

FOSSIL FAUNA OF RAJASTHAN (INDIA)

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(With 1 Text-figure and 2 tables)

I—INTRODUCTION

Impey (1956) was the earliest worker to deal with the animal fossils from Rajasthan. Towards the end of last century Blanford (1877), and Oldham (1886) recorded a few forms while dealing with the geology of Jaisalmer area. It is observed that this subject received greater attention of workers since 1946. Thereafter a number of workers have contributed to the study of animal fossils from this part of India. An attempt has been made below to give a systematic list of fossil forms known from this state, their geographical distribution along with the author who reported them from each locality. A reference to table II will give an idea about the geological distribution of the species.

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II—GEOLOGY OF RAJASTHAN

The study of fossil animals is always correlated with the location, both geographical and stratigraphical. It is the latter which gives actual knowledge about the palaeoecology and palaeogeography of the area and also the relative time of existence of a species vis-à-vis other species.

The geology of Rajasthan has, since the later half of the last century, been studied by different workers like Blanford (1877), Coulson (1933), Fermor (1930), Gupta (1934), Gupta and Mukherji (1938), Heron (1917, 1924, 1932, 1935 & 1936), Oldham (1886), La Touche (1902), etc.

The existing knowledge on geology of Rajasthan has been well summarised by Ghosh (1952). Table I (based on Ghosh) shows the various geological formations which are found in this state. It will be seen that the eastern part (excepting Dholpur) and the Aravallis are devoid of fossils whereas, the western part consisting of Barmer, Bikaner, Jaisalmer and Jodhpur districts, is full of fossiliferous sites which are given in Table II. These fossiliferous formations belong to Cretaceous, Jurassic and Eocene periods. Map 1 shows the distribution of fossil-bearing formations and the known fossiliferous sites in these areas.

TABLE 1

Showing Geological formations in Rajasthan

(Broken lines indicate unconfirmity)

Era (Age in Million years).	Systems	Formations.
Quarternary	Recent	Recent : Sand, alluvium, Kankar,
1	Pleistocene	Older alluvium
Tertiary. or Kainozoic (Birth of Himalaya; Final wreck of Gondwana land)	Pliocene Miocene Oligocene } Eocene	Not reported in Rajasthan Nummulitic limestone, Fuller's earth and subbentonite of Western Rajasthan, and lignite in Bikaner and Jodhpur.
60		
120	Cretaceous	Barmer sandstone Abur formation
145	Jurassic	Parihar formation Bedesar formation Jaisalmer limestones Lathi formation
170	Triassic	Not reported in Rajasthan
240	Permian ? Carboniferous-	Bap boulder beds Bhadaura formation near Bap in Jodhpur
Palaeozoic	Devonian Silurian Ordovician } Cambrian	Absent in Rajasthan Upper Vindhyaans :—East and West of Aravallis. Lower Vindhyaans :—Limestone and shale ; and Malani series

500	-----
Algonkian or Proterozoic	-----
610—725	-----
Precambrian	Cuddapah (Kadapa) Delhi System : Alwar series Ajabgarh series (from Delhi Idar, Ajmer, Udaipur state).
(Major elevation of Aravallies & birth of Gondwana land)	
1000	-----
Archaean or Azoic	----- Raialo series :- Makrana, Rajnagar, ----- Bhagwanpura marbles. ----- Aravalli system (= Dharwarian system) ----- Banded Gneissic complex and Bundelkhand granite (seen on both to the east and west of the Aravallis).
1500	-----

Based on Ghosh (1952) and Liubimova, Guha & Mohan (1960).

III—SYSTEMATIC LIST OF FOSSIL FAUNA

Authors recording various species from different localities are cited by numbers in the list of references.

Phylum PROTOZOA
Class SARCODINA
Order FORAMINIFERA

Family ACERVULINIDAE

1. Genus *Gypsina* Carter,

(1) *Gypsina* sp.—Kolayat (45, 48) Bandah (27).

Family ALVEOLINELLIDAE

2. Genus *Alveolina* d'Orbigny

(2) *Alveolina elliptica* var. *flosculina* Silvestri.—Bandah (27)

(2a) *Alveolina oblonga* d'Orbigny.—Jaisalmer (5).

Subgenus *Flosculina* Stache

(3) *Alveolina (Flosculina)* sp.—Kolayat (44, 45, 48, 51); Marh (47).

Family AMPHISTEGINIDAE

3. Genus *Eoconuloides* Cole & Bermudez

(4) *Eoconuloides* sp.—Kolayat (48).

4. Genus **Asterigerina** d'Orbigny

- (5)
- Asterigerina indica*
- Jacob & Sastri, 1950.—Marh (24)

Family **ASTRORHIZIDAE**5. Genus **Bathysiphon** M. Sars

- (6)
- Bathysiphon*
- sp.—Nagurda (1).

Family **BULIMINIDAE**6. Genus **Bulimina** d'Orbigny

- (7)
- Bulimina*
- sp.—Marh (24).

7. Genus **Turrilina** Andreae

- (8)
- Turrilina*
- sp.—Nagurda (1)

8. Genus **Virgulina** d'Orbigny

- (9)
- Virgulina*
- sp.—Marh (24)

Family **CHAPMANIIDAE**9. Genus **Dictyoconoides** Nuttal

- (10)
- Dictyoconoides cooki*
- (Carter).—Bandah formation (27, 35) Jaisalmer (5); Kolayat (44, 45, 48, 51).

- (11)
- Dictyoconoides*
- sp.—Marh (47).

Family **CYCLOCYCLEIDAE**10. Genus **Discocyclina** Gumbel

- (12)
- Discocyclina dispansa*
- (Sowerby 1837).
-
- Bandah formation (27, 35).

- (12a)
- Discocyclina sowerbyi*
- Nuttla.—Bandah (27)

- (13)
- Discocyclina*
- sp. (sellate forms) Kolayat (44); Bandah (27).
-
- Subgenus
- Discocyclina**
- Gumbel, 1870.

- (14)
- Discocyclina (Discocyclina)*
- sp.—Kolayat (48); Marh (47).

Subgenus **Actinocyclina** Gumbel

- (15)
- Discocyclina (Actinocyclina)*
- sp.—Kolayat (44, 45, 48).

11. Genus **Pseudophragmina** Douville
Subgenus **Proporocyclina** Vaughan & Còle

- (16) *Pseudophragmina (Proporocyclina)* spp.
(=*Discocyclina (Proporocyclina)*) sp.—Kolayat (44, 45, 48).
- Family HETEROCHELICIDAE
12. Genus **Bolivina** d'Orbigny
- (17) *Bolivina* sp.—Rohli (43, 42); Utarlai (42)
- Family MILIOLIDAE
13. Genus **Quinqueloculina** d'Orbigny
- (18) *Quinqueloculina* sp.—Marh (24)
- Family NODOSARIDAE
14. Genus **Astacolus** Montfort
- (19) *Astacolus ahrastus* var. *minuta* Subbotina, Datta & Srivastava 1960.—Jaisalmer (53).
- (20) *Astacolus centrogyrata* var. *definita* Subbotina & Datta, 1960.—Kuldhar (54).
15. Genus **Citharina** d'Orbigny
- (20a) *Citharina submulticostata* Subbotina & Datta, 1960.—Kuldhar (53).
- 15a. Genus **Citharinella** Marie
- (21) *Citharinella foliaformis* Subbotina & Datta, 1960. Marie Kuldhar (53).
16. Genus **Dentalina** d'Orbigny
- (22) *Dentalina* sp.—Marh (24).
17. Genus **Lagena** Walker & Jacob
- (23) *Lagena* sp.a.—Marh (24).
- (24) *Lagena* sp.b.—Marh (24).
- (25) *Lagena* sp.—Nagurda (1); Rohli and Utarlai (42).
18. Genus **Lenticulina** Lamarck
- (26) *Lenticulina dilectaformis* Subbotina & Srivastava, 1960.—Kuldhar (54).
- (27) *Lenticulina munsteri* (Roemer).—Kuldhar (53).

