



Permian Brachiopods
of West Texas, III

(PART 2 – PLATES)

G. ARTHUR COOPER
and
RICHARD E. GRANT

SERIAL PUBLICATIONS OF THE SMITHSONIAN INSTITUTION

The emphasis upon publications as a means of diffusing knowledge was expressed by the first Secretary of the Smithsonian Institution. In his formal plan for the Institution, Joseph Henry articulated a program that included the following statement: "It is proposed to publish a series of reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge." This keynote of basic research has been adhered to over the years in the issuance of thousands of titles in serial publications under the Smithsonian imprint, commencing with *Smithsonian Contributions to Knowledge* in 1848 and continuing with the following active series:

Smithsonian Annals of Flight
Smithsonian Contributions to Anthropology
Smithsonian Contributions to Astrophysics
Smithsonian Contributions to Botany
Smithsonian Contributions to the Earth Sciences
Smithsonian Contributions to Paleobiology
Smithsonian Contributions to Zoology
Smithsonian Studies in History and Technology

In these series, the Institution publishes original articles and monographs dealing with the research and collections of its several museums and offices and of professional colleagues at other institutions of learning. These papers report newly acquired facts, synoptic interpretations of data, or original theory in specialized fields. These publications are distributed by mailing lists to libraries, laboratories, and other interested institutions and specialists throughout the world. Individual copies may be obtained from the Smithsonian Institution Press as long as stocks are available.

S. DILLON RIPLEY
Secretary
Smithsonian Institution

Permian Brachiopods
of West Texas, III

(PART 2 – PLATES)

G. Arthur Cooper
and *Richard E. Grant*

ISSUED
DEC 29 1975



SMITHSONIAN INSTITUTION PRESS

City of Washington

1975

Contents

PLATES

	<i>Page</i>
192. <i>Heteralosia</i> , <i>Ctenalosia</i> , and <i>Liosotella</i>	1300
193. <i>Heteralosia</i>	1302
194. <i>Spuriosa</i> and <i>Heteralosia</i>	1304
195. <i>Heteralosia</i>	1306
196. <i>Heteralosia</i>	1308
197. <i>Ctenalosia</i>	1310
198. <i>Ctenalosia</i>	1312
199. <i>Acritosia</i>	1314
200. <i>Acritosia</i> and <i>Richthofenia</i>	1316
201. <i>Acritosia</i>	1318
202. <i>Acritosia</i>	1320
203. <i>Acritosia</i> and <i>Teguliferina</i>	1322
204. <i>Teguliferina</i>	1324
205. <i>Teguliferina</i>	1326
206. <i>Teguliferina</i>	1328
207. <i>Teguliferina</i>	1330
208. <i>Paucispinifera</i> , <i>Liosotella</i> , <i>Cooperina</i> , <i>Glyptosteges</i> , and <i>Horridonia</i>	1332
209. <i>Cooperina</i>	1334
210. <i>Cooperina</i>	1336
211. <i>Atelestegastus</i>	1338
212. <i>Chonosteges</i> and <i>Cooperina</i>	1340
213. <i>Limbella</i>	1342
214. <i>Limbella</i>	1344
215. <i>Limbella</i>	1346
216. <i>Limbella</i>	1348
217. <i>Paucispinifera</i> , <i>Cyclacantharia</i> , <i>Limbella</i> , and <i>Rhamnaria</i>	1350
218. <i>Edriosteges</i>	1352
219. <i>Edriosteges</i>	1354
220. <i>Edriosteges</i>	1356
221. <i>Edriosteges</i>	1358
222. <i>Edriosteges</i>	1360
223. <i>Edriosteges</i> and <i>Echinosteges</i>	1362
224. <i>Echinosteges</i>	1364
225. <i>Echinosteges</i>	1366
226. <i>Echinosteges</i>	1368
227. <i>Echinosteges</i>	1370
228. <i>Echinosteges</i>	1372
229. <i>Echinosteges</i>	1374
230. <i>Echinosteges</i>	1376
231. <i>Agelesia</i> , <i>Spyridiophora</i> , and <i>Cactosteges</i>	1378
232. <i>Xenosteges</i>	1380
233. <i>Hystriculina</i> and <i>Xenosteges</i>	1382
234. <i>Xenosteges</i>	1384
235. <i>Xenosteges</i>	1386
236. <i>Xenosteges</i>	1388
237. <i>Scapharina</i> and <i>Kutorginella</i>	1390
238. <i>Scapharina</i>	1392
239. <i>Scapharina</i>	1394

	<i>Page</i>
240. <i>Chonosteges</i>	1396
241. <i>Chonosteges</i>	1398
242. <i>Chonosteges</i>	1400
243. <i>Chonosteges</i>	1402
244. <i>Chonosteges</i> , <i>Yakovlevia</i> , <i>Echinosteges</i> , <i>Paucispinifera</i> , <i>Oncosarina</i> , and <i>Xenosteges</i> ..	1404
245. <i>Chonosteges</i>	1406
246. <i>Institella</i> and <i>Peniculauris</i>	1408
247. <i>Institella</i>	1410
248. <i>Institella</i>	1412
249. <i>Glyptosteges</i>	1414
250. <i>Glyptosteges</i>	1416
251. <i>Spyridiophora</i>	1418
252. <i>Spyridiophora</i>	1420
253. <i>Spyridiophora</i> and <i>Glyptosteges</i>	1422
254. <i>Craspedona</i>	1424
255. <i>Agelesia</i>	1426
256. <i>Ametoria</i> and <i>Ramavectus</i>	1428
257. <i>Limbella</i> and <i>Ramavectus</i>	1430
258. <i>Rhamnaria</i> , <i>Ramavectus</i> , and <i>Echinosteges</i>	1432
259. <i>Rhamnaria</i>	1434
260. <i>Rhamnaria</i>	1436
261. <i>Rhamnaria</i>	1438
262. <i>Rhamnaria</i>	1440
263. <i>Rhamnaria</i>	1442
264. <i>Rhamnaria</i>	1444
265. <i>Rhamnaria</i>	1446
266. <i>Rhamnaria</i>	1448
267. <i>Echinosteges</i> and <i>Rhamnaria</i>	1450
268. <i>Tschernyschewia</i>	1452
269. <i>Tschernyschewia</i> and <i>Strophalosia</i>	1454
270. <i>Scacchinella</i>	1456
271. <i>Scacchinella</i>	1458
272. <i>Scacchinella</i>	1460
273. <i>Scacchinella</i>	1462
274. <i>Scacchinella</i>	1464
275. <i>Scacchinella</i>	1466
276. <i>Scacchinella</i>	1468
277. <i>Scacchinella</i>	1470
278. <i>Scacchinella</i>	1472
279. <i>Scacchinella</i>	1474
280. <i>Scacchinella</i>	1476
281. <i>Scacchinella</i>	1478
282. <i>Scacchinella</i>	1480
283. <i>Scacchinella</i>	1482
284. <i>Dyoros</i> (<i>Dyoros</i>), <i>Scacchinella</i> , <i>Sestropoma</i> , and <i>Acritosia</i> ..	1484
285. <i>Hercosia</i>	1486
286. <i>Hercosia</i>	1488
287. <i>Hercosia</i>	1490
288. <i>Hercosia</i>	1492
289. <i>Hercosestria</i> and <i>Hercosia</i>	1494
290. <i>Hercosia</i> and <i>Hercosestria</i>	1496
291. <i>Hercosestria</i>	1498
292. <i>Hercosestria</i>	1500
293. <i>Hercosestria</i>	1502
294. <i>Acritosia</i> and <i>Cyclacantharia</i>	1504
295. <i>Cyclacantharia</i>	1506
296. <i>Cyclacantharia</i>	1508
297. <i>Cyclacantharia</i>	1510

	<i>Page</i>
298. <i>Cyclacantharia</i>	1512
299. <i>Cyclacantharia</i>	1514
300. <i>Cyclacantharia</i>	1516
301. <i>Hercosia</i> and <i>Cyclacantharia</i>	1518
302. <i>Cyclacantharia</i>	1520
303. <i>Taphroestria</i>	1522
304. <i>Taphroestria</i>	1524
305. <i>Taphroestria</i> and <i>Collumatus</i>	1526
306. <i>Collumatus</i> and <i>Sestropoma</i>	1528
307. <i>Sestropoma</i>	1530
308. <i>Acritosia</i> , <i>Cyclacantharia</i> , and <i>Sestropoma</i>	1532
309. <i>Acritosia</i> , <i>Hercosia</i> , <i>Teguliferina</i> , <i>Collumatus</i> and <i>Cyclacantharia</i>	1534
310. <i>Fimbrinia</i> , <i>Simplicarina</i> , <i>Oncosarina</i> , and <i>Costispinifera</i>	1536
311. <i>Fimbrinia</i> and <i>Rhytisia</i>	1538
312. <i>Kozlowskia</i> , <i>Costispinifera</i> , and <i>Simplicarina</i>	1540
313. <i>Kozlowskia</i>	1542
314. <i>Kozlowskia</i>	1544
315. <i>Hystriculina</i>	1546
316. <i>Bothrionia</i> and <i>Thamnosia</i>	1548
317. <i>Bothrionia</i>	1550
318. <i>Oncosarina</i> and <i>Bothrionia</i>	1552
319. <i>Costispinifera</i>	1554
320. <i>Costispinifera</i>	1556
321. <i>Costispinifera</i>	1558
322. <i>Elliottella</i>	1560
323. <i>Elliottella</i>	1562
324. <i>Oncosarina</i>	1564
325. <i>Hystriculina</i> and <i>Elliottella</i>	1566
326. <i>Echinauris</i>	1568
327. <i>Echinauris</i>	1570
328. <i>Echinauris</i>	1572
329. <i>Echinauris</i>	1574
330. <i>Echinauris</i>	1576
331. <i>Echinauris</i>	1578
332. <i>Echinauris</i>	1580
333. <i>Echinauris</i>	1582
334. <i>Echinauris</i>	1584
335. <i>Echinauris</i>	1586
336. <i>Echinauris</i>	1588
337. <i>Echinauris</i>	1590
338. <i>Echinauris</i>	1592
339. <i>Echinauris</i>	1594
340. <i>Echinauris</i>	1596
341. <i>Echinauris</i>	1598
342. <i>Kutorginella</i>	1600
343. <i>Kutorginella</i>	1602
344. <i>Kutorginella</i>	1604
345. <i>Thamnosia</i>	1606
346. <i>Thamnosia</i>	1608
347. <i>Thamnosia</i>	1610
348. <i>Thamnosia</i>	1612
349. <i>Thamnosia</i>	1614
350. <i>Kutorginella</i>	1616
351. <i>Thamnosia</i> and <i>Rhamnaria</i>	1618
352. <i>Bathymyonia</i> and <i>Waagenoconcha</i>	1620
353. <i>Hercosia</i> , <i>Juresania</i> , and <i>Bathymyonia</i>	1622
354. <i>Waagenoconcha</i>	1624
355. <i>Waagenoconcha</i>	1626

