

XX. FRESHWATER SHELLS FROM MESOPOTAMIA.

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(With Plate XX.)

The shells discussed in this paper were found for the most part in what may be called a subfossil condition. Some of them may now be extinct in the districts in which they were collected, but this seems to be improbable in most cases, and some have certainly been deposited by recent inundations. The collection was made at two localities; in the neighbourhood of Nasariyeh on the Euphrates, near where it now joins the Tigris, and at Samara on the latter river. For most of the specimens I have to thank Lieutenant-Colonel W. H. Lane, whose valuable notes have been of great use in considering the environment in which the different species lived; for others I have to thank Bombardier R. Hodgart, who in civil life is a collector attached to the Zoological Survey of India, and while on active service has not neglected to obtain specimens for presentation to the Indian Museum.

The specimens from the neighbourhood of Nasariyeh are from three different deposits, probably of different age but in no case of great geological antiquity. Some are from a place annually inundated by the Euphrates, others from an almost superficial deposit now separated from the bank of the river but once probably the bed of a pool or back-water connected with it in the floods if not perpetually, while others again are from the bed of a shallow lake that has been filled from time to time with sand. There is some evidence that this last deposit was laid down in water that was or had recently been brackish. The specimens from Samara were found in the dry bed of an ancient tank and all the shells are white and opaque. Amongst the freshwater forms I found a number of money cowries (*Cypraea (Arícia) moneta*, L.), the presence of which is evidently fortuitous and due to man, and also shells of at least two species of Helicidae, which I shall not attempt to name.

The shells from the most recent deposit on the banks of the Euphrates at Nasariyeh belong to the following species:—

GASTROPODA.

Neritina jordani
Melania tuberculata
Melanopsis nodosa
Limnaea spp.
Planorbis convexiusculus
Bullinus contortus

PELECYPODA.

Corbicula fluminalis
Corbicula cor
Unio calliopsis
Unio tigridis
Unio ciconius
Gabillotia euphratica

All these shells, except those of the Unionidae and Cyrenidae, are for the most part white and opaque. Some of those of Pulmonates,

however, retain a certain translucency; those of the *Melania* have often vestiges of epidermis, while those of *Neritina* retain their colour to some extent. Those of the *Melanopsis* are particularly white and chalky.

The shells from the swamp deposit in the same neighbourhood, separated from the Euphrates by a narrow stretch of flat land and the remains of an old embankment, belong to the following species:—

GASTROPODA.

Neritina jordani
Bithynia badiella
Melania tuberculata
Melanopsis nodosa
Limnaea tenera
Limnaea sp.
Bullinus contortus

PELECYPODA.

Unio sp.

Except the *Unio*, all the specimens of which are white, broken and crumbling, the shells are in much the same condition as those from recently inundated land.

The collection from the lacustrine deposit at Nasariyeh, to which Colonel Lane paid particular attention, includes specimens of the following:—

GASTROPODA.

Neritina jordani
Bithynia badiella
Bithinella palmyrae
Melania tuberculata
Melanopsis subtingitana,
 Nevill, Ms.
Melanopsis nodosa
Potamides fluviatilis
Limnaea peregriformis
Limnaea subpersica
Limnaea sp.
Planorbis convexiusculus
Bullinus contortus

PELECYPODA.

Unio sp.
Corbicula fluminalis
Corbicula cor
Corbula (Erodona) mesopotamica, sp. nov.

There is also a single shell of the barnacle *Balanus amphitrite*, and many tests of Ostracod Crustacea.

The collection of freshwater shells from Samara is a small one; only the following species are included:—

GASTROPODA.

