sôma-gun, Hukusima-ken, Honsyû.
8. Diatomaceous Earth, (Pleistocene), Enda-mura, Katta-gun, Miyagi-ken, Honsyû.
9. Tennozi-bed (Pliocene), Iezaka-mati, Sinobu-gun, Hukusima-ken, Honsyû.
10. Azuma-yama, Sinobu-gun, Hukusima-ken, Honsyû.
11. Akasaka, O-daira, Yumoto-mura; Iwase-gun, Hukusima-ken, Honsyû.
12. Takatama metal-mine, Asaka-gun, Hukusima-ken, Honsyû.
13. Moniwa-mura, Date-gun, Hukusima-ken, Honsyû.
14. Shiobara plant beds (Pleistocene) Nasu-gun, Totigi-ken. Honshû.
15. Tokyo bed (Pleistocene) of Suga, Hanno-mati, Iruma-gun, Saitama-ken, Honsyû.
16. Yokohama plant bed (Pleistocene), Yamasita-tyô, Yokohama-si, Kanagawa-ken, Honsyû
17. Kawanisi-mura, Asigarakami-gun, Kanagawa-ken, Honsyû.
18. Hatukari-mura (Miocene) Kitaturu-gun, Yamanasi-ken, Honsyû.
19. Utiyama plant bed, (Pliocene) Taguti-mura, Minamisaku-gun, Nagano-ken, Honsyû.
20. Sirakawa-toge, (Upper Miocen) Kobe-si, Hyôgo-ken.
21. Tamayu-mura, Hassoku-gun, Simane-ken, Honsyû.
22. Sakura-zima, Kagosima-ken, Kyûsyû.

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1) KÖPPEN, W.: Grundriss der Klimakunde. (Berlin) 1931.

2) ENDO, S.: On the fossil *Fagus* from Japan. (Japanese) Jour. Geol. Soc. Tokyo, 37, 1930.
ENDO, S.: Cenozoic fossil Plants. (Japanese) Iwanami-kôza. 1931.

23. Yosida-mura, and Isiki-mura, Kagosima-gun, Kagosima-ken, Kyûsyû.
24. Sigetomi-mura, and Tyôsa-mura, Aira-gun, Kagosima-ken, Kyûsyû.
25. Kantindo formation (Miocene) and *Engelhardtia* bed (Miocene), Kankyôhoku-do, Tyôsen.[1]

Beside of above localities, Mr. S. MIKI[2] described recently the present species from another two localities, the conifer bed of Ekoda (Pleistocene) at Nakano in Tokyo and the Stegodon beds (Upper Pliocene) at Nakayagi-Nisiyagi, near Akasimati, Akasi-gun, Hyôgo-ken Honsyû.

Finally the present writer wishes to express his sincere thanks to Prof. H. YABE for his kind assistance in preparing this note.

九州，鹿兒島縣產更新世植物化石（摘要）

遠藤誠道

鹿兒島市の北西2里乃至4里程の地域に發達する含植物化石層から理學士山口鎌次氏が採集した稍〻多量の化石植物を同氏の好意によつて親しく拜見するの機會を得たが，此植物群は種々の點から見て興味あるものであるから次に其梗概を述べたいと思ふ。

さて材料の主なるものは鹿兒島縣鹿兒島郡吉田村五反田の南，本名川河岸に露出して居る白色硅藻土質凝灰岩(2)から採集されたもので山口鎌次氏によると其層序は次の通りである。

上方より列擧すれば

1. 浮石及び砂土
2. 白色硅藻土質凝灰岩（走向，北 70° 東，傾斜 5° 北）
3. 紫蘇輝石，角閃石粗面岩質安山岩
4. 含玄武質安山岩，集塊岩

又此他に別表 (Table I) の產地から可なり多數の材料が採集された（Table I. 參照)。

此含植物化石層なる硅藻土質凝灰岩を顯微鏡下に檢すると多數の *Cyclotella* cfr. *comta* (EHRB.) KÜTZ, *Cyclotella* cfr. *striata* GRUM と少數の *Epithemia* cfr. *hyndmannii* W. SM. 及び *Synedra* sp. が認められた。