19. Genus **Pseudoglandulina** Cushman(28) *Pseudoglandulina* sp.—Marh (24).20. Genus **Vaginulinopsis** Silvestri(29) *Vaginulinopsis cryptospira* (Paalzow).—Jaisalmer (53).(30) *Vaginulinopsis* cf. *eritheles* Loeblich & Tappan, 1950.—Jaisalmer (53).

Family NONIONIDA E

21. Genus **Nonion** Montfort(31) *Nonion scapha* var. *indica* Jacob & Sastri, 1950.—Marh (24).22. Genus **Nonionella** Cushman(32) ? *Nonionella* sp.—Marh (24).

Family NUMMULITIDAE

23. Genus **Assilina** d'Orbigny(33) *Assilina daviesi* de Cizancourt, 1938.—Kolayat (45); Bandah (27).(34) *Assilina granulosa* (d'Archiac, 1847).—Khewansar (50); Jaisalmer (5, 34); Kolayat (45); Kuiala (35); Palana (34, 51, 58).(35) *Assilina leymerie* d'Archiac & Haime, 1853.—Khewansar (50); Kolayat (45); Marh (24); Palana (51).(36) *Assilina* cf. *spinosa* Davies, 1937.—Khewansar (50).(37) *Assilina spinosa* Davies, 1937.—Kuiala (35); Bandah (27).(38) *Assilina subumbilicata* de Cizancourt, 1938.—Khewansar (50); Kolayat (55).(39) *Assilina umbilicata* (Rutten, 1915).—Kolayat (45).(40) *Assilina* sp.—Khewansar (50).24. Genus **Eoassilina** Singh(41) *Eoassilina elliptica* Singh, 1957.—Palana (51).25. Genus **Heterostegina** d'Orbigny(42) *Heterostegina* sp.—Kolayat (44, 48).26. Genus **Nummulites** Lamarck(43) *Nummulites asymmetrica* Singh, 1957.—Kolayat (51).(44) *Nummulites atacicus* Leymerie, 1846.—Bandah (27, 35); Jaisalmer (5); Khewansar (50); Marh (24, 45); Palana (34, 58).

- (45) *Nummulites beaumonti* d'Archiac & Haime, 1853.—Kuchri (3).
 (46) *Nummulites irregularis* Deshayes, 1838.—Kuiala (35).
 (47) *Nummulites leymeriei* d'Archiac Haime, 1853.—Kuchri (3).
 (48) *Numulites maculatus* Nuttal, 1926.—Kolayat (45, 49, 51).
 (49) *Nummulites* cf. *maculatus* Nuttal, 1926.—Kolayat (44).
 (50) *Nummulites ramondi* DeFrance.—Kuchri (3).
 (51) *Nummulites spira* (de Roissy, 1853).—Kuchri (3).
 (52) *Nummulites stamineus* Nuttal, 1926.—Kolayat (44, 49, 51).
 Bandah (27).
 (53) *Nummulites* sp.—Khwansar (50) ; Kishangarh and Boa (6) ;
 Kolayat (44) ; Marh (47) ; Bandah (27).

27. Genus **Operculina** d'Orbigny

- (54) *Operculina* sp.—Kolayat (45) ; Palana (51) ; Bandah (21)

28. Genus **Operculinoides** Hanzawa

- (55) *Operculinoides* sp.—Kuiala (35).

Family ORBITOIDIDAE

29. Genus **Eulinderina** Barker & Grimsdale

- (56) *Eulinderina* sp.—Marh (45).

Family ORBULUNIDAE

30. Genus **Globigerina** d'Orbigny

- (57) *Globigerina* cf. *pseudobulloides* Plumer, 1926.—Marh (24).
 (58) *Glogigerina triloculinoides* Plumer, 1926.—Marh (24).
 (59) *Globigerina* sp.—Marh (24) ; Nagurda (1).

Family POLYMORPHINIDAE

31. Genus **Guttulina** d'Orbigny

- (60) *Guttulina* sp.—Marh (24).

Family ANOMALINIDAE

32. Genus **Cibicides** Montfort

- (61) *Cibicides* cf. *beaumontiana* (d'Orbigny).—Marh (24).
 (62) *Cibicides praecursorius* (Schwager, 1838).—Marh (24).
 (63) *Cibicides praecursorius* var. *madhensis* Jacob & Sastri, 1950.
 Marh (24).
 (64) *Cibicides* sp.—Nagurda (1) ; Rohli (42, 43) ; Utarlai (42).

Family GLOBOROTALIIDAE

33. Genus **Cycloloculina** Heron-Allen & Earland

(65) *Cycloloculina* sp.—Marh (24).

34. Genus **Discorbis** Lamarck

(66) *Discorbis globularis* (d'Orbigny, 1826).—Marh (24).

(67) *Discorbis* sp.—Rohli (42, 43); Siasar (28); Utarlai (42).

35. Genus **Globorotalia** Cushman

(68) *Globorotalia* sp.—Rohli (42, 43); Utarlai (42).

36. Genus **Gyroidina** d'Orbigny

(69) *Gyroidina* sp.—Rohli (42, 43); Utarlai (42).

37. Genus **Linderina** Schlumberger

(70) *Linderina bikanerensis* Singh, 1953a.—Marh (47); Kolayat (49, 51); Bandah (35).

(71) *Linderina* aff. *brugesi* Schlumberger, 1893.—Kolayat.

(72) *Linderina kirtharensis* Singh, 1953a.—Bandah (35); Kolayat (51); Marh (47).

(73) *Linderina kolayatensis* Singh, 1953a.—Bandah (35); Kolayat (51); Marh (47).

(74) *Linderina rajasthanensis* Singh, 1953a.—Bandah (35); Kolayat (49, 51); Marh (47).

(75) *Linderina* sp.—Kolayat (44, 45).

38. Genus **Lockhartia** Davies

(76) *Lockhartia tipperi* (Davies).—Kolayat (45).

(77) *Lockhartia* sp.—Khewansar (50).

39. Genus **Planorbulina** d'Orbigny

(78) *Planorbulina* sp.—Kolayat (44).

40. Genus **Pulvinulina** Parker & Jones

(79) *Pulvinulina* sp.—Khari (28).

41. Genus **Pulvinulinella** Cushman

(80) *Pulvinulinella* sp.—Marh (24).

42. Genus **Rotalia** Lamarck

(81) *Rotalia crookshankiana* Jacob & Sastri, 1950.—Marh (24).

- (82) *Rotalia subgranulosa* Jacob & Sastri, 1950.—Marh (24).
 (83) *Rotalia* sp.—Khari (28); Nagurda (1); Rohli (42, 43);
 Utarlai (42).

Family PLANORBULINIDAE

43. Genus **Eoannularia** Cole & Bermudez

- (84) *Eoannularia* sp.—Kolayat (48).

Family SPIRILLINIDAE

44. Genus **Coscinoconus** Leupold

- (85) *Coscinoconus* cf. *elongatus* Leupold, 1935.—Jaisalmer (53).