	<i>Page</i>
356. <i>Waagenoconcha</i>	1628
357. <i>Waagenoconcha</i>	1630
358. <i>Kochiproductus</i>	1632
359. <i>Kochiproductus</i>	1634
360. <i>Kochiproductus</i>	1636
361. <i>Kochiproductus</i>	1638
362. <i>Rhamnaria</i> and <i>Kochiproductus</i>	1640
363. <i>Dasysaria</i>	1642
364. <i>Dasysaria</i>	1644
365. <i>Dasysaria</i> and <i>Nudauris</i>	1646
366. <i>Xestosia</i> and <i>Nudauris</i>	1648
367. <i>Echinauris</i> , <i>Xestosia</i> , and <i>Nudauris</i>	1650
368. <i>Nudauris</i>	1652
369. <i>Nudauris</i>	1654
370. <i>Nudauris</i>	1656
371. <i>Nudauris</i> and <i>Xestosia</i>	1658
372. <i>Nudauris</i>	1660
373. <i>Rugatia</i>	1662
374. <i>Rugatia</i>	1664
375. <i>Rugatia</i>	1666
376. <i>Rugatia</i>	1668
377. <i>Rugatia</i>	1670
378. <i>Rugatia</i> and <i>Reticulatia</i>	1672
379. <i>Spinarella</i>	1674
380. <i>Spinarella</i>	1676
381. <i>Spinarella</i>	1678
382. <i>Xestosia</i>	1680
383. <i>Xestosia</i> and <i>Reticulatia</i>	1682
384. <i>Spinifrons</i>	1684
385. <i>Spinifrons</i>	1686
386. <i>Reticulatia</i> , <i>Antiquatonia</i> , <i>Calliprotonia</i> , and <i>Echinaria</i>	1688
387. <i>Spinifrons</i>	1690
388. <i>Spinifrons</i>	1692
389. <i>Spinifrons</i>	1694
390. <i>Spinifrons</i> and <i>Antiquatonia</i>	1696
391. <i>Antiquatonia</i>	1698
392. <i>Reticulatia</i>	1700
393. <i>Reticulatia</i>	1702
394. <i>Peniculauris</i>	1704
395. <i>Peniculauris</i>	1706
396. <i>Peniculauris</i>	1708
397. <i>Peniculauris</i>	1710
398. <i>Peniculauris</i>	1712
399. <i>Peniculauris</i>	1714
400. <i>Peniculauris</i>	1716
401. <i>Peniculauris</i>	1718
402. <i>Peniculauris</i>	1720
403. <i>Peniculauris</i>	1722
404. <i>Peniculauris</i>	1724
405. <i>Peniculauris</i>	1726
406. <i>Peniculauris</i>	1728
407. <i>Peniculauris</i>	1730
408. <i>Anemonaria</i>	1732
409. <i>Liosotella</i>	1734
410. <i>Nudauris</i> , <i>Echinauris</i> and <i>Liosotella</i>	1736
411. <i>Liosotella</i>	1738
412. <i>Liosotella</i> and <i>Grandaurispina</i>	1740
413. <i>Liosotella</i>	1742

	<i>Page</i>
414. <i>Liosotella</i>	1744
415. <i>Liosotella</i>	1746
416. <i>Liosotella</i>	1748
417. <i>Paucispinifera</i>	1750
418. <i>Paucispinifera</i>	1752
419. <i>Paucispinifera</i> and <i>Oncosarina</i>	1754
420. <i>Paucispinifera</i>	1756
421. <i>Paucispinifera</i>	1758
422. <i>Paucispinifera</i>	1760
423. <i>Paucispinifera</i>	1762
424. <i>Paucispinifera</i>	1764
425. <i>Paucispinifera</i>	1766
426. <i>Paucispinifera</i>	1768
427. <i>Polymorpharia</i>	1770
428. <i>Cancrinella</i>	1772
429. <i>Cancrinella</i>	1774
430. <i>Cancrinella</i> and <i>Grandaurispina</i>	1776
431. <i>Linoproductus</i>	1778
432. <i>Linoproductus</i>	1780
433. <i>Compressoproductus</i> and <i>Linoproductus</i>	1782
434. <i>Yakovlevia</i> and <i>Liraria</i>	1784
435. <i>Grandaurispina</i>	1786
436. <i>Grandaurispina</i>	1788
437. <i>Grandaurispina</i>	1790
438. <i>Grandaurispina</i>	1792
439. <i>Grandaurispina</i>	1794
440. <i>Grandaurispina</i>	1796
441. <i>Grandaurispina</i>	1798
442. <i>Grandaurispina</i>	1800
443. <i>Grandaurispina</i>	1802
444. <i>Holotricharina</i>	1804
445. <i>Echinaria</i> , <i>Holotricharina</i> , <i>Hystriculina</i> and <i>Calliprotonia</i>	1806
446. <i>Acanthocrania</i> , <i>Paucispinifera</i> , <i>Elliottella</i> , <i>Liosotella</i> , <i>Megousia</i> , and <i>Holotricharina</i>	1808
447. <i>Megousia</i> and <i>Kozlowskia</i>	1810
448. <i>Megousia</i>	1812
449. <i>Megousia</i>	1814
450. <i>Megousia</i>	1816
451. <i>Megousia</i>	1818
452. <i>Megousia</i> and <i>Yakovlevia</i>	1820
453. <i>Megousia</i> , <i>Grandaurispina</i> , <i>Linoproductus</i> , <i>Antiquatonia</i> , and <i>Kozlowskia</i>	1822
454. <i>Compressoproductus</i>	1824
455. <i>Striatifera</i> and <i>Compressoproductus</i>	1826
456. <i>Compressoproductus</i>	1828
457. <i>Compressoproductus</i>	1830
458. <i>Compressoproductus</i>	1832
459. <i>Compressoproductus</i>	1834
460. <i>Compressoproductus</i>	1836
461. <i>Compressoproductus</i>	1838
462. <i>Compressoproductus</i> and <i>Striatifera</i>	1840
463. <i>Institella</i> , <i>Megousia</i> , <i>Compressoproductus</i> , and <i>Striatifera</i>	1842
464. <i>Compressoproductus</i> and <i>Polymorpharia</i>	1844
465. <i>Striatifera</i>	1846
466. <i>Siphonosisia</i>	1848
467. <i>Siphonosisia</i> , <i>Megousia</i> , and <i>Undellaria</i>	1850
468. <i>Horridonia</i> , <i>Echinauris</i> , <i>Institella</i> , <i>Glyptosteges</i> , <i>Siphonosisia</i> , and <i>Nudauris</i>	1852
469. <i>Yakovlevia</i>	1854
470. <i>Yakovlevia</i>	1856
471. <i>Yakovlevia</i>	1858