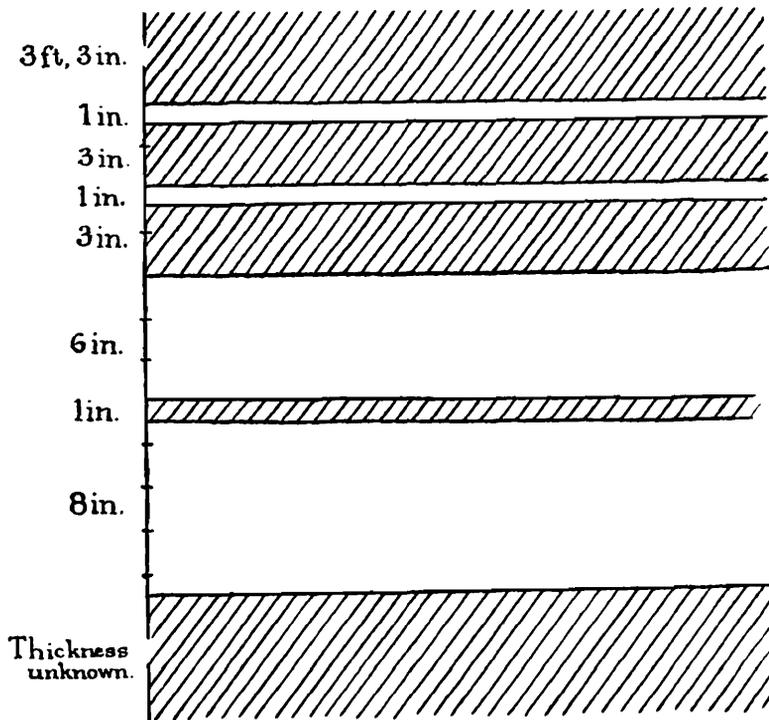
Melanopsis nodosa
Limnaea sp.
Bullinus contortus

PELECYPODA.

Corbicula fluminalis
Unio dignatus var. *semi-ramidis*
Unio mossulensis

The shells had all been dead for some time and were quite opaque.

The most interesting of these deposits, and also the most fully investigated, is that of the lake-bed near Nasariyeh. Colonel Lane has sent me several diagrams to illustrate its position and structure. I reproduce (in a slightly modified form) one of his drawings, which is of a section of the deposit as seen in a trench. The sandy layers evidently represent the sudden and repeated filling in of the lake by sand-storms, the



layers of clay (shaded) the bottom at different periods. There has probably been some denudation of the surface. In the sandy layers the shells are well preserved, while in those of clay conditions were unfavourable for preservation and the only recognizable remains are those of thick and heavy shells such as *Unio* and the tests of Ostracods. Fragments of vegetable matter are abundant in the clay. There is some uncertainty as to which sandy layer many of the specimens are from, but there is sufficient evidence that some of the species came from all these layers; the *Potamides* and the *Corbula*, brackish-water forms, were certainly found in the upper as well as the lower ones; most of these shells are probably from the 6 inch layer. All the thinner shells from the deposit are dwarfed and many of those of *Limnaea* are distorted, but this is also the case with many specimens from recently inundated land in the same neighbourhood. Without examining fresh specimens it is impossible to say whether all of the latter are recent.

From a geographical point of view the most interesting feature of the collection is the additional evidence it affords of the close relationship between the aquatic fauna of lower Mesopotamia and that of the Jordan valley. The abundant occurrence of *Neritina jordani* in the former district is particularly significant in this connexion.

GASTROPODA.

Order PECTINIBRANCHIATA.

Family NERITIDÆ.

Genus *Neritina*, Montfort.

Three species of this genus have been described from Mesopotamia and I have here to put on record the occurrence of a fourth hitherto known from Palestine. The four species are easily distinguished. They are *N. mesopotamica*, Mousson, *N. cinctella*, Martens, *N. euphratica*, Mousson and *N. jordani*, Sowerby. The first two are only known from upper Mesopotamia, but although *N. euphratica* is stated to be widely distributed through the whole country, none of the specimens I have examined can be assigned to it.

The four species may be distinguished as follows:—

- | | |
|---|-------------------------|
| I. Shell with an obtuse ridge on the body-whorl | <i>N. cinctella.</i> |
| II. Shell with a broad, shallow constriction running round the main whorl, distinctly taller than broad, marked with dark and pale zig-zag lines; the inner lip without denticulation or emargination | <i>N. jordani.</i> |
| III. Shell without transverse constriction or ridge— | |
| A. Shell slightly taller than wide, of a uniform blackish colour; inner lip entire | <i>N. mesopotamica.</i> |
| B. Shell wider than tall, marked with dark and pale zig-zag lines, with a slight emargination in the middle of the inner lip | <i>N. euphratica.</i> |

Neritina jordani, Sowerby.

1899. *Neritina jordani*, Kobelt in Rossmässler's *Icon. Land-u. Süßw. Moll.* (n. f.) VIII, p. 2, pl. ccxi, fig. 1319.

1899. *Neritina jordani* var. *turris*, *id.*, *ibid.*, p. 3, pl. ccxi, fig. 1320.