45. Genus **Spirillina** Ehrenberg

- (86) *Spirillina tenuicostata* Subbotina, Datta & Srivastava,
 1960. Jaisalmer (53).

46. Genus **Trocholina** Paalzow

- (87) *Trocholina transversarii* Paalzow, 1932.—Jaisalmer (53).

Family SORITIDAE

47. Genus **Orbitolites** Lamarck

- (88) *Orbitolites complanatus* Lamarck, 1801.—Kuiala (35);
 Khewansar (50).

Family TINOPORIDAE

48. Genus **Calcarina** d'Orbigny

- (89) *Calcarina* sp.—Kolayat (48).

Family TROCHAMMINIDAE

49. Genus **Ammobaculites** Cushman

- (90) *Ammobaculites* sp.—Gunga (59); Kapurdi and Nagurda
 (1); Rohli (42, 43); Utarlai (42).

50. Genus **Haplophragmoides** Cushman

- (91) *Haplophragmoides* sp.—(=*Haplophragmies*).— Damodera
 (37); Rohli and Utarlai (42).

51. Genus **Trochammina** Parker & Jones

- (92) *Trochammina* sp.—Damodera (37); Nagurda (1).

Phylum PORIFERA

- (93) Unidentified sponge spicules.—Jaisalmer (53).

Phylum COELENTERATA
Class ANTHOZOA

- (94) Unidentified corals.—Kuldhar (29) ; Lodorwa (32).

Phylum BRYOZOA
Order CRYPTOSOMATA

Family FENESTELLIDAE

52. Genus **Polypora** McCoy

- (95)
- Polypora ampla*
- Lonsd.—Bap (41).

- (96) Unidentified Bryozoa.—Jaisalmer (53).

Phylum ANNELIDA
Class POLYCHAETA

Family NEREIDAE

53. Genus **Nereites** Linnaeus

- (97)
- Nereites*
- sp.—Jaisalmer (16).

Phylum ARTHROPODA
Class CRUSTACEA
Order OSTRACODA

Family BAIRDIIDAE

54. Genus **Bairdia** McCoy

- (98)
- Bairdia*
- sp.—Jamsar (25) ; Marh (24).

Family CYPRIDAE

55. Genus **Cypris** Muller

- (99)
- Cypris*
- sp.—Jamsar (25).

56. Genus **Potamocypris** Brady

- (100)
- Potamocypris*
- sp.—Jamsar (25).

Family CYTHERELLOIDAE

57. Genus **Cytherella** Jones

- (101)
- Cytherella obscura*
- Iubimova & Mohan, 1960.—Amar Sagar (29).

Family CYTHERIDAE

58. Genus **Bythocythere** Sars

- (102)
- Bythocythere*
- sp. juv.—Kuldhar (29).

59. Genus **Cythereis** Jones

- (103)
- Cythereis*
- sp.—Marh (24) ; Nagurda (1).

60. Genus **Cytheropteron** Sars

- (104)
- Cytheropteron*
- sp.—Marh (24).

61. Genus **Paijanborchella** Kingma

- (105)
- Paijanborchella*
- sp.—Kuiala formation (35).

62. Genus **Progonocythere** Sylvester—Bradley

- (106)
- Progonocythere grumosa*
- Lubimova & Mohan, 1960.—Kuldhar (29).

- (107)
- Progonocythere implicata*
- Lubimova & Mohan, 1960.—Kuldhar (29).

- (108)
- Progonocythere laeviscula*
- Lubimova & Mohan, 1960.—Kuldhar (29).

- (109)
- Progonocythere prolata*
- Lubimova & Mohan, 1960.—Kuldhar (29).

- (110)
- Progonocythere*
- aff.
- obscura*
- Lubimova & Mohan, 1960.—Kuldhar (29).

- (111)
- Progonocythere*
- sp.—juv.—Kuldhar (29).

- (112)
- Progonocythere*
- sp.—indet.—Kuldhar (29).

63. Genus **Xestolebris** Sars

- (113)
- Xestolebris*
- sp.—Kuiala formation (35).

- (114) Unidentified Ostracoda.—Jaisalmer (53) ; Damodera (37).

Order DECAPODA

Suborder *MACRURA*

Family PENAEIDAE

64. Genus **Penaeus** Fabricius

- (115)
- Penaeus barmerensis*
- Tiwari, 1963.—Kapurdi (56).

- (116)
- Penaeus glaessneri*
- Tiwari, 1963.—Kapurdi (56).

- (117)
- Penaeus kapurdi*
- Prasad, 1961.—Kapurdi (36).

- (118)
- Penaeus*
- sp.—Kapurdi (55).

65. Genus **Metapenaeus** Wood-Mason and Alcock(119) *Metapenaeus* sp.—Kapurdi (55).Suborder **ANOMURA**Family **GONEPLACIDAE**66. Genus **Goniocypoda** Woodward(120) *Goniocypoda rajasthanica* Glaessner & Rao, 1960.—Kapurdi (13, 55).

(121) Unidentified crabs (possibly of Potamonidae or Ocypodidae or Grapsidae).—Kapurdi (2, 26).

(122) Unidentified Caridean.—Kapurdi (13).

Phylum **ECHIWODERMATA**Class **ASTEROIDEA**

(123) Unidentified Asteroid.—Ramgarh (17).

Class **ECHINOIDEA**Order **CIDAROIDA**Family **CIDARIDAE**67. Genus **Cidaris** Leske(124) *Cidaris* sp.—Jaisalmer. (22).Family **HEMICIDARIDAE**68. Genus **Hemicidaris** Linnaeus(125) *Hemicidaris jaisalmerensis* Sahni & Bhatnagar, 1955.—Jaisalmer (39, 40).(126) *Hemicidaris* sp.—Jaisalmer (3).Order **CASSIDULOIDA**Family **CLYPBIDAE**69. Genus **Pygurus** Agassiz(127) *Pygurus* sp.—Jaisalmer (3).Family **HEMIASTERIDAE**70. Genus **Ditremaster** Munier-Chalmas(128) *Ditremaster* sp.—Marh (59).

71. Genus **Hemiaster** Desor

(129) *Hemiaster* sp.—N.W. of Boa (6).

Family BRISSIDAE

72. Genus **Macropneustes** Linnaeus

(130) *Macropneustes* sp.—Boa (6).

73. Genus **Metalia** Gray

(131) *Metalia sowerbyi* d'Archiac.—Marh (10, 34).

(132) Unidentified Echinoids.—Kapurdi (1, 11, 55).

(133) Unidentified spines.—Jaisalmer (53).

(134) Dwarf echinoids.—Khewansar (50).

Class CRINOIDEA

(135) Unidentified crinoid stems.—Bap (41).

Class HOLOTHUROIDEA

(136) Unidentified spines.—Jaisalmer (53).

Phylum MOLLUSCA

Class GASTROPODA

Family BELLEROPHONTIDAE

74. Genus **Bellerophon** Montfort

(137) *Bellerophon* sp.—Bap (41).

Family CERITHIIDAE

75. Genus **Potamides** Brongniart

(138) *Potamides* sp.—Jamsar (12).

Family CONIDE

76. Genus **Conus** L.

(139) *Conus* sp.—Boa (6).

Family CONULARIIDAE

77. Genus **Conularia** Sowerby

(140) *Conularia* cf. *laevigata* Waagen, 1891.—Bap (41).

Family LYMNAEIDAE

78. Genus **Planorbis** Guttard.

(141) *Planorbis* sp.—Dholpur (34)

Family MELANIIDAE

79. Genus **Melania** Lamarck

(142) *Melania tuberculata* var.—Dholpur (34).