	<i>Page</i>
472. <i>Yakovlevia</i>	1860
473. <i>Yakovlevia</i>	1862
474. <i>Yakovlevia</i>	1864
475. <i>Spyridiophora</i> , <i>Paucispinifera</i> , <i>Limbella</i> , <i>Striatifera</i> , and <i>Orthotichia</i>	1866
476. <i>Echinauris</i> , <i>Sestropoma</i> , <i>Paucispinifera</i> , and <i>Rugoclostus</i>	1868
477. <i>Chonetinetes</i>	1870
478. <i>Chonetinetes</i> , <i>Chonetinella</i> , and <i>Sulcataria</i>	1872
479. <i>Chonetinella</i> and <i>Leurosina</i>	1874
480. <i>Chonetinella</i> and <i>Sulcataria</i>	1876
481. <i>Dyoros</i> (<i>Dyoros</i>)	1878
482. <i>Dyoros</i> (<i>Dyoros</i>)	1880
483. <i>Dyoros</i> (<i>Dyoros</i>)	1882
484. <i>Dyoros</i> (<i>Dyoros</i>)	1884
485. <i>Dyoros</i> (<i>Dyoros</i>)	1886
486. <i>Dyoros</i> (<i>Dyoros</i>)	1888
487. <i>Dyoros</i> (<i>Dyoros</i>) and <i>Dyoros</i> (<i>Lissosia</i>)	1890
488. <i>Dyoros</i> (<i>Lissosia</i>)	1892
489. <i>Dyoros</i> (<i>Lissosia</i>) and <i>Dyoros</i> (<i>Tetragonetes</i>)	1894
490. <i>Dyoros</i> (<i>Tetragonetes</i>)	1896
491. <i>Dyoros</i> (<i>Tetragonetes</i>), <i>Lissochonetes</i> , and <i>Quadrochonetes</i>	1898
492. <i>Dyoros</i> (<i>Tetragonetes</i>) and <i>Undulella</i>	1900
493. <i>Micraphelia</i>	1902
494. <i>Leurosina</i>	1904
495. <i>Leurosina</i> and <i>Dyoros</i> (<i>Tetragonetes</i>)	1906
496. <i>Mesolobus?</i> , <i>Rugaria</i> , and <i>Neochonetes</i>	1908
497. <i>Neochonetes</i> , <i>Dyoros</i> (<i>Tetragonetes</i>), and <i>Lamellosia</i>	1910
498. <i>Rugaria</i> , <i>Leurosina</i> , <i>Dyoros</i> (<i>Tetragonetes</i>), <i>Dyoros</i> (<i>Dyoros</i>) and "Chonetes"	1912
499. <i>Dyoros</i> (<i>Tetragonetes</i>) and <i>Rugaria</i>	1914
500. <i>Chonetinella</i> , <i>Dyoros</i> (<i>Dyoros</i>), and <i>Leurosina</i>	1916
501. <i>Dyoros</i> (<i>Dyoros</i>), <i>Chonetinella</i> , and <i>Micraphelia</i>	1918
502. <i>Quadrochonetes</i> , <i>Undulella</i> , <i>Dyoros</i> (<i>Lissosia</i>), <i>Dyoros</i> (<i>Dyoros</i>), and <i>Chonetinetes</i> ...	1920

PLATE 192

Heteralosia, Ctenalosia, and Liosotella

Heteralosia vidriensis, new species: 1-6, Interior, side, anterior, ventral, and posterior views, $\times 2$, and ventral view, $\times 1$, of a large pedicle valve, paratype USNM 152632d; 7, 8, interior and exterior, $\times 2$, of a brachial valve, paratype USNM 152632b; 9, 10, exterior, $\times 2$, and interior, $\times 3$, of another brachial valve, showing bilobed cardinal process and dental sockets, paratype USNM 152632h. [Cathedral Mountain Formation, USNM 721u.]

Heteralosia magnispina, new species: 11-13, Dorsal, side, and ventral views of a complete individual, $\times 2$, holotype USNM 151272e; 14, interior of the brachial valve, $\times 2$, paratype USNM 151272f. [Cherry Canyon Formation (Getaway Member), USNM 728.]

15, 16, Side and ventral views of a pedicle valve, $\times 2$, paratype USNM 151289a; 17-19, side, interior, and ventral views of another pedicle valve, $\times 2$, paratype USNM 151289b. [Cherry Canyon Formation (Getaway Member), AMNH 519.]

Ctenalosia rotunda, new species: 20-22, Interior, $\times 3$, exterior, $\times 2$, and posterior $\times 3$, of a brachial valve, showing adductor platforms, paratype USNM 154121a; 23-25, posterior and interior, $\times 3$, and exterior, $\times 2$, of another brachial valve, showing brachial ridges and adductor platforms, paratype USNM 154121b. [Bell Canyon Formation (Hegler Member), USNM 732a.]

Ctenalosia primitiva, new species: 26, Two immature specimens attached to the interior of a *Derbyia* brachial valve, $\times 3$, paratype USNM 151249d; 27, 28, exterior, $\times 3$, and interior, $\times 4$, of the brachial valve, paratype USNM 151249c; 29-32, dorsal, ventral, side, and posterior views of the holotype, $\times 2$, USNM 151249a. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

33, 34, Interior and exterior, $\times 4$, of another brachial valve, paratype USNM 151267. [Neal Ranch Formation (bed 4), USNM 721g.]

Ctenalosia rotunda, new species: 35, 36, Interior, $\times 4$, and posterior, $\times 6$, of a brachial valve, holotype USNM 152645c; 37-41, ventral, side, anterior, dorsal, and posterior views, $\times 4$, of a complete specimen, paratype USNM 152645b; 42-45, anterior, dorsal, side, and ventral views of a complete specimen, $\times 4$, showing the exterior view of the brachial valve in figure 35, holotype USNM 152645c. [Bell Canyon Formation (Hegler Member), AMNH 635.]

Liosotella rotunda, new species: 46-51, Dorsal, side, anterior, ventral, and posterior views, $\times 1$, and ventral view, $\times 2$, of a complete specimen, holotype USNM 154122a; 52-56, side, anterior, interior, ventral, and posterior views of a pedicle valve, $\times 1$, paratype USNM 154122b; 57, interior of the brachial valve, $\times 2$, paratype USNM 154122c. [Road Canyon Formation, USNM 732j.]

PLATE 192.—*Heteralosia*, *Ctenalosia*, and *Liosotella*

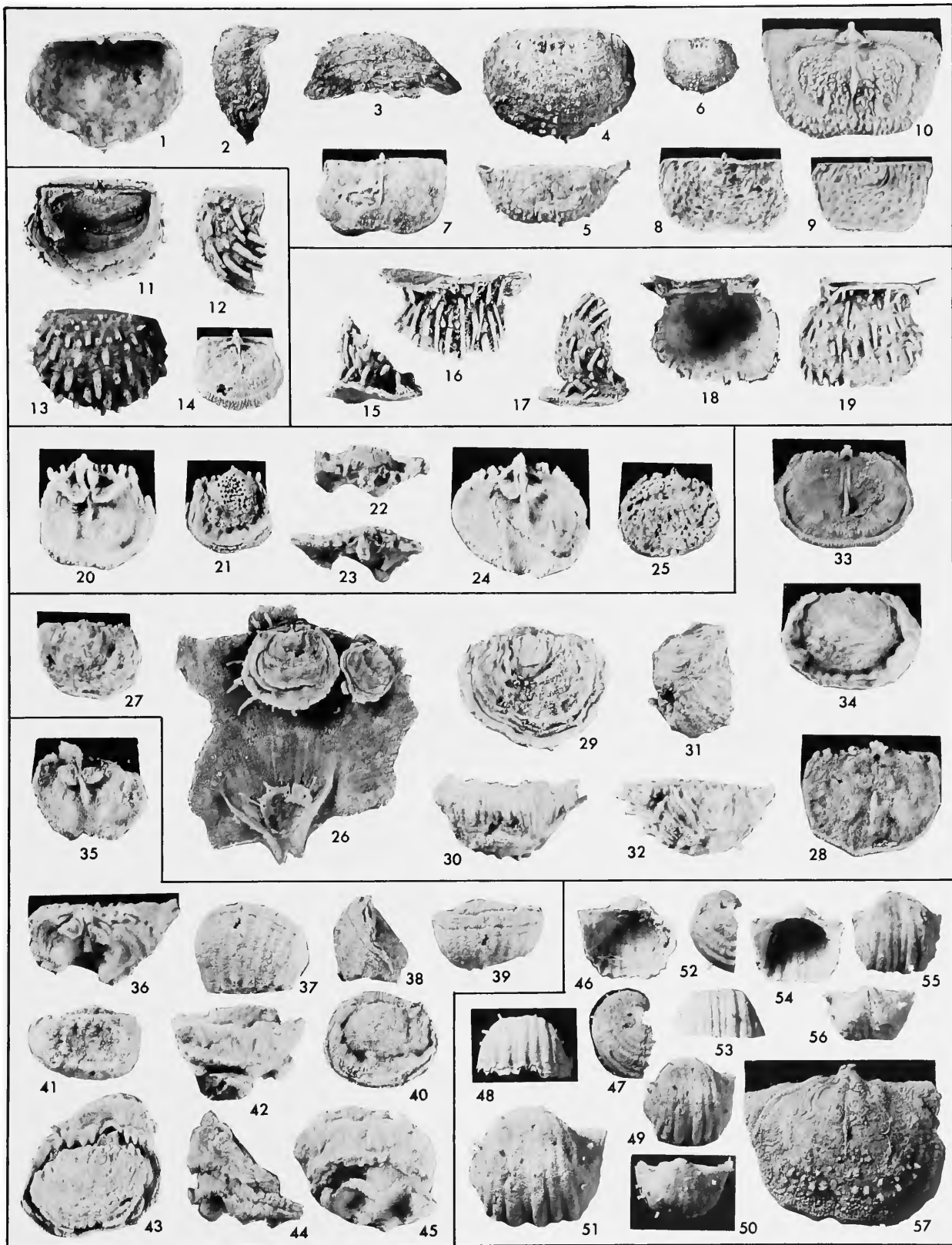


PLATE 193

Heteralosia

Heteralosia species 1: 1, Dorsal, posterior, side, anterior, and ventral views of a complete specimen, $\times 1$, figured specimen USNM 152631; 2, dorsal view of the preceding specimen, $\times 2$. [Cathedral Mountain Formation, USNM 702.]