There are numerous shells of this species in collections from the bank of the Euphrates at Nasariyeh and from both lacustrine and paludine deposits in the same neighbourhood. They agree very closely, except in being rather smaller, with shells of the var. *turris* of Mousson collected by myself in the Lake of Tiberias. All are variegated, but there is considerable variation in the relative breadth of the dark and the pale zig-zag markings.

Family HYDROBIIDÆ.

Bithynia badiella, Parreyss.

1874. *Bithynia badiella*, Mousson, *Journ. de Conch.* XXI, p. 45.

Shells are abundant in lacustrine and paludine deposits at Nasariyeh. They agree well with specimens from northern Palestine. The species is common in Syria, the Lake of Tiberias and Lower Mesopotamia.

Bithinella palmyrae, Dautzenberg.

1894. *Bithinella palmyrae*, Dautzenberg, *Rev. biol. Nord France* VI, p. 348, fig. 4.

Several shells, of which only one is complete, from the old lake-basin at Nasariyeh seem to agree with Dautzenberg's figure. The species is otherwise known only from Palmyra in the Syrian desert.

? Genus **Lithoglyphus**, Mühl.

A single broken shell from the same deposit perhaps belongs to this genus.

Family MELANIIDAE.

Melania tuberculata (Müller).

1918. *Melania tuberculata*, Annandale, *Rec. Ind. Mus.* XIV, pp. 114, 156, fig. 6, pl. xii, figs. 1, 2.

This common mollusc is well represented in all the deposits from which I have seen specimens. Most of the shells are of the typical form and of rather small size (not longer than 25 mm.). Mr. Hodgart has, however, sent some very large ones from the banks of the Euphrates at Nasariyeh, the largest of which must have been at least 45 mm. long by 16 broad when complete. Some of these large shells retain vestiges of their epidermis, but most are denuded and broken.

Melanopsis nodosa, Férussac.

1874. *Melanopsis nodosa*, Brot, "Die Melaniaceen," in Chemnitz's *Conch.-Cab.* (ed. Küster), p. 432, pl. xlvi, figs. 17-24.

This is apparently by far the commonest species of its genus in lower Mesopotamia. It is represented by numerous specimens from all the deposits at Nasariyeh and by a single much worn shell from Samara. All the shells I have examined have lost their epidermis and are white and chalky.

Melanopsis subtingitana, Nevill, Ms.

(Plate XX, figs. 1, 2.)

1884. *Melanopsis costata*, var., Nevill, *Hand-List Moll. Ind. Mus.* II, p. 262.

The shell is thick, of a very regular ovato-conical shape, narrow, sharply pointed at the apex, from which it increases gradually and evenly. The spire is conical, unbroken, with the suture little impressed and the whorls not at all swollen. Seven or seven and a half whorls persist in the two adult shells examined. The first three whorls are small and almost smooth; the others are decorated with broad and prominent, slightly sinuous longitudinal ridges, of which there are about fifteen. These ridges may become obsolete at the base of the body-whorl or may be divided into two longitudinal tubercles by a deep groove running round this whorl. The mouth of the shell is narrowly ellipsoidal and is produced backwards in the form of a narrow slit which is at first straight and then curves inwards and is not protected by an overhanging lip. The columella is almost straight and pointed at its extremity, which does not project or hardly projects beyond the lip; the callus is poorly developed.

Measurements of shells (in millimetres).

Specimen A is the type-specimen from Basra (?): specimen B is the adult shell from Nasariyeh.

	A.	B.
Length of shell	15	14
Breadth of shell	7.4	7.5
Length of aperture (including slit)	6.5	8.3
Breadth of aperture	3.5	3.2

Type-specimen.—No. 11390/2M, *Zoological Survey of India (Ind. Mus.)*.

Localities.—Nevill gave the Ms. name here adopted to three shells labelled "Basrah, Biluchistan" from the collection of the late Dr. W. T. Blanford. The "Biluchistan" was probably a mistake. Two of these shells are very young and one of them appears to be merely a young shell of *M. nodosa*. The adult specimen I have made the type of the species. In Colonel Lane's collection from the old lake-bed at Nasariyeh I found two other shells, only one of them adult. They differ from Dr. Blanford's adult specimen in having the longitudinal ridges undivided and obsolete at the base on the body-whorl, but, considering the variability habitual in the genus, must belong to the same species. All four specimens were probably subfossil.