Family NATICIDAE

80. Genus **Natica** Lamarck

(143) *Natica* sp.—Jaisalmer (3).

Family NERINAEIDAE

81. Genus **Nerinaea** DeFrance

(144) *Nerinaea* sp.—Jaisalmer (22).

Family NERINEIDAE

82. Genus **Nerinea** DeFrance

(145) *Nerinea* sp.—Jaisalmer (3)

Family STROMBIDAE

83. Genus **Rostellaria** Lamarck

(146) *Rostellaria* sp.—Boa (6).

84. Genus **Tibia** Roeding

(147) *Tibia* sp.—Kapurdi (1).

Family SUCCINEIDAE

84a. Genus **Succinea** Draparnaud

(147a) *Succinea* sp.—Dholpur (34).

Family VIVIPARIDAE

85. Genus **Vivipara** Lamarck

(148) *Vivipara bengalensis* Lamarck.—Siasar (25).

(149) *Vivipara* sp.—Dholpur (34.)

Family VOLUTIDAE

86. Genus *Voluta* Linnaeus

(150) *Voluta* sp.—Boa (6).

87. Genus *Volutilithes* Swains

(151) *Volutilithes* cf. *cithara* Lamarck.—Marh (59).

Family EUOMPHALIDAE

88. Genus *Straparollus* Montfort

(152) *Straparollus* sp.—Bhadaura (30).

Family BELLEROPHONTIDAE

89. Genus *Bucanopsis* Ulrich

(153) *Bucanopsis warthi* Waagen.—Bap (41)

90. Unplaced Genus *Cruziana* d'Orbigny

(154) *Cruziana furcifera* d'Orbigny, 1842.—Osia (33, 58).

(155) Unidentified Gastropoda.—Dangri (37) ; Jaisalmer (22) ; Kapurdi (1) ; Shawal (3).

Class LAMELLIBRANCHIA

Family ANOMIIDAE

91. Genus *Anomia* Linnaeus

(156) *Anomia* sp.—Jaisalmer (3).

Family ARCIDAE

92. Genus *Arca* Linnaeus

(157) *Arca* sp.—Boa (6) ; Kuchri (3) ; Rohli (42, 43) ; Utarlai (42).

93. Genus *Glycimeris* da Costa

(158) *Glycimeris* sp.—Marh (59).

Family AVICULIDAE

94. Genus *Pinna* Linnaeus

(159) *Pinna* sp.—Jaisalmer (3).

Family CARDITIDAE

95. Genus **Cardium** Linnaeus

(160) *Cardium* sp.—Barmer (28) ; Boa (6).

96. Genus **Discors** Deshayes

(161) *Discors* sp.—Rohli (1).

Family CARDITIDAE

97. Genus **Venericardia** Lamarck

(162) *Venericardia mutabilis* (d'Archiac & Haime).—Marh (59).

(163) *Venericardia* cf. *sindensis* (d'Archiac & Haime).—Marh (59).

(164) *Venericardia* cf. *subcomplanata* (d'Archiac & Haime).—Marh (59).

(165) *Venericardia* sp.—Nagurda (1).

(166) *Venericardia* cf. *semi-inflata* type.—Rohli (42, 43) ; Utarlai and Nagurda (42).

Family CHAMIDAE

98. Genus **Chama** Bruguiere

(167) *Chama* sp.—Boa (6).

Family CORBULIDAE

99. Genus **Palaeocorbula** Reed

(168) *Palaeocorbula* sp.—Bap (41).

100. Genus **Corbula** Bruguiere

(169) ? *Corbula* (*Bicorbula*) *subexarata* d'Archiac.—Marh (59).

(170) *Corbula lyrata* Sowerby.—Jaisalmer (3, 32, 33).

(171) *Corbula pectinata* Sowerby.—Jaisalmer (3, 32, 33).

(172) *Corbula* sp.—Barmer & Nagurda (1) ; Rohli (42, 43) ; Utarlai (42).

Family CYRENIDAE

101. Genus **Corbicula** Müllhf

(173) *Corbicula* aff. *occidens* Bens.—Dholpur (34).

Family LUCINIDAE

102. Genus **Lucina** Bruguiere

(174) *Lucina metableata* Cossm.—Nagurda (1).

(175) *Lucina* sp.—Rohli (42, 43) ; Utarlai (42).

Family MYTILIDAE

103. Genus **Modiola** Lamarck

(176) *Modiola* sp.—Jaisalmer (3).

Family NUCULANIDAE

104. Genus **Nuculana** Link

(177) *Nuculana* cf. *thompsoni* Reed, 1937.—Bap (41).

(178) *Nuculana prashadi* Tiwari, 1966.—Kapurdi (57).

(179) *Nuculana (Sacella)* sp.—Barmer (1).

(180) *Nuculana* sp.—Rohli (42, 43); Utarlai (42).

(181) ? *Nuculana* sp.—Marh (59).

Family NUCULIDAE

105. Genus **Nucula** Lamarck

(182) *Nucula cuneiformis* Sowerby.—Jaisalmer (32, 33).

Family OSTREIDAE

106. Genus **Liostrea** Douville

(183) *Liostrea (Catinula) alimena* (d'Orbigny, 1850).— 2 km. SW. of Kuldhar (22).

(185) *Liostrea (Catinula) sandalina* (Goldfuss, 1833).— 6 km. NW. of Jaisalmer (22).

107. Genus **Ostrea** Linnaeus

(186) *Ostrea* aff. *angulata* Sowerby.—Boa (6).

(187) *Ostrea multicostata* Deshayes.—Palana (58).

(188) *Ostrea (Liostrea)*, sp.—Marh (59).

(189) *Ostrea (Lopha) marshi* Sowerby.—1 km. SW. of Kuldhar (22).

(190) *Ostrea* sp.—NE. of Boa (6); Kuchri (3).

Family PECTINIDAE

108. Genus **Aviculopecten** M'coy

(191) *Aviculopecten* sp.—Bap (41).

109. Genus **Pecten** Müller

(192) *Pecten lens* Sowerby.—Jaisalmer (3, 32, 33).

(193) *Pecten (Camptonectes) indicus* Cox, 1952.—1 km. SW. of Kuldhar (22).

- (194) *Pecten (Camptonectes)* sp.—6 km. NW. of Jaisalmer (22).
 (195) *Pecten* sp.—Marh (59).

110. Genus **Spondylopecten** Roeder

- (196) *Spondylopecten* cf. *rogeri* Agarwal.—2 km. SW of Kuldhar (22).

Family **PHOLADOMYIDAE**

111. Genus **Homomya** Agassiz

- (197) *Homomya* (2 spp.).—Jaisalmer (3)

112. Genus **Mactromya** Agassiz

- (198) *Mactromya* sp.—Jaisalmer (3).

113. Genus **Pholadomya** Sowerby

- (199) *Pholadomya granosa* Sowerby.—Jaisalmer (3, 32, 33).
 (200) *Pholadomya* sp.—Jaisalmer (22).

Family **TRIGONIDAE**

114. Genus **Trigonia** Bruguiere, 1789

- (201) *Trigonia costata* Parkinson.—Jaisalmer (3, 32, 33).
 (202) *Trigonia* cf. *nitida* Kitchin, 1903.—Jaisalmer (22).

Family **UNIONIDAE**

115. Genus **Unio** Retzius

- (203) *Unio* aff. *corrugatus* Mull.—Dholpur (34).
 (204) *Unio* sp.—Barmer (28).