Heteralosia species 7: 3–7, Posterior, side, ventral, anterior, and interior views of a pedicle valve with rectangular outline, $\times 2$, figured specimen USNM 151274a; 8, interior of a brachial valve, $\times 2$, USNM 151274b. [Bone Spring Formation, locality 728f.]

Heteralosia species 4: 9, Ventral, posterior, anterior, and side views of a pedicle valve, $\times 2$, figured specimen USNM 151293a. [Bone Spring Formation, AMNH 628.]

Heteralosia species 6: 10, Ventral, posterior, and side views of a pedicle valve, $\times 2$, figured specimen USNM 152636. [Bell Canyon Formation (Rader Member), AMNH 410.]

Heteralosia species 7: 11, Exterior of a rectangular pedicle valve, $\times 2$, figured specimen USNM 151274c. [Bone Spring Formation, USNM 728f.]

Heteralosia magnispina, new species: 12, 13, Interior and exterior of a brachial valve, $\times 2$, paratype USNM 154119. [Bell Canyon Formation (Lamar Member), USNM 738b.]

Heteralosia species 2: 14, Dorsal and ventral views, $\times 2$, of a small specimen, figured specimen USNM 154120. [Road Canyon Formation, USNM 707c.]

Heteralosia tenuispina, new species: 15–17, Ventral, anterior, and posterior views of a pedicle valve, $\times 2$, paratype USNM 152634a; 18, 19, exterior and interior of a pedicle valve, $\times 2$, holotype USNM 152634b; 20–23, interior, anterior, posterior, and ventral views, of a young pedicle valve, $\times 2$, paratype USNM 152634c; 24, 25, exterior and interior of a brachial valve, $\times 2$, showing slightly developed cardinal process, paratype USNM 152634d. [Bell Canyon Formation (Hegler Member), USNM 731.]

Heteralosia paucispinosa, new species: 26, 27, Interior and exterior of a brachial valve, $\times 2$, showing cardinal process, paratype USNM 155030. [Bell Canyon Formation (Hegler Member), USNM 731.]

Heteralosia vidriensis, new species: 28–33, Ventral view, $\times 1$, and ventral, anterior, posterior, side, and interior views, $\times 2$, of a large pedicle valve, paratype USNM 152632c; 34–37, interior, side, posterior, and ventral views of another pedicle valve with most of its spines stripped away, $\times 2$, paratype USNM 152632f; 38–43, ventral view, $\times 1$, and ventral, interior, anterior, side, and posterior views, $\times 2$, of another pedicle valve preserving scattered spines, paratype USNM 152632a; 44, ventral, anterior, posterior, and side views of a well preserved pedicle valve, $\times 2$, holotype USNM 152632g. [Cathedral Mountain Formation, USNM 721u.]

Heteralosia hystricula (Girty): 45, 46, Posterodorsal and interior views of a large, old brachial valve, $\times 3$, showing strongly pustulose interior, brachial ridges, and strongly lobed cardinal process, hypotype USNM 154115–1. [Word Formation (Willis Ranch Member), USNM 706.]

PLATE 193.—*Heteralosia*

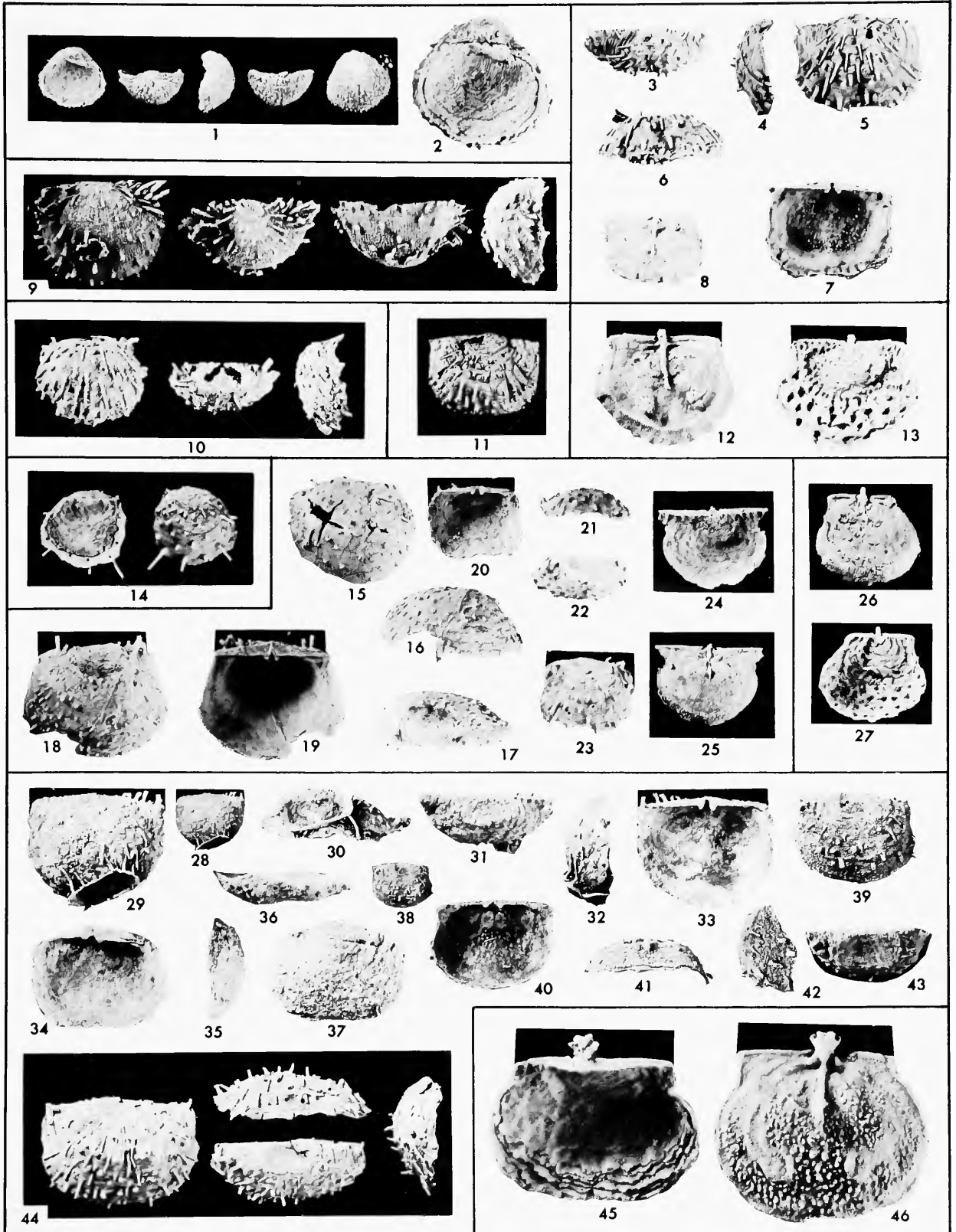


PLATE 194

Spuriosa and *Heteralosia*

Spuriosa circularis, new species: 1-4, Ventral, side, dorsal, and anterior views of a complete specimen, $\times 2$, holotype USNM 153490a; 5, 6, interior and exterior of the brachial valve of the holotype, $\times 6$, 7-11, Interior, posterior, anterior, and ventral views of a pedicle valve, $\times 2$, paratype USNM 153490b; 12, 13, posterior and exterior views of the brachial valve of the preceding specimen, $\times 4$; 14, 15, exterior and interior views of the preceding specimen, $\times 6$, showing median ridge. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

Heteralosia hystricula (Girty): 16, Anterior view, $\times 2$, of a large pedicle valve showing its rhizoid spines, hypotype USNM 153581b; 29, pedicle valve of *Paucispinifera* encrusted by individuals of *Heteralosia*, $\times 2$, showing mode of attachment, hypotype USNM 123891g. [Word Formation (Willis Ranch Member), USNM 706e.]

17, Interior of a pedicle valve of *Costispinifera*, $\times 2$, occupied by *Heteralosia* and showing the long ornament spines, hypotype USNM 154115a; 19, another *Costispinifera* pedicle valve, $\times 2$, occupied by *Heteralosia* with long ornament spines, hypotype USNM 154115b; 20, 21, dorsal and ventral views of a complete specimen, $\times 1$, hypotype USNM 154115c; 22-25, dorsal, anterior, ventral, and side views, $\times 2$, of the preceding hypotype; 28, dorsal valve of *Costispinifera* occupied by *Heteralosia*, $\times 1$, hypotype USNM 154115d. [Word Formation (Willis Ranch Member), USNM 706.]