The species is closely related to *M. tingitana*, Morelet, which is probably confined to the western parts of the Mediterranean basin. It differs in its more regular form, narrower body-whorl, more conical spire and narrower aperture. It differs still more considerably in shape and proportions from any form of *M. costata*, of which I have examined a very large series of shells from Palestine, Spain, etc. From *M. saulcyi*, Bourguignat, it differs in sculpture as well as in the shape of the body-whorl.

Family CERITHIIDAE.

Potamides fluviatilis (Pott. & Mich.).

1838. *Cerithuom fluviatilis*, Potiez et Michaud, *Gall. Moll.*, p. 363, pl. xxxi, figs. 19, 20.

1916. *Potamides (Tympanotonos) fluviatilis*, Annandale and Kemp, *Mem. Ind. Mus.* V, p. 344.

Several worn and broken shells of this common estuarine species, the range of which extends from the Persian Gulf to the seas of China, Japan and Australia, are present in the collection from the sandy beds in the lake deposit at Nasariyeh. So far as I am aware, *P. fluviatilis*, though often abundant in water of low salinity, never lives in pure fresh water. The specimens, therefore, must represent, with those of *Corbula* and *Balanus*, a brackish-water element in this deposit.

Order PULMONATA.

Family LIMNAEIDAE.

Genus **Limnaea**, Lamarck.

The material at my disposal does not make it possible to deal in at all a satisfactory manner with the species or forms of this genus that

occur in lower Mesopotamia. A large proportion of the shells I have examined are immature or broken; all are very small and many seem to be distorted or abnormal. Some species of the genus are extraordinarily plastic and an enormous number of forms have received varietal or specific names. Indeed, it is doubtful whether a final diagnosis is possible in many cases without an examination of the radula and genital system. I have not attempted, therefore, to name the majority of specimens in the collection. They include representatives of curious races or varieties that may belong to such species as *L. lagotis* and *L. ovata* but, except in a few instances, I have not been able to identify them with described forms. All are certainly different from any of the forms from central Asia and from Baluchistan, Persia or Palestine represented by specimens in the collection of the Zoological Survey of India. In three cases I have been able to select series of shells that agree fairly well with published figures of supposed species. To these I give the appropriate names, but in so doing I wish it to be understood that I do not intend to express an opinion as to the specific validity of the forms.

***Limnaea tenera* (Parreyss), Küster.**

(Plate XX, fig. 3.)

1862. *Limnaeus tener*, Küster, "Die Gattungen *Limnaeus*," etc., in Chemnitz's *Conch.-Cab.* (ed. Küster), p. 54, pl. xii, figs. 1, 2.
 1865. *Limnaeus tener*, Tristram, *Proc. Zool. Soc. London*, p. 540.
 1874. *Limnaea Euphratica*, Mousson, *Journ. de Conch.* XXI, p. 40.
 1894. *Limnaea tenera*, Dautzenberg, *Rev. biol. Nord France* VI, p. 335.

This may be no more than an Asiatic race of *L. ovata*, which in its turn is probably no more than a phase of *L. peregra*. It was described from Persia and according to Dautzenberg is common in swamps and lakes in Syria. I have selected a series of shells from the specimens collected by Colonel Lane in a swamp-deposit at Nasariyeh. The larger specimens, though considerably smaller than Küster's figures, agree with them otherwise in every respect except that the mouth is slightly narrower.

***Limnaea peregriformis*, Locard.**

(Plate XX, fig. 4.)

1883. *Limnaea peregriformis*, Locard, *Arch. Mus. d'Hist. Nat. Lyon* III, p. 286, pl. xxiii, figs. 41-43.

Several specimens from the lake-deposit at Nasariyeh agree fairly closely with Locard's figures, except that they are much smaller (not longer than 10.5 mm.) and that the body-whorl is sometimes not quite so elongate. I am not at all sure that the form is specifically distinct from the same author's *L. lagotopsis* and *L. reneana*, and Kobelt¹ is inclined to regard the former as no more than an individual aberration of *L. lagotis* and the latter as a young form of Locard's *L. axiaca*, which Westerlund calls a variety of *L. stagnalis*. According to Kobelt, however,

¹ Kobelt in Rossmässler's *Icon. Land-u. Süßw.-Moll.* (new edition) XVIII, pp. 2, 4, 5.

Westerlund calls *L. peregriformis* merely "*L. peregra* var." *L. peregriformis*, whatever its precise status may be, has hitherto been recorded only from the Lake of Homs in Asia Minor.