Family **VENERIDAE**

116. Genus **Clementia** Gray

- (205) *Clementia* aff. *papyracea* Gray.—Boa (6).

117. Genus **Dosinia** Scop.

- (206) *Dosinia* sp.—Boa (6).

118. Genus **Pitar** Romer

- (207) *Pitar* sp.—Nagurda (1).

119. Genus **Tapes** Megerle

- (208) *Tapes* sp.—Boa (6).

Family EDMONDIDAE

120. Genus **Astartila** Dana

(209) *Astartila* sp.—Bap (41).

Family PLEUROTOMARIIDAE

121. Genus **Peruvispira** Chronic

(210) *Peruvispira* cf. *umariensis* (Reed, 1928).—Bap (41).

Unplaced LAMELLIBRANCHIA

122. Genus **Astartella** Hall & Whitney

(211) *Astartella* sp.—Bap (41).

123. Genus **Nucleana**

(212) *Nucleana* sp.—Nagurda (1).

(213) Unidentified Lamellibranch shells.—Jaisalmer (22, 53) ;
1 km.SW of Kuldhar (22) ; Kuchri (3).

Class CEPHALOPODA¹

Family AMMONITIDAE

124. Genus **Ammonites** Bruguiere

Subgenus **Stephanoceras** Waagen

(214) *Ammonites* (*Stephanoceras*) *fissus* Sowerby.—Jaisalmer
(3, 32, 33, 52).

(215) *Ammonites opis* Sowerby.—Kuchri (3, 23).

(216) *Ammonites* sp.—Damodera (6) ; Loderwa (32).

Family BELEMNOPSIDAE (=Belemnitidae)

125. Genus **Belemnites** Breyn.

Subgenus **Belemnopsis** Bayle]

(217) *Belemnites* (*Belemnopsis*) cf. *orientalis* Waagen.—2 Km.
SW of Kuldhar (22).

(218) *Belemnites* (*Belemnopsis*) sp.—1.6 km. W of Bhadesar
(40) ; 1 km. and 2 km.SW of Kuldhar (22).

(219) *Belemnites* sp.—Lodorwa (32) ; Kuchri (23).

126. Genus **Hibolites** Mayer

(220) *Hibolites* sp.—2.5 km.SW of Bhadesar (22).

Family BERRAISSELLIDAE

127. Genus **Hoplitides** vonKoenen

(221) *Hoplitides laevisculus* Vonkoenen, 1902.—Abur (33, 52).

Family BONARELLIDAE

128. Genus **Sindeites** Spath

(222) *Sindeites sindensis* Spath.—Jaisalmer (32, 33, 52).

Family DESHAYESITIDAE

129. Genus **Deshayesites** Kazanskii

(223) *Deshayesites ? aburensis* Spath.—Abur (33, 52).

(224) *Deshayesites bodei* (v. Koenen.).—10 km. SW of Sann (37).

Family EUCYCLOCERATIDAE

130. Genus **Idiocycloceras** Spath

(225) *Idiocycloceras singulare* Spath.—Jaisalmer (32,33, 52).

Family MAYAITIDAE

131. Genus **Dhosaites** Spath

(226) *Dhosaites* aff. *otoitoides* Spath.—2 km. SW. of Kuldhar (22).

132. Genus **Epimayaites** Spath

(227) *Epimayaites* cf. *excentricus* Spath.—2 km. SW. of Kuldhar (22).

(228) *Epimayaites* sp.—2 km. SW of Kuldhar (22).

133. Genus **Mayaites** Spath

(229) ? *Mayaites* sp.—1 km. and 2 km. S. of Kuldhar (22).

Family OPPELIDAE

134. Genus **Campylites** Rollier

(230) ? *Compylites* sp.—Jaisalmer (33, 52).

Family PARACENOCERATIDAE

135. Genus **Paracenoceras** Spath

(231) *Paracenoceras (Nautilus) kumagunensis* Waagen.—Jaisalmer (3, 32, 33).

Family PERISPHINCTIDAE

136. Genus **Aulacosphinctes** Uhlig

(232) *Aulacosphinctes occultefurcatus* Waagen.—2.5 km. SW of Bhadesar (22).

(233) *Aulacosphinctes* sp.—2.5 km. SW. of Bhadesar (22).

137. Genus **Choffatia** Siemiradzki

(234) ? *Choffatia* sp.—2 Km. SW. of Kuldhar (22).

138. Genus **Grossouvria** Siemiradzki

(235) *Grossouvria steinmanni* (Parona and Bonarelli).—Jaisalmer (32, 33, 52).

139. Genus **Indosphinctes** Spath

(236) *Indosphinctes* sp.—1 km. SW. of Kuldhar (22).

140. Genus **Kinkeliniceras** Buckman

(237) *Kinkeliniceras* sp.—1 km. & 2 km. SW. of Kuldhar (22).

141. Genus **Obtusicostrites** Buckman

(238) *Obtusicostrites* cf. *nandi* Spath.—1 km. SW. of Kuldhar (22).

(239) *Obtusicostrites* sp.—Jaisalmer (32, 33, 52).

142. Genus **Pachysphinctes** Dietrich

(240) *Pachysphinctes* aff. *bathyplocus* Waagen.—3.5 km. NW. of Lodorwa (33, 52).

143. Genus **Perisphinctes** Waagen

(241) *Perisphinctes* sp.—2.5 km. SW. of Bhadesar (22) ; 1.6 km. W of Bhadesar (40) ; Damodera (6).

144. Genus **Properisphinctes** Waagen

(242) *Properisphinctes* aff. *bernesis* P de Loriol.—Jaisalmer (32, 33, 52).

145. Genus **Prososphinctes** Schindewolf

(243) *Prososphinctes* sp.—Jaisalmer (33, 52)

146. Genus **Torquatisphinctes** Spath

(244) *Torquatisphinctes* sp. ? of *jelskii* group.—Jaisalmer (33).

147. Genus **Virgatosphinctes** Uhlig

- (245) *Virgatosphinctes communis* Spath.—2.5km. SW of Bhadesar (22).
 (246) *Virgatosphinctes densiplicatus* Waagen.—2.5 km. SW of Bhadesar (22).
 (247) *Virgatosphinctes densiplicatus* var. *rotunda* Spath.—2.5 km. SW of Bhadesar (22).
 (248) *Virgatosphinctes* aff. *oppeli* Spath—Lodorwa (33, 52).
 (249) *Virgatosphinctes* sp.—2.5 km. SW of Bhadesar (22) ; 3.5 km. NW of Lodorwa (33, 52).

Family STEPHANOCERATIDAE

148. Genus **Hoplites** Neumayr

- (250) *Hoplites macconnelli* Whiteaves.—Abur (33, 52).

Family REINECKIDAE

149. Genus **Reineckia** Bayle

- (251) *Reineckia* cf. *reissi* Steinmann.—Jaisalmer (32, 33, 52).
 (252) *Reineckia* sp.—1 km. and 2 km. SW of Kuldhar (22).

150. Genus **Reineckeites** Buckmann

- (253) *Reineckeites* cf. *waageni* (Till).—1 Km. SW of Kuldhar (22).
 (254) Unidentified Cephalopoda.—1 Km. SW of Kuldhar (22) ; Badhaura (30) ; Bap (41).

Class SCAPHOPODA

Family DENTALIIDAE

151. Genus **Dentalium** Linnaeus

- (255) *Dentalium* sp.—Marh (59).