18, *Heteralosia* on *Dyoros*, $\times 1$, hypotype USNM 154116a; 26, Interior of a large *Paucispinifera*, $\times 2$, showing a number of *Heteralosia*, hypotype USNM 154116d; 27, Exterior of a *Paucispinifera* pedicle valve encrusted by *Heteralosia*, $\times 1$, hypotype USNM 154116f; 30, 31, brachial valve of *Paucispinifera* with attached *Heteralosia* and young *Cyclacantharia*, $\times 1$, $\times 2$, hypotype USNM 154116e. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 194.—*Spuriosa* and *Heteralosia*

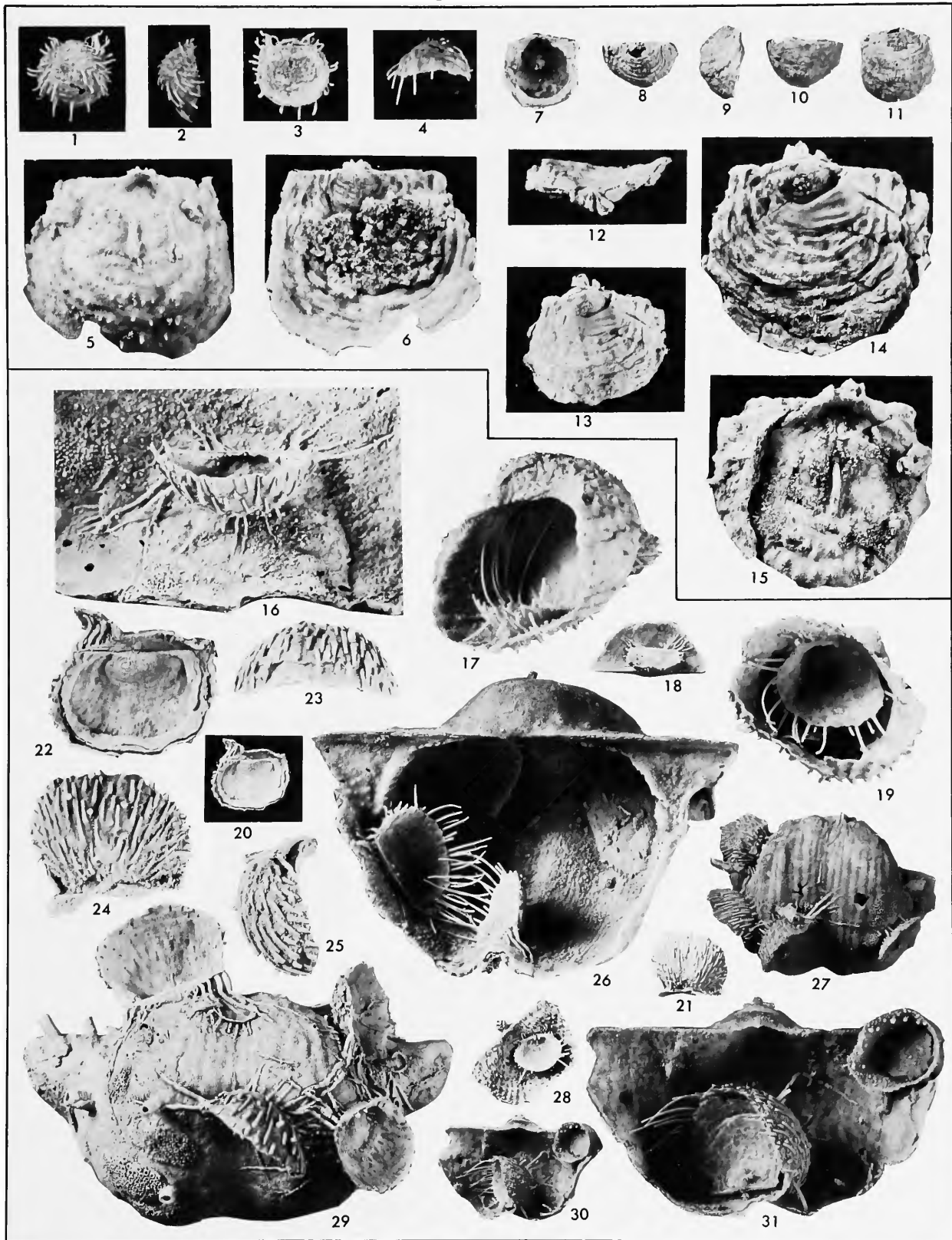


PLATE 195

Heteralosia

Heteralosia hystricula (Girty): 1, Interior, interior tilted posteriorly, side, posteroventral, and anterior views of a large pedicle valve, $\times 1$, hypotype USNM 154117c; 2, interior, $\times 2$, of the preceding specimen, showing the teeth; 3-6, anterior, ventral, side, and posterior views of the preceding specimen showing cicatrix of attachment; 7, group of young specimens attached to a productid shell, $\times 2$, hypotype USNM 154117a. [Word Formation (Willis Ranch Member), USNM 706e.]

8-10, Dorsal, ventral, and posterior views of a complete specimen, $\times 1$, hypotype USNM 154115e; 20, ventral view of a pedicle valve attached to the umbo of a productid shell, $\times 1.5$, hypotype USNM 154115f; 27, 28, interior, $\times 3$ and exterior $\times 2$ of a brachial valve, hypotype USNM 154115g; 29, 30, interior, $\times 3$, and exterior, $\times 2$, of another brachial valve with lobate cardinal process, hypotype USNM 154115h; 31, 32, interior, $\times 3$, and exterior, $\times 2$, of another brachial valve with strongly lobate cardinal process, hypotype USNM 154115i; 33, 34, interior, $\times 3$, and exterior, $\times 2$, of a brachial valve of large size but nonlobate cardinal process, hypotype USNM 154115j; 35, 36, interior, $\times 3$, and exterior, $\times 2$, of an obese brachial valve with strongly lobate cardinal process, hypotype USNM 154115k. [Word Formation (Willis Ranch Member), USNM 706.]

11-14, Posterior, anterior, dorsal, and side views, $\times 2$, of an obese specimen, hypotype USNM 154118a; 15-19, posterior, ventral, dorsal, anterior, and side views of the preceding specimen, $\times 1$; 21, 22, ventral valve, $\times 1$, $\times 2$, attached to a lytoniid and showing the myophragm, hypotype USNM 154118b; 23, 24, dorsal view, $\times 1$, $\times 2$, of a young specimen with brachial valve in place, hypotype USNM 154118c; 25, 26, interior and exterior of a brachial valve, $\times 2$, showing elevated adductor platforms and unlobed cardinal process, hypotype USNM 154118d; 43, two interior views, $\times 1$, and interior, ventral, and side views, $\times 2$, of a specimen showing myophragm and rhizoid spines, hypotype USNM 154118e. [Word Formation (China Tank Member), USNM 706c.]

37, 38, Interior and exterior views, $\times 2$, of a brachial valve with unlobed cardinal process, hypotype USNM 154116b; 39, posterodorsal view of the preceding specimen, $\times 3$, showing myophore; 40, 41, exterior and interior of another brachial valve, $\times 2$, but having a strongly lobed cardinal process, hypotype USNM 154116c; 42, posterodorsal view of the preceding hypotype, $\times 3$, showing the lobed myophore. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 195.—*Heteralosia*