是等は栃木縣鹽原溫泉の更新世植物化石層及び宮城縣刈田郡圓田村の更新世と考へられる硅藻土の中に多量に包含せらるる硅藻と全く同一のものである。

次に化石雙子葉植物の葉の印象を見るに標本全部で 63 箇の中 40 箇は實に

Fagus crenata BLUME で其他には

Carpinus laxiflora BLUME	1 箇
Zelkowa serrata MAKINO	2 箇
Acer sp.（保存不良）	2 箇
Quercus sp.（保存不良）	6 箇
Salix sp.（保存不良）	3 箇

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1) ENDO, S.: Cenozoic Plants from Tyôsen (Korea), Jour. Geol. Soc. Japan, 45. 1938.

2) MIKI, S.: Plant fossils from the *Stegodon* beds and the *Elephas* Beds near Akasi. Jap. Jour. Bot. Tokyo, 8, 1937.

MIKI, S.: On the Change of flora of Japan since the Upper Pliocene and the floral composition at the present Jap. Jour. Bot. Tokyo, 9, 1938.

Phyllites sp. (葉の破片)	7 箇
Stem (印痕)	2 箇

等が認められた。則ち保存良好なものの大部分 (90% 以上) が *Fagus crenata* BLUME であつて他は保存不良で種の同定困難なものが多い。

用意周到なる山口教授が採集されたのであるから化石として保存されて居るものを注意深く持ち來たされた事は明らかである。夫れ故此化石植物の材料を供給した森林は恐らく *Fagus crenata* BLUME の純林であつたのではないかと思はれる。

Fagus crenata BLUME は KÖPPEN の Climatic formula で現はすと Cfb (海岸で言ふと北海道函館附近) の氣候狀況のところに最もよく繁茂するものであるのに是が鹿兒島灣岸に近き海面上，高度 50 米乃至 100 米附近に其純林をなして居たと見られるのであるから我等の感興を引くことが大である。

Fagus crenata BLUME は現在九州南部に於ては其最低限界 1000 米であるとの事があるから今回の發見は其地質時代の氣候を考察する上に重要な材料である。

次に此植物群の地質時代を案ずるに，

(1) 遠隔の地方に現生する要素を缺き，悉く九州島に現生する種であること

(2) 化石植物の產出場所よりも北方に分布する現生種を有すること。

(3) 化石植物の產出場所に於ける地質時代の氣候狀況が現在のそれより遙かに寒冷であつたこと 等から考察して此化石植物群は第三紀のものでなく第四紀更新世の或時期のものなる事は確實である。則ち此材料は日本更新世の或時期に於て *Fagus crenata* BLUME が鹿兒島灣岸に近く夥しく繁茂した證據と見るべき重要な材料である。

なほ日本群島產 *Fagus crenata* の化石は別表 (Table II) に示した如く多數發見されて居るが今回の材料は櫻島產のものと共に其最南端のものである。

日本古生物學會記事

Proceedings of the Palaeontological Society of Japan

昭和 13 年 12 月 17 日　日本古生物學會第 13 回例會を東京帝國大學理學部地質學教室に於て開催す（參會者 19 名）。　講演者並に講演題目次の如し。

Pliocene Foraminifera from Japan (Preliminary Report) — Kiyosi ASANO

新潟縣南蒲原郡田上村茗ケ谷產有孔蟲化石 — 大炊御門經輝

Notes Some Foraminifera discovered by SCHWAGER from the Pliocene of Kar Nicobar (代讀) — Joseph A. CUSHMAN

Notes on Some Species of the Genus *Pseudoschwagerina* found in the Permian Formation from the Kitakami Mountainland, Northern Japan (代讀) — Shôshirô HANZAWA