Phylum BRACHIOPODA
Class INARTICULATA
Order ATREMATA

Family LINGULIDAE

152. Genus **Lingula** Bruguiere

- (256) *Lingula* sp.—Bap (41).

Family PRODUCTIDAE

153. Genus **Linoproductus** Chao

- (257) *Linoproductus* sp.—Bap (41).

154. Genus **Productus** Sowerby(258) *Productus* sp.—Badhaura (30).

Class ARTICULATA
Order PALAEOTREMATA
Family RHYNCHONELLIDAE

155. Genus **Rhynchonella** Fischer

- (259) *Rhynchonella* (*Cryptorhynchia*) *pulcherrima* Kitchin.—
6 km. NW of Jaisalmer (22).
(260) *Rhynchonella* (*Cryptorhynchia*) *pulcherarima* var. *jhuraensis*
Agrawal.—6 km. NW of Jaisalmer (22).
(261) *Rhynchonella* (*Kutchyrhynchia*) *kutchensis* Kitchin.— 6
km. NW of Jaisalmer (22).
(262) *Rhynchonella* cf. *recticardinalis* Kitchin.—1 km. SW of
Kuldhar (22).
(263) *Rhynchonella* cf. *rugosa* Kitchin.—1 km. SW of Kuldhar
(22).
(264) *Rhynchonella* sp.—Jaisalmer (3) ; 2 km. SW of Kuldhar
(22).

Family SPIRIFERIDAE

156. Genus **Spirifer** Sowerby

- (265) *Spirifer* cf. *nagmargensis* Bion, 1928.—Bap (41).
(266) *Spirifer* cf. *narsarhensis* Reed.—Bap (41).
(267) *Spirifer* sp.—Badhaura (30).

Family SUESSIDAE

157. Genus **Spiriferina** d'Orbigny(268) *Spiriferina* sp.—Badhaura (30).

Family TEREBRATULIDAE

158. Genus **Jaisalmeria** Sahni & Bhatnagar

- (269) *Jaisalmeria depressa* Sahni & Bhatnagar, 1955.—Bhadesar (39, 40).
(270) *Jaisalmeria inflata* (Kitchin).—Bhadesar (39, 40).
(271) *Jaisalmeria kitchini* (Stefanini).—Bhadesar (39, 40).
(272) *Jaisalmeria ovalis* Sahni & Bhatnagar, 1955.—Bhadesar (39, 40).
(273) *Jaisalmeria ovalis* var. *cuneata* Sahni & Bhatnagar, 1955.—Bhadesar (39, 40).
(274) *Jaisalmeria taylori* Sahni & Bhatnagar, 1955.—Bhadesar (39, 40).

159. Genus **Kutchithyris** Buckmann

- (275) *Kutchithyris jaisalmerensis* Sahni & Bhatnagar, 1955.—
Bhadesar (39, 40).
(276) *Kutchithyris jaisalmerensis* var. *ganesha* Sahni & Bhatnagar.—
1955 Bhadesar (39, 40).

160. Genus **Terebratula** Bruguiere

- (277) *Terebratula biplicata* Sowerby.—Jaisalmer (3, 32, 33).
(278) *Terebratula dhosaensis* Kitchin.—1 km. SW of Kuldhar
(22).
(279) *Terebratula intermedia* Sowerby.—Jaisalmer (3, 32, 33).
(280) *Terebratula jooraensis* Kitchin.—6 km. NW of Jaisalmer
(22); 1 km. and 2 km. SW of Kuldhar (22).
(281) *Terebratula* cf. *pyroidea* Kitchin.—6 km. NW of Jaisalmer
(22).

161. Genus **Waldheimia** King
Subgenus **Zeilleria** Bayle

- (282) *Waldheimia* (? *Zeilleria*) sp.—2.5 km. SW of Bhadesar
(22).

Family STROPHOMENIDAE

162. Genus **Derbyia** Waagan

- (283) *Derbyia* sp.—Bhadhaura (30); Bap (41).

163. Genus **Streptorhynchus** King

- (284) *Streptorhynchus* sp.—Bap (41).

Family TEREBRATULIDAE

164. Genus **Dielasma** King

- (285) *Dielasma* cf. *dadanense* Heed.—Bap (41).
(286) Unidentified Brachiopoda.—Kotah (11).

Phylum CHORDATA

Class PISCES

Order EUSELACHII

Family CARCHARIIDAE
(= ODONTASPIDAE)165. Genus **Odontaspis** Agassiz

- (287) *Odontaspis macrata striata* (Winkler).—Gunga (60).

Order ISOSPONDYLI

Family CLUPEIDAE

- (288) Clupeoid Fish.—Kapurdi (2, 13).
 (289) Unidentified fish.—Kapurdi (26).
 (290) Unidentified fish vertebra.—Gunga (60).

Unplaced fossil
 166. Genus **Lingular**

- (291) *Lingular* sp.—Badhaura (30).

IV.—FAUNA FROM DIFFERENT GEOLOGICAL PERIODS

Ghosh (1952) has mentioned the occurrence from Kotah, of certain doubtful forms which may be treated either as primitive brachiopods or the algae. Nature of these specimens has been discussed by many authors and summarized by Misra (1957) who on the basis of his observations of this material treats them as of inorganic origin. In view of the findings of Misra (1957) the existence of animal life in Lower Vindhians becomes doubtful. The Upper Vindhians are so far known to be devoid of animal life. A definite proof of the existence of life in Rajasthan has been given by Shah (1963) since Permian time from Bap. A list of Permian fauna is given in section I of appendix I. Section II of the same appendix deals with the list of fauna from Bhadaura assigned to Permo-Carboniferous by Misra *et al.* (1961), who treat Bap Boulders and yellow 'bouldery' sand stones of Badhaura Formation as contemporaneous.

During Mesozoic maximum fauna is known from Jurassics of Jaisalmer area. A list of Jurassic fauna is given in appendix II. The Cretaceous are exposed near Abur and a few cephalopods are known from that locality.

The tertiaries are represented in Rajasthan by Eocene deposits in Barmer, Jaisalmer and Bikaner. These deposits have yielded a good number of Foraminifera in addition to Ostracoda, Decapod Crustacea, Echinoderms, molluscs and a few fish remains. A list of Eocene fauna is given in Appendix III.

The fauna from Recent deposits including the alluvium etc. have been, due to small number of fossils known from them, given in appendix IV.

V.—SUMMARY

Geology of fossil bearing formations in Rajasthan is briefly given. A list and map of fossiliferous localities in the State is given. 291 species, belonging to 166 genera of different groups of animals are listed systematically. Animal fossils known from different geological periods are listed separately. An index of fossils known from Rajasthan (India) is provided.

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VII.—APPENDICES

APPENDIX I

(1) List of Permian Fauna from Rajasthan

BRYOZOA : *Polypora ampla*.

CRINOIDEA : Unidentified crinoid stem.

GASTROPODA : *Bellerophon* sp., *Bucanopsis warthi*, *Conularia* cf. *laevigata*.LAMELLIBRANCHIA : *Astartella* sp., *Astartila* sp., *Aviculopecten* sp., *Nuculana* cf. *thompsoni*, *Palaeocorbula* sp.

CEPHALOPODA : Unidentified cephalopoda.

BRACHIOPODA : *Derbyia* sp., *Dielasma* cf. *dadanense*, *Lingula* sp., *Linoproductus* sp., *Spirifer* cf. *nagmargensis*, *Spirifer* cf. *narsarhensis*, *Streptorhynchus* sp.