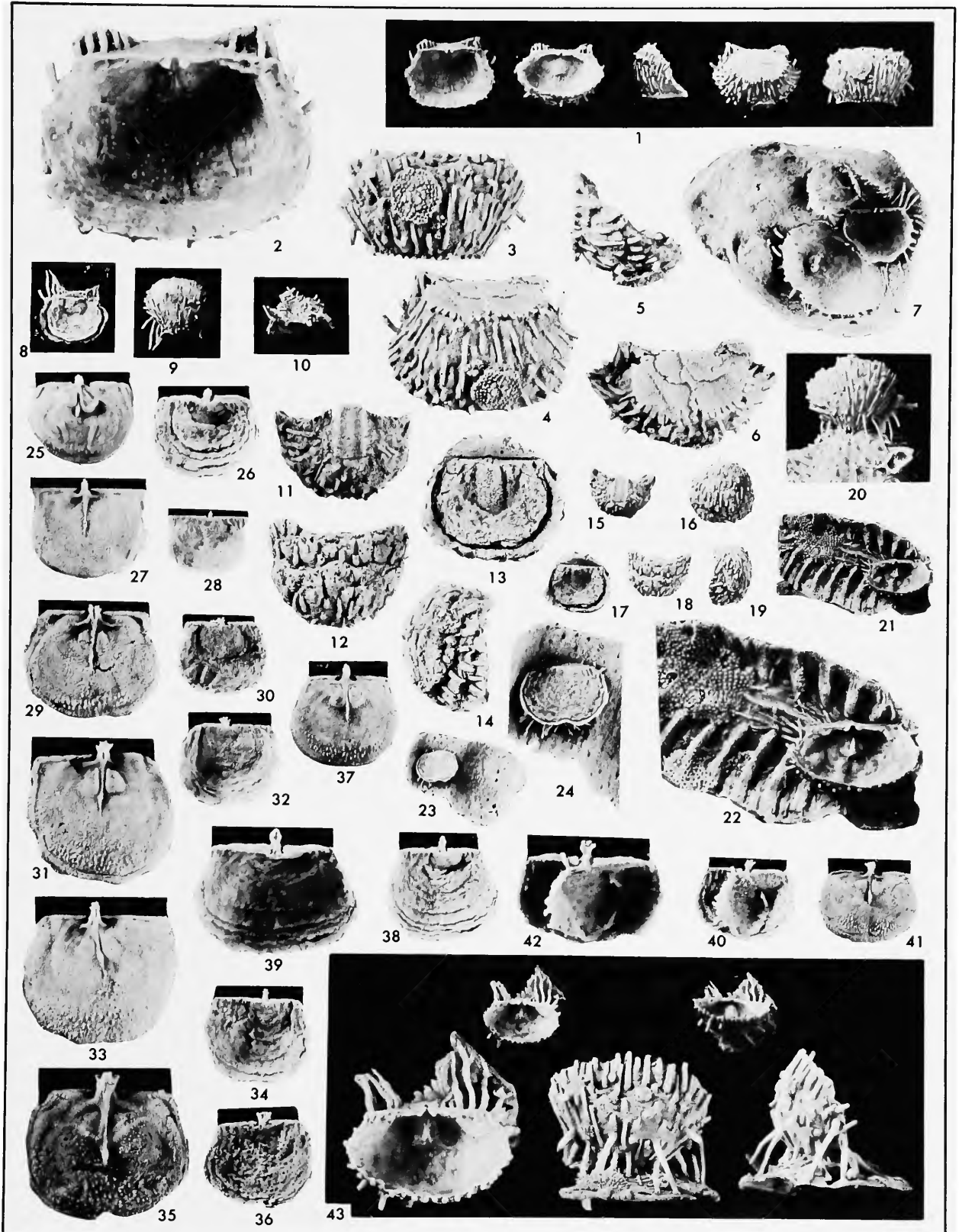


PLATE 196

Heteralosia

Heteralosia paucispinosa, new species: 1–3, Exterior and interior, $\times 2$, and posterodorsal view, $\times 3$, of a brachial valve showing a slender, unlobed cardinal process, paratype USNM 154129a; 4–6, exterior, interior, $\times 2$, and posterodorsal view of another brachial valve, showing a slender unlobed cardinal process, paratype USNM 154129b; 8–11, anterior, posterior, side, and interior of a pedicle valve, $\times 2$, showing few, stout, ornament spines, holotype, USNM 154129c; 12–15, ventral, posterior, side, and interior views, $\times 2$, of another pedicle valve, paratype USNM 154129e; 16–19, ventral, posterior, side, and interior views of a pedicle valve, $\times 2$, paratype USNM 154129d; 20, ventral view of a young pedicle valve, $\times 2$, having few ornament spines, paratype USNM 154129f; 21–23, side, posterior, and ventral views of a large pedicle valve, $\times 2$, paratype USNM 154129g. [Bell Canyon Formation (Hegler Member), USNM 731.]

7, Interior of a pedicle valve attached to a small coral, $\times 1.5$, paratype USNM 154130. [Bell Canyon Formation (Hegler Member), USNM 732a.]

24, 25, Interior and exterior, of a brachial valve with brachial ridges, $\times 2$, paratype USNM 151280a; 26, 27, exterior, $\times 2$, and interior, $\times 3$, of another brachial valve having the anterior ends of the brachial ridges strongly elevated, paratype USNM 151280c; 28–31, ventral, side, posterior, and interior views, $\times 2$, of a pedicle valve, paratype USNM 151280b. [Bell Canyon Formation (Lamar Member), AMNH 38.]

32, 33, Exterior, $\times 2$, and interior $\times 3$, of a brachial valve having an unlobed cardinal process, paratype USNM 154131a; 34–36, posterior, anterior, and side views of a pedicle valve, $\times 2$, showing few, long ornament spines, paratype USNM 154131b. [Bell Canyon Formation (Rader Member), AMNH 410.]

37, Interior of a brachial valve, $\times 2$, showing a slightly lobed cardinal process, paratype USNM 154132a; 38–40, posterior, side, and ventral views, $\times 2$, of a pedicle valve, paratype USNM 154132b. [Bell Canyon Formation (Hegler Member), AMNH 635.]

41, 42, Interior and side views of a pedicle valve attached to an *Ombonia* valve, $\times 2$, paratype USNM 154133. [Bell Canyon Formation (Lamar Member), USNM 728p.]

Heteralosia magnispina, new species: 43, 44, Interior of the brachial valve, $\times 3$, $\times 2$, showing thick median ridge, and stout cardinal process, paratype USNM 151272h; 45–47, dorsal, ventral, and side views, $\times 2$, of the paratype, USNM 151272i; 48–50, interior, side, and ventral views, $\times 2$, of a pedicle valve, showing teeth and myophragm, paratype USNM 151272j; 51–53, side, ventral, and dorsal views, $\times 2$, of a complete specimen, showing large cicatrix, paratype USNM 151272k; 54, interior of a pedicle valve showing attachment by rhizoid spines on all sides, $\times 2$, paratype USNM 151272-l; 55, interior of a brachial valve, $\times 3$, showing median septum, pustulose inner region, and narrow cardinal process, paratype USNM 151272c; 56–58, posterior, $\times 3$, and exterior and interior, $\times 2$, of a brachial valve with very slender cardinal process, paratype USNM 151272g; 59, 60, interior and exterior, $\times 2$, of another brachial valve with slender cardinal process, paratype USNM 151272d; 61–63, ventral, side, and dorsal views of the paratype USNM 151272m; 64, posterior of a pedicle valve, $\times 2$, showing the interarca and teeth, paratype USNM 151272n; 65–67, interior, side, and ventral views, $\times 2$, of a small pedicle valve, paratype USNM 151272o. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 196.—*Heteralosia*

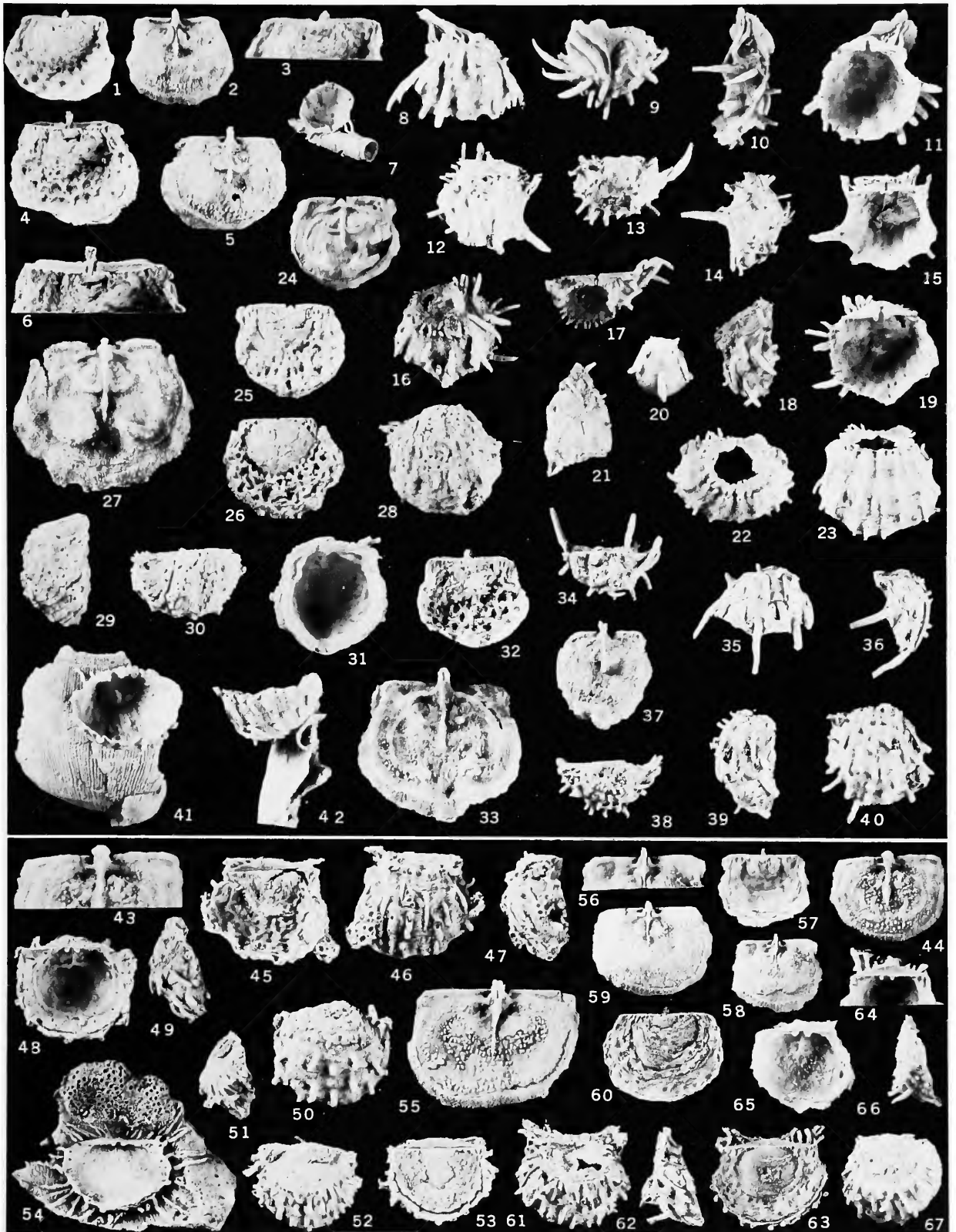


PLATE 197

Ctenalasia

Ctenalasia fixata Cooper and Stehli: 1, Ventral valve, $\times 2$, fixed to a bryozoan and showing teeth and myophragm, hypotype USNM 154123. [Word Formation (Appel Ranch Member), USNM 706d.]

2-5, Ventral, dorsal, posterior, and side views of a small individual, $\times 2$, hypotype USNM 154124a; 6, 7, interior of the brachial valve, $\times 3$ and exterior, $\times 2$, showing a large, strongly lobate cardinal process, hypotype USNM 154124b. [Word Formation (Appel Ranch Member), USNM 722t.]

8-10, Exterior and interior, $\times 2$, and interior, $\times 3$, of a brachial valve with brachial ridges, hypotype USNM 154125c; 11, 12, side and dorsal views, $\times 2$, of a specimen preserving its rhizoid spines, hypotype USNM 154125b; 13-15, side and interior views, $\times 2$, and interior $\times 3$, of a large pedicle valve showing the myophragm and hinge denticles, hypotype USNM 154125a; 16-19, side, dorsal, anterior, and posterior views, $\times 2$, of a complete specimen devoid of spines, hypotype USNM 152642a; 20, 21, cluster of pedicle valves attached to a pectenoid pelecypod valve, $\times 1$, $\times 2$, hypotype USNM 152642b. [Word Formation (China Tank Member), USNM 706c.]