***Limnaea subpersica*, Locard.**

(Plate XX, fig. 5.)

1883. *Limnaea subpersica*, Locard, *op. cit.*, p. 285, pl. xxiii, figs. 38-40.

Some still smaller shells (greatest length 9 mm.) from the same deposit agree fairly well with Locard's figure, but show considerable variation in the form of the aperture. Westerlund (*vide* Kobelt, *op. cit.*, p. 7) regards the form as a variety of *L. lagotis*. It was found with *L. peregriformis* in the Lake of Homs.

Family PLANORBIDAE.

1906. Planorbidae, Pelseneer, "Mollusca" in Lankester's *Treatise on Zoology*, Vol. V, p. 185.

Genus ***Planorbis***, Guttard.

The only species of this genus represented in the collection belongs to the section or subgenus *Gyraulus*, Agassiz.

***Planorbis convexiusculus*, Hutton.**

1876. *Planorbis convexiusculus*, Hanley and Theobald, *Conch. Ind.*, pl. xcix, figs. 8, 9, 10.

1918. *Planorbis saigonensis* (?), Annandale, *Rec. Ind. Mus.* XIV, p. 112, pl. xi, fig. 1.

I have been in some doubt whether this form was more than a variety of *P. saigonensis*, Crosse & Fischer (= *P. compressus*, Hutton), but, having recently had an opportunity of examining good series of fresh specimens of both, I am now convinced that they are specifically distinct. *P. saigonensis* is a more constant species than *P. convexiusculus*, which exhibits considerable individual variability in the form of the shell. In most individuals of the latter species there is no peripheral keel or angulation, but it is not uncommon for a distinct angulation to be present. *P. saigonensis* has a larger, flatter, coarser and more irregularly sculptured shell, which is distinctly carinate. There is also a difference in the shape of the aperture. I have recently seen a number of specimens of *P. saigonensis* from Lahore which have traces of the bacterial velum so noticeable in *P. velifer*¹; some also possess spiral rows of epidermal cilia as in the var. *ciliata* of that species, from which both *P. convexiusculus* and *P. saigonensis* differ considerably in the shape of the mouth of the shell.

Shells of *P. convexiusculus* very like those from deposits in the Shan States are abundant in the samples from all the deposits at Nasariyeh and Samara. The species was described from Afghanistan and is common in northern India.

¹ Annandale, *Rec. Ind. Mus.* XIV, p. 112, pl. xi, figs. 7-11 (1918).

Genus **Bullinus**, Adanson.

1757. *Bulinus*, Adanson, *Voy. Sénégal, Coquillages*, p. 5, pl. i, figs.
 1815. *Bullinus*, Oken, *Lehrbuch Naturgesch.* III, p. 303 (*vide* Hedley).
 1830. *Isidora*, Ehrenberg, *Symb. Phys.* II (unpaged).
 1862. *Isidora* (in part), Küster, "Die Gatt. *Limnaeus*," etc., in Chemnitz's *Conch.-Cab.* (ed. Küster), p. 69.
 1886. *Physa* (in part), Clessin, "Limnaeciden," in Chemnitz's *Conch.-Cab.* (ed. Küster and Dunker), p. 236.
 1917. *Bullinus*, Hedley, *Rec. Austr. Mus.* XII, p. 3.

As this genus has now assumed a certain practical sanitary importance it may be well to discuss its synonymy and systematic position. It was originally described, from a West African form, by Adanson in 1757. He spelt the name with one "l," but as he derived it from "bulle" or *bulla* was evidently in error in so doing.¹ Apart, therefore, from any question of date, or from the fact that Adanson did not designate the species, Oken in 1815 was justified in changing the name to *Bullinus*. Oken's work is inaccessible to me, but I gather from recent writers that he merely adopted Adanson's description without seeing his species. This description is clear and adequate; the figures that accompany it, though a little crude, illustrate the form of the shell and the external anatomy of the animal with sufficient accuracy. They prove that in the species known to him, which was described by Bourguignat in 1856 as *Physa senegalensis*, the mantle did not extend over the shell and that the tentacles were filiform. These are characters which separate the living *Bullinus* from the living *Physa* at a glance.