(2) List of Permo-Carboniferous Fauna from Rajasthan

GASTROPODA : *Straparollus* sp.BRACHIOPODA : *Derbyia* sp., *Productus* sp., *Spirifer* sp., *Spiriferina* sp.UNPLACED FORMS : *Lingular* sp.

CEPHALOPODA : Unidentified forms.

APPENDIX II

List of Jurassic Fauna from Rajasthan

FORAMINIFERA : *Astacolus aphrastus* var. *minuta* ; *Astacolus centrogyrata* var. *definita*, *Citharina submulticostata*, *Citharinella foliaformis*, *Coscinoconus* cf. *elongatus*, *Haplophragmoides* sp., *Lenticulina dilectaformis*, *L. munsteri*, *Nummulites beaumonti*, *N. leymeriei*, *N. ramondi*, *N. spira*, *Spirillina tenuicostata*, *Trochammina* sp., *Trocholina transversarii*, *Vaginulinopsis cryptospira*, *V* cf. *eritheles*.

PORIFERA : Unidentified sponge spicules.

COELENTERATA : Unidentified corals.

BRYOZOA : Unidentified Bryozoa.

ANNELIDA, (Polychaeta) : *Nereites* sp.OSTRACODA : *Bythocythere* sp. juv., *Cytherella obscura*, *Progonocythere grumosa*, *P. implicata*, *P. laevisculus*, *P. prolata*, *P. aff. obscura*, *Progonocythere* sp. juv., *Progonocythere* sp. indet.ECHINOIDA : *Cidaris* sp., *Hemicidaris jaisalmerensis*, *Hemicidaris* sp., *Pygurus* sp., unidentified spines.

HOLOTHUROIDEA : Unidentified spines.

GASTROPODA : *Natica* sp., *Nerinaea* sp., *Nerinea* sp., and other unidentified gastropoda.LAMELLIBRANCHIA : *Anomia* sp., *Arca* sp., *Corbula lyrata*, *C. pectinata*, *Homomya* sp., *Liostrea* (*Catinula*) *alimena*, *L. (C.) sandalina*, *Mactromya* sp., *Modiola* sp., *Nucula cuneiformis*, *Ostrea* (*Lopha*) *marshi*, *Ostrea* sp., *Pectan lens*, *P. (Camptonectes) indicus*, *P. (Camptenectis)* sp., *Pholadomya granosa*, *Pho-*

ladomya sp., *Pinna* sp., *Spondylopecten* cf. *rogeri*, *Trigonia costata*, *T* cf. *nitida*, and other unidentified forms.

CEPHALOPODA : *Ammonites* (*Stephanoceras*) *fissus*, *A. opis*, *Ammonites* sp., *Aulacosphinctes occultefurcatus*, *Aulacosphinctes* sp., *Belemnites* (*Belemnopsis*) *orientalis*, *B.* (*Belemnopsis*) sp., *Belemnites* sp., ? *Campylites* sp., ? *Choffatia* sp., *Dhosaites* aff. *otoitoides*, *Epimayaites* cf. *excentricus*, *Epimayaites* sp., *Grossouvria steinmanni*, *Hibolites* sp., *Idiocycloceras singulare*, *Indosphinctes* sp., *Kinkeliniceras* sp., ? *Mayaites* sp., *Obtusicosites* cf. *nandi*, *Obtusicosites* sp., *Paracnoceras* (*Nautilus*) *kumagunensis*, *Pachysphinctes* aff. *bathyplocus*, *Perisphinctes* sp., *Properisphinctes* aff. *bernensis*, *Prososphinctes* sp., *Reineckia* cf. *reissi*, *Reineckia* sp., *Reineckites* cf. *waageni*, *Sindeites sindensis*, *Torquatisphinctes* sp., cf. *jelskii* group, *Virgatosphinctes communis*, *V. densiplicatus*, *V. densiplicatus* var. *rotunda*, *V.* aff. *oppeli*, *Virgatosphinctes* sp. and other unidentified cephalopod.

BRACHIOPODA : *Jaisalmeria depressa*, *J. inflata*, *J. kitchini*, *J. ovalis*, var. *cuneata*, *J. taylori*, *Kutchithyris jaisalmerensis*, *K. jaisalmerensis* var. *ganesha*, *Rhynchonella* (*Cryptorhynchia*) *pulcherrima*, *R.* (*C.*) *pulcherrima* var. *jhuraensis*, *R.* (*Kutchyrhynchia*) *Kutchensis*, *R.* of. *recticardinalis*, *R.* cf. *rugosa*, *Rhynchonella* sp., *Terrbratula biplicata*, *T* cf. *dhosaisensis*, *T* *intermedia*, *T* *Jooraisensis*, *T* cf. *phroidea*, *Waldheimia* (? *Zeilleria*) sp.

APPENDIX III

List of Eocene Fauna from Rajasthan

FORAMINIFERA : *Alveolina elliptica* var. *flosculina*, *A. oblonga*, *Alveolina* (*Flosculina*) sp., *Ammobaculites* sp., *Assilina daviesi*, *A. granulosa*, *A. leymeriei*, *A.* cf. *spinosa*, *A. subumblicata*, *A. umblicata*, *Assilina* sp., *Asterigerina indica*, *Bathysiphon* sp., *Bolivina* sp., *Bulimina* sp., *Calcarina* sp., *Cibicides* aff. *beaumontiana*, *C. praecursorius*, *C. p.* var. *madhensis*, *Cibicides* sp., *Cyclolocolina* sp., *Dentalina* sp., *Dictyoconoides cooki*, *Dictyoconoides*, sp., *Discocyclina* sp. (*sellate forms*), *D. dispansa*, *D. sowerbyi*, *D.* (*Discocyclina*) sp., *D.* (*Actinocyclina*) sp., *D.* (*Proporocyclina*) sp., *Discorbis globularis*, *Discorbis* sp., *Eoannularia* sp., *Eoassilina elliptica*, *Eoconuloides* sp., *Eulinderina* sp., *Globigerina triloculinoides*, *G.* cf. *pseudobulloidis*, *Globigerina* sp., *Globorotalia* sp., *Guttulina* sp., *Gypsina* sp., *Gyrodina* sp., *Heterostegina* sp., *Lagena* sp., *a*, *Lagena* sp. *b*, *Lagena* sp., *Linderina bikanerensis*, *L.* off. *brugesi*, *L. kirtharensis*, *L. kolayatensis*, *L. rajasthanensis*, *Linderina* sp., *Lockhartia tipperi*, *Lockhartia* sp., *Nonion scapha* var. *indica*, *Nonionella* sp., *Nummulites asymmetrica*, *N. atacicus*, *N. irregularis*, *N. maculatus*, *N.* cf. *maculatus*, *N. stamineus*, *Nummulites* sp., *Operculina* sp., *Operculinoides* sp., *Orbitolites complanatus*, *Planorbulina* sp., *Pseudoglandulina* sp., *Pseudophragmina* (*Proporocyclina*) sp., *Pulvinulinella* sp., *Quenquelocolina* sp.,