22-24, Anterior and interior views, $\times 2$, and anterior, $\times 1$, of a ventral valve, showing mode of attachment and myophragm, hypotype USNM 154126a; 25, 26, small cluster of pedicle valves attached together, $\times 1$, $\times 2$, hypotype USNM 154126b; 27, 28, exterior, $\times 2$, and interior, $\times 3$, of a brachial valve, showing moderately lobed cardinal process and brachial ridges, hypotype USNM 154126c. [Word Formation (Appel Ranch Member), USNM 719z.]

29, 30, Exterior and interior, $\times 2$, of brachial valve having a cardinal process without marked lobation, hypotype USNM 154127a; 31, 32, exterior and interior of another brachial valve, $\times 2$, showing thickened adductor patches, hypotype USNM 154127b; 33, 34, pedicle valve attached with a young *Cyclacantharia*, $\times 1$, $\times 2$, hypotype USNM 154127c. [Word Formation (Appel Ranch Member), USNM 715i.]

35-37, Interior, and exterior, $\times 2$, and posterior, $\times 3$, views showing small, lobate cardinal process, hypotype USNM 154128a; 38-41, exterior and anterior, $\times 2$, and posterior and interior, $\times 3$, views showing denticles, adductor platforms, and large lobate cardinal process, hypotype USNM 154128b; 42-45, posterior, exterior, and interior, $\times 2$, and direct posterior, $\times 3$, views of a brachial valve having a strongly lobate cardinal process, hypotype USNM 154128c; 46-48, anterior and exterior, $\times 2$, and interior, $\times 3$, views, showing strong median fold, hypotype USNM 154128d; 49-52, exterior and anterior, $\times 2$, and posterior and interior $\times 3$, views, showing anterior fold and widely lobate cardinal process, hypotype USNM 154128e; 53-55, interior, side, and partial side views, $\times 2$, of a pedicle valve attached to a crinoid stem, hypotype USNM 154128f; 56, ventral or anterior view of a specimen attached by rhizoid spines and showing the costellae on the surface, $\times 2$, hypotype USNM 154128g; 57-59, ventral, dorsal, and side views, $\times 2$, of a complete specimen, hypotype USNM 154128h; 60-62, interior, anterior, and side views of a pedicle valve, $\times 2$, showing myophragm, costellae, and rhizoid spines, hypotype USNM 154128i; 63-64, interior and posterior of a specimen attached by nearly its entire surface, $\times 2$, hypotype USNM 154128j; 65, interior of an attached pedicle valve, $\times 2$, showing a thick myophragm, hypotype USNM 154128k. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 197.—*Ctenalasia*

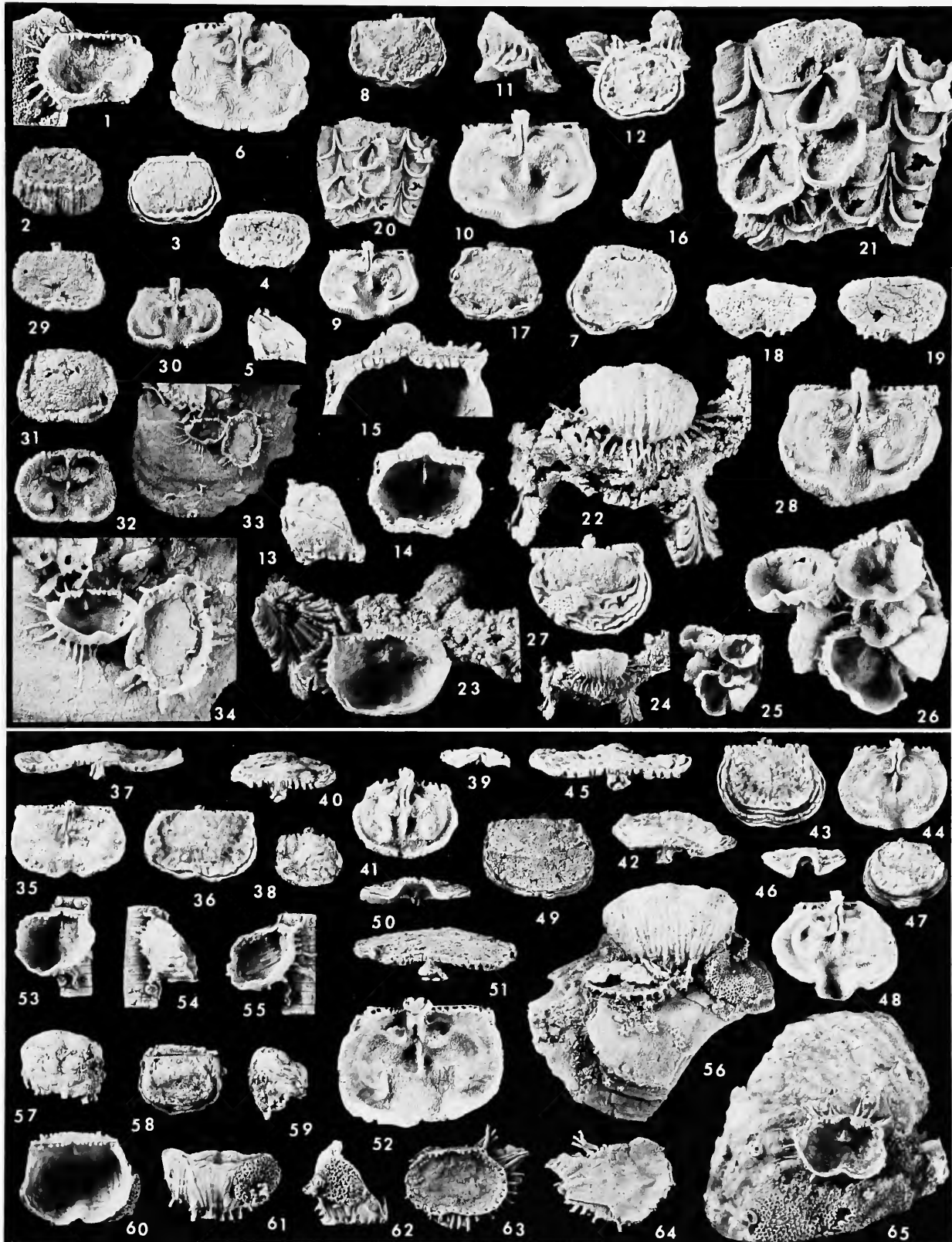


PLATE 198*Ctenalasia*

Ctenalasia transversa, new species: 1, 2, Dorsal view of a complete specimen, $\times 1$, $\times 2$, holotype USNM 152644d; 3, 4, interior of two attached pedicle valves, $\times 2$, $\times 1$, paratypes USNM 152644a, b; 5–7, anterior, interior, and side views of a pedicle valve attached to shell of *Derbyia*, $\times 2$, paratype USNM 152644e; 8, 9, interior of another pedicle valve, $\times 2$, and $\times 1$, paratype USNM 152644c; 10, exterior of the previous specimen, $\times 1.5$, showing a group of pedicle valves attached to the dorsal valve of *Bathymyonia*; 18, 19, two brachial valves of *Bathymyonia*, $\times 1.5$, with clusters of attached *Ctenalasia*, paratypes USNM 152644g, h. [Park City Formation (Franson Member), USNM 762.]

11–13, Exterior, $\times 2$, and posterior and interior, $\times 3$, views, showing lobate cardinal process and adductor platforms, paratype USNM 154134a; 14–16, exterior, $\times 2$, and interior and posterior, $\times 3$, views, showing large cardinal process, adductor platforms and brachial ridges, paratype USNM 154134b; 17, interior of another brachial valve with lobate cardinal process and adductor platforms, $\times 3$, paratype USNM 154134c. [Park City Formation (Franson Member), USNM 760.]