In 1830 Ehrenberg erected for certain Egyptian and Syrian forms a new genus, which he called *Isidora* or the "Gift of Isis." He appears to have been ignorant of Adanson and Oken's genus and his description, which is fairly full both in reference to the shell and to the external soft parts, coincides closely with Adanson's. Moreover, the first two of the three species² he assigned to *Isidora* (*I. hemprichii*, *I. brocchii* and *I. forskalii*) are probably no more than varieties or phases of *Bullinus contortus*, which closely resembles *B. senegalensis* except in the poor development of the columellar callus. *Isidora*, therefore, seems to me to be an absolute synonym of *Bullinus*.³ Germain,⁴ however, treats it as a subgenus of that genus in his recent list of the molluscs of Syria and Palestine.

Pelsener (*op. cit.*, 1906) places *Bullinus* with *Planorbis* in the family Planorbidae, which he defines thus: "Visceral mass and shell sinistrally coiled; inferior pallial lobe very prominent and transformed into a branchia; tentacles tapering." *Planorbis* he distinguishes thus: "shell discoid; branchia not folded": *Bullinus* thus, "shell ovoid with prominent spire; branchia folded." There is never any difficulty in distinguishing the flattened discoid adult shells of *Planorbis* from those

¹ He says, "Je donne le nom de Bulin a un petit coquillage d'eau douce. Cette denomination m'a paru lui convenir, parceque l'animal pendant sa vie nago presque continuellement a fleur d'eau, et qu'après sa mort sa coquille flotte comme une petite bulle d'air transparente."

² The third species (*i.e.*, the third to be described) *I. forskalii*, is quite distinct.

³ Hedley (*op. cit.*, 1917) revives the name *Isidora* for certain Australian species in supersession of *Isidorella*, Tate; but in view of what is said above this cannot stand.

⁴ Germain, *Bull. Mus. Hist. Nat. (Paris)* 1912, p. 450.

of *Bullinus*, but very young shells¹ are in some species almost indistinguishable.

Bullinus contortus (Mich.).

(Plate XX, figs. 6—11.)

1874. *Isidora contortu*, Jickeli, *Nov. Act. Leop-Carol. Ak. Natur.* XXXVII (1), p. 203, pl. iii, fig. 4, pl. vii, fig. 14.
 1874. *Physa (Isidora) Brochii*, var. *approximans*, Mousson, *Journ. de Conch.* XXI, p. 42.
 1886. *Physa contorta*, Clessin, *op. cit.*, p. 314, pl. i, figs. 9-11.
 1886. *Physa natalensis*, *id. ibid.*, p. 8, pl. i, figs. 12-14.
 1916. *Bullinus contortus*, Leiper, *Journ. R. A. M. C.* XXVII, p. 117, fig. 66.

Jickeli has discussed the synonymy and Leiper proved the sanitary importance of this species, which, with two closely allied forms, is the intermediate host of the human parasite, *Bilharzia haematobium*. The shell is extremely variable (see figs. 6—11, pl. XX) and it is possible that further study will extend the synonymy.

Specimens were obtained both in the swamp-deposit at Nasariyeh and at the edge of the Euphrates at the same place; also at Samara. The shells are small, rather thick, and extremely variable as regards both the form of the spire and the shape of the body-whorl. There are shells in the Indian Museum from Portugal, Corsica, Algeria, Egypt, Abyssinia, Natal and Palestine. The species is also known from tropical W. Africa, from the upper waters of the Euphrates, and from Syria.

PELECYPODA.

Family CYRENIDAE.

Genus *Corbicula*, Megerle.

A considerable number of species of this genus have been described from Western Asia, but the synonymy of these is obscure. I have distinguished two forms, which seem to be specifically distinct; others I have left unnamed.

Corbicula fluminalis (Müller).

1913. *Corbicula fluminalis*, Germain, *Bull. Mus. Hist. Nat. (Paris)*, p. 472.

This is perhaps the commonest species of the genus in Western Asia. It has a wide range in Asia and Africa. Specimens, both recent and subfossil, from Nasariyeh seem to be typical.

Corbicula cor, Lk.

1914. *Corbicula cor*, Preston, *Journ. As. Soc. Bengal* (n. s.) IX, p. 474.

Specimens from Nasariyeh seem to be intermediate between this form and *C. crassula*, Mousson, which is probably, as Preston points out, a variety of it. They differ very little from shells from the Lake of Tiberias identified by the latter conchologist as *C. crassula*. The species, if the two be united, is common in Syria and there are specimens from Persia

¹ See Annandale, *Rec. Ind. Mus.* XIV, pl. xi, fig. 1-(1918)

in the collection of the Indian Museum. These are perhaps more like the typical *cor.* Germain (*loc. cit.*) treats *C. crassula* as a variety of *C. fluminalis*.