Notes on *Eomontipora* found from the Eocene of the Palau Island — Hisakatsu YABE and Toshio SUGIYAMA

On a Fossil Species of *Lingula* from Hirobuti-mura, Miyagiken (代讀) — Misaburo SHIMAKURA and Kotora M. HATAI

Calliostoma kounjiana YOKOYAMA に似たる 1 新種 — 大塚彌之助

北海道アベシナイ地方中新統軟體動物 — 大塚彌之助

Note on a New Form of Conularida from the Lower Triassic of the Kitakami Mountainland — Toshio SUGIYAMA

A New Lowor Ordovician Fauna discovered at Junee, Tasmania by Dr. A. N. LEWIS — Teiichi KOBAYASHI

余が米國各處にて實査したる「デスモスチラス」の齒 — 德永重康

A Pleistocene Flora from Kagoshima, Kyûsyû, Japan (代讀) — Seidô ENDÔ

昭和 14 年 2 月 18 日　日本古生物學會第 14 回例會を京都帝國大學理學部地質學鑛物學教室に於て開催す（參會者 23 名）。　講演者並に講演題目次の如し。

大井川層の石灰岩と *Lepidocyclina* — 槇山次郎

Marindaqueia mirabilis, gen. et. sp. nov, a Sponge-like Fossil from the Eocene *Discocyclina* Limestone of Marindaque Island, Philippine Islands — Hisakatsu YABE and Toshio SUGIYAMA

Descriptive Notes on *Bittium* from the Etigo Oil-Field — Tsuneteru OINOMIKADO and Nobuo IKEBE

Mollusca from the Miocene of Itukaiti, Tokyo Prefecture (代讀) — Yanosuke OTUKA

寺洞炭坑產の *Aviculopecten* に就て — 前島俊郎

An Occurrence of *Striaptychus* (*Paraestriaptychus*?) in the Upper Jurassic of Japan (代讀) — Takumi NAGAO

Lower Ordovician Carolina Creek Fauna of the Mesrey River District, Tasmania (代讀) — Teiichi KOBAYASHI

On Three New *Callianassa* from the Tertiary of Japan (代讀) — Takumi NAGAO

滿洲國濱江省蔡家溝產最新世哺乳動物 — 高井冬二

An Occurrence of a Fossil Sea-Lion in the Miocene Deposits of Sinano (代讀) — Takumi NAGAO

明石洪積層中に見出した哺乳類趾跡 — 槇山次郎

亞米利加產三葉松に近似のミツバマツ (*Pinus tryphylla* MIKI, n. sp.) の本州產遺體に就いて　三木茂

高坊山統の楔葉類　小畠信夫

A Fossil Cones of the Genus *Abies* from Sendai, Japan (代讀)　Seidô ENDÔ and Haruo OKUTU

昭和 13 年 12 月 20 日以降 14 年 3 月 30 日迄の會員移動次の如し。

入會者　赤岡純一郎　嵐由之　所敏一　小山千万喜

退會者　今井半次郎(死亡)

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5. 本會ノ會費ハ年額3圓トシ，日本地質學會々員ハ年額1圓トス，但シ一時ニ金100圓以上ヲ寄附セル者ヲ賛助會員ニ推ス
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Article 1. The Society shall be known as the Palaeontological Society of Japan. It forms a section of the Geological Society of Japan.

Article 2. The object of the Society is the promotion of palaeontology and related sciences.

Article 3. This Society to execute the scheme outlined under Article 2, shall hold annual meetings and discussions.

Article 4. Proceedings of the Society and articles for publication shall be published through the Journal of the Geological Society of Japan. Separates and circulations will be sent to members of the Palaeontological Society who are not members of the Geological Society of Japan.

Article 5. The annual dues of this Society is two dollars for the foreign members of the Society.

Article 6. This Society shall hold the following executives. President one person, Councillors several persons.

Article 7. The President and Councillors shall be elected annually. The President and Councillors shall be elected from the Society body by vote of its members. All elections shall be ballot.

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