- Rotalia crookshankiana*, *R. subgranulosa*, *Rotalia* sp., *Trochammina* sp., *Turrilina* sp., *Virgulina* sp.
- OSTRACODA : *Bairdia* sp., *Cypris* sp., *Cythereis* sp., *Cytheropteron* sp., *Paijanborchella* sp., *Potamocypris* sp., *Xestolebris* sp., Unidentified ostracoda.
- CRUSTACEA (Decapoda) : *Penaeus barmerensis*, *P. glaessneri*, *P. kapurdi*, *Penaeus* sp., *Metapenaeus* sp., *Goniocypoda rajasthanica*, unidentified crabs, unidentified Caridan.
- ASTEROIDEA : Unidentified asteroid.
- ECHINOIDEA : *Ditremaster* sp., *Macropneustes* sp., *Metalia sowerbyi*, dwarf echinoids and other unidentified echinoids.
- GASTROPODA : *Conus* sp., *Potamides* sp., *Rostellaria* sp., *Tibia* sp., *Voluta* sp., *Volutilithes* cf. *cithara*, and other unidentified gastropoda.
- LAMELLIBRANCHIA : *Arca* sp., *Cardium* sp., *Chama* sp., *Clementia* aff. *papyracea*, *Corbula* (*Bicorbula*) *subexarata*, *Corbula* sp., *Discors* sp., *Dosinia* sp., *Glycimeris* sp., *Lucina metableata*, *Lucina* sp., *Nucleana* sp., *Nuculana* (*Sacella*) sp., *Nuculana* sp., *Ostrea angulata*, *O. multicostata*, *O. (Liostrea)* sp., *Pecten* sp., *Pitar* sp., *Tapes* sp., *Unio* sp., *Venericardia mutabilis*, *V. cf. sindensis*, *V. cf. subcomplanata*, *Venericardia* sp., *Venericardia* of sem-inflata type.
- SCAPHOPODA : *Dentalium* sp.
- PISCES : *Odontaspis macrata striata*, clupeid fish, and unidentified fish vertebra.

APPENDIX IV

List of Sub-Recent or Recent and Gangetic Alluvial Fauna from Rajasthan

- FORAMINIFERA : *Discorbis globularis*, *Discorbis* sp., *Pulvinulina* sp., *Rotalia* sp.,
- GASTROPODA : *Melania tuberculata* var., *Planorbis* sp., *Vivipara bengalensis*, *Vivipara* sp., *Succinea* sp.
- LAMELLIBRANCHIA : *Corbicula* aff. *occidens*, *Unio* cf. *corrugatus*.

List of Abbreviations used

A., Asteroidea ; Br. Brachiopoda ; Bz., Bryozoa ; Cp., Cephalopoda ; Cl., Coelenterata ; Cr. Crinoidea ; Cd., Crustacea (Decapoda) ; E., Echinoidea ; Fm., Foraminifera ; G., Gastropoda ; H. Holothuroidea ; Lm., Lamellibranchia ; O., Ostracoda ; Pc., Pisces ; Pf., Proifera ; Pl., Polychaeta ; Sp., Scaphopoda.

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TABLE II—Showing the fossiliferous sites in Rajasthan

Locality	District	Longitude & Latitude.	Age of the formation (given by the author in parentheses)
1. Abur	Jaisalmer	70°37' : 27°11'	Cretaceous, Lower Aptian (Pascoe, 1959).
2. Amar Sagar	Jaisalmer	70°55' : 26°49'	Jurassic : Jaisalmer formation.
3. Badhaura (Bhadaura)	Jodhpur	71°17' : 27°18'	Palaeozoic : Badhaura formation (Permocarboniferous) (Misra et al, 1961).
4. Bandah	Jaisalmer	70°17' : 27°12'	Upper Eocene : Bandah formation of Kirthaeage (Poddar, 1963).
5. Bap	Jodhpur	72°21' : 27°22'	Palaeozoic : Permian : Bap Boulder beds (Shah, 1963).
6. Barmer	Barmer	71°24' : 25°45'	Lower Tertiary (LaTouche, 1902).
7. Bhadesar, (Badhesar or Bedesir)	Jaisalmer	70°45' : 27°05'	Jurassic : Bhadesar formation (Hoffman, 1963).
8. Boa	Jaisalmer	70°52' : 27°17'	Lower Tertiary (Chatterji, P. C.)
9. Damodera	Jaisalmer	70°43' : 26°53'	Jurassic : Upper Baisakhi (Richter--Bernburg & Schott, 1963). Possibly Jurassic-Possible, Lathiformation
10. Dangri	Jaisalmer	71°20' : 26°30'	(Richter-Bernburg & Schott, 1963).
11. Dholpur	Dholpur	77°50' : 26°40'	Gangetic Alluvium (Pascoe, 1963).
12. Gunga	Jodhpur	71°10' : 26°10'	Lower Eocene (Ghosh, 1952).
13. Jaisalmer (Town)	Jaisalmer	70°55' : 26°55'	Jurassic : Jaisalmer formation (Hoffman, 1963).
14. Jamsar	Bikaner	73°20' : 28°15'	Late Tertiary or later (Recent) (Jacob, Sastry & Sastri, 1952).
15. Kapurdi	Barmer	71°20' : 25°50'	Upper Paleocene or Lower Eocene (Glaessner & Rao, 1960) Laki series (Barooah, 1950).
16. Khari	Bikaner	73°35' : 28°20'	Recent (La Touche, 1902).

TABLE II—(Contd.)

17.	Khewansar ¹	Jaisalmer	70°54' : 27°15'	Eocene : Lakistage (Singh, 1955).
18.	Kishangarh	Jaisalmer	70°33' : 27°53'	Eocene (Chatterji, P. C.)
19.	Kolayat	Bikaner	72°55' : 27°50'	Middle Eocene : Middle Kirthar (Singh, 1957).
20.	Kotah	Kotah	75°50' : 25°10'	Palaeozoic Lower Vindhyan (Ghosh, 1952, Pg. 105).
21.	Kuchri	Jaisalmer	70°33' : 27°05'	Jurassic (Blanford, 1877).
22.	Kuldhar	Jaisalmer	70°45' : 26°50'	Jurassic : Jaisalmer formation (Subbotina, Datta & Srivastava, 1960).
23.	Khuijala (Kuiala)	Jaisalmer	70°26' : 27°08'	Eocene : Khuijala formation of Lakiseries (Poddar, 1963).
24.	Lodorwa	Jaisalmer	70°48' : 26°59'	Jurassic : Baisakhi (Subbotina, Datta & Srivastava, 1960).
25.	Marh	Bikaner	72°56' : 27°51'	Eocene : Laki formation (Jacob and Sastri, 1950).
26.	Nagurda	Barmer	71°24' : 26°09'	Eocene : Laki series (Barooah, 1946).
27.	Osia	Jodhpur	71°20' : 26°05'	Trans Arawalli (Pascoe, 1959).
28.	Palana	Bikaner	73°15' : 26°50'	Lower Eocene : Laki formation (Vredenberg, 1907).
29.	Ramgarh	Jaisalmer	70°30' : 27°20'	Eocene (Blanford, 1877).
30.	Rohli	Barmer	71°20' : 25°55'	Eocene : Upper Paleocene to Lower Eocene (Siddique & Iqbaludin, 1963).
31.	Sann ²	Jaisalmer	70°30' : 26°37'	Cretaceous : Abur stage (Richter-Bernburg & Schott, 1963).
32.	Shawal	Jaisalmer	71°14' : 26°59'	Jurassic Laki formation (Blanford, 1877).
33.	Siasar	Bikaner	72°34' : 28°35'	Sub Recent (Jacob, Sastry & Sastri, 1952).
34.	Utarlai	Barmer	71°25' : 25°45'	Upper Paleocene or Lower Eocene (Siddiqui & Bahl, 1965).

1, 2. These places could not be found on topo-sheets. Co-ordinates are given for Khewalsir or Khinsar, and Sam respectively.