Family UNIONIDAE.

The Western Asiatic species of this family are described and figured piecemeal by Kobelt in the new edition of Rossmässler's "Iconographie," on which I have relied mainly in the following identifications. Volumes XVIII and XIX (1912-1913) contain most of the descriptions. There seems to be much confusion among the named shells from Mesopotamia in the Indian Museum.

Unio calliopsis (Bourg.), Kobelt.

1913. *Unio calliopsis*, Kobelt in Rossmässler's *Icon. Land-u. Süsww. Moll.* (n. f.) XIX, p. 15, pl. dxix, fig. 2703.

There are a number of fresh shells in Mr. Hodgart's collection from the banks of the Euphrates at Nasariyeh. Most of them are rather smaller than Kobelt's figure, but a single worn valve which has the characteristic hinge is larger: 62 mm. × 31 mm. The shell is thinner than the other Unionid shells in the collection and its epidermis is paler than that of other fresh specimens.

The species was described from Baghdad.

Unio tigridis, Bourguignat.

1912. *Unio tigridis*, Kobelt, *op. cit.*, XVIII, p. 62, pl. dx, figs. 2683, 2684.

Fresh shells from the same collection as the last species show considerable variation in outline and have the epidermis darker than it is shown in Kobelt's figures.

The species occurs in both the Tigris and the Euphrates.

Unio dignatus var. **semiramidis**, Kobelt.

1913. *Unio dignatus semiramidis*, Kobelt, *op. cit.*, XIX, p. 11, pl. dviii, fig. 2698.

Dead shells from Samara agree with Kobelt's figures. The variety was described from "the Euphrates near Baghdad."

Unio ciconius (Bourg.), Kobelt.

1913. *Unio ciconius*, Kobelt, *tom. cit.*, p. 11, pl. dvii, fig. 2697.

Shells were found, with those of the last species, at Samara by Colonel Lane. The type-specimens were collected near Mossul.

Gabillotia euphratica (Bourguignat).

1886. *Margaritana euphratica*, Kobelt, *op. cit.*, II, p. 26, pl. xlv, fig. 266.

A single fresh valve from the Euphrates at Nasariyeh agrees well with Kobelt's figure. The species has been found in the Tigris as well as the Euphrates.

Family CORBULIDAE.

Genus *Corbula*, Brugière.

The majority of the species of this family are marine, but a few make their way up the larger rivers of South America and southern Asia into water that is nearly if not quite fresh. Their range, however, never extends much beyond the limits of tidal influence. The shells of these brackish water forms are small, fragile and colourless, with prominent single hinge-teeth. The Asiatic and American species are probably convergent, but it may be convenient to group all the characteristic estuarine forms under the subgeneric name *Erodona*, Daudin. Preston¹ has described several species from the delta of the Ganges.

Corbula (*Erodona*) *mesopotamica*, sp. nov.

(Plate XX, figs. 12, 13.)

Shell small, thin, inaequivalve, inaequilateral, about $1\frac{1}{2}$ times as long as high, rounded in front, subtruncate and produced behind, moderately swollen in the central region; umbones pointed, small, slightly prominent, not at all introverted, situated slightly nearer the anterior than the posterior extremity; dorsal margin from umbo to upper end of anterior margin slightly convex, not interrupted, from umbo to posterior margin straight, sloping, hardly at all concave; lower margin convex, evenly curved; surface of upper part of shell with fine irregular transverse concentric striae; striae coarser near lower margin; no sloping ridges on posterior region. The form of the hinge is shown in figs. 12a, 13a, plate XX

Measurements of shells (in millimetres).

			Right valve.	Left valve.
Breadth	8.5	8
Height	5.5	5.4

Type specimen.—No. 11404/2M, *Zoological Survey of India (Ind. Mus.)*.

Locality.—Nasariyeh, Mesopotamia; subfossil in sandy beds of lacustrine deposit near the Euphrates.

The fresh shell was probably translucent, but a thin brownish epidermis, of which traces possibly persist, may have been present. The species comes nearest among described forms to *C. pfefferi*, Preston, from the Gangetic delta, but the shell is larger, proportionately broader and more produced posteriorly; the umbo is also more acute.

¹ *Ann. Mag. Nat. Hist.* (7) XIX, p. 215 (1907).