PLATE 198.—*Ctenalasia*

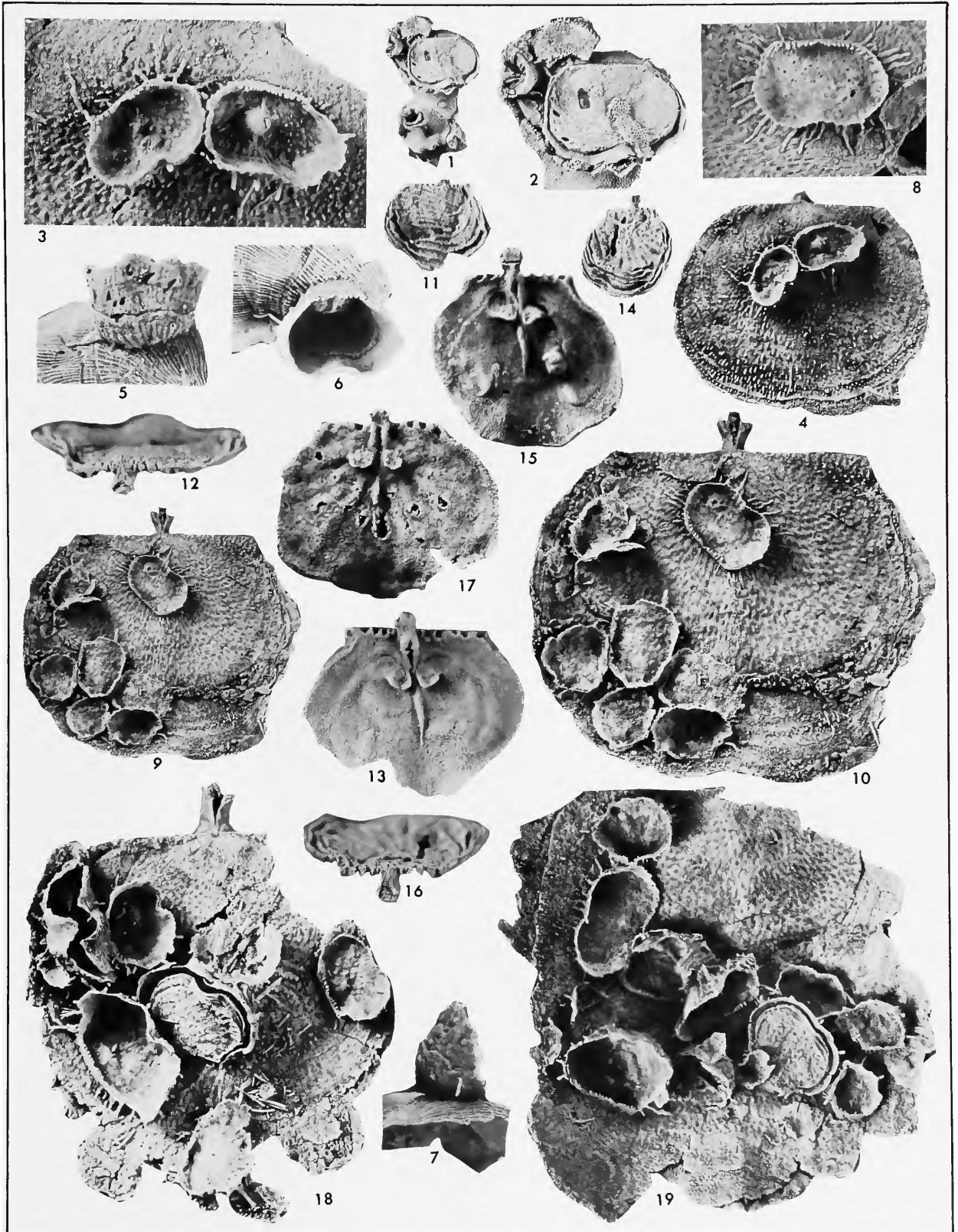


PLATE 199

Acritosia

Acritosia magna, Cooper and Grant: 1, 2, Side and dorsal views of a pedicle valve, $\times 1$, paratype USNM 154043a; 3-5, posterior, apertural, and side views of a young specimen, $\times 1$, paratype USNM 154043b. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701c.]

6-8, Anterior, dorsal, and side views of a specimen with brachial valve in place, $\times 1$, paratype USNM 151734; 28, 29, apertural and side views of a specimen with brachial valve attached in a cluster of *Fissispongia*, holotype USNM 151735a. [Neal Ranch Formation (bed 9 of Cooper), USNM 701g.]

9, 10, Apertural and anterior views of a pedicle valve, $\times 1$, paratype USNM 154044a; 11, 12, dorsal and apertural views of a specimen with brachial valve in place, $\times 1$, paratype USNM 154044b; 13, side view of a large individual, $\times 1$, paratype USNM 154044d; 14, side view of another pedicle valve, $\times 1$, showing thin, round attachment spines, paratype USNM 151737e. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701h.]

15, 16, Apertural and side views of a young specimen with brachial valve in place, $\times 1$, paratype 151739f; 17-19, interior, $\times 2$, and interior and exterior, $\times 1$, of the brachial valve, paratype USNM 151738; 20-22, apertural, anterior, and side views of a small individual, $\times 1$, holotype USNM 151739a; 23, 24, side and anterior views of a large individual, $\times 1$, paratype USNM 151739b; 25, anterior view of a short, squat specimen, $\times 1$, paratype USNM 151739e; 26, 27, side and apertural views, $\times 1$, of a large adult, paratype USNM 151739h. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701k.]

PLATE 199.—*Acritosia*

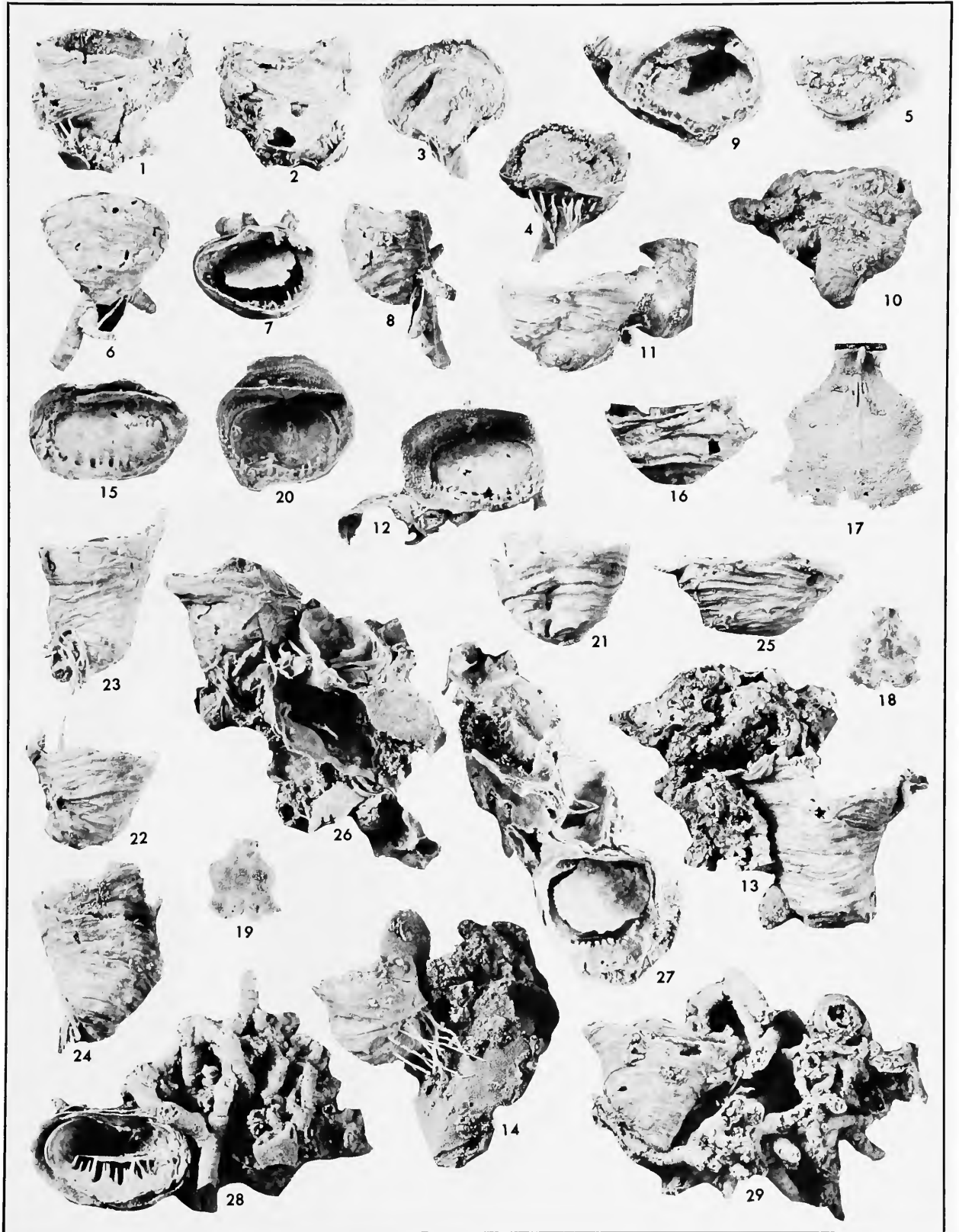


PLATE 200

Acritosia and *Richthofenia*

Acritosia silicica, new species: 1, 2, Side and apertural views of a pedicle valve, $\times 1$, paratype USNM 152687b; 3-5, anterior, side, and dorsal (apertural) views of a complete specimen, $\times 1$, paratype USNM 152687g; 6-8, side, dorsal, and anterior views of a small individual elongated by crowding, $\times 1$, paratype USNM 152687q; 9-11, side, anterior, and dorsal views of another but normally shaped complete specimen, $\times 1$, paratype USNM 152687a; 12, 13, dorsal and ventral views of two attached specimens, $\times 1$, paratype USNM 152687s; 14, 15, dorsal and ventral views of another two attached specimens, $\times 1$, paratype USNM 152687t; 16-18, side, anterior, and dorsal views of a large pedicle valve, $\times 1$, paratype USNM 152687d; 19-21, dorsal, side, and anterior views of a large, normal, complete specimen, $\times 1$, paratype USNM 152687h; 22-24, dorsal, side, and anterior views of a large attached specimen, showing endospines and attachment spines, $\times 1$, paratype USNM 152687o; 25, 26, anterior view of a broken specimen, $\times 1$, $\times 2$, showing brachial valve in place, paratype USNM 152687v; 27, 28, ventral view of another broken specimen, $\times 1$, $\times 2$, showing the brachial valve in place and the position of the cardinal process, paratype USNM 152687u; 29, small group of specimens attached to a large *Composita*, $\times 1$, paratype USNM 152687x. [Hueco Formation, USNM 725b.]

Acritosia teguliferoides (R. E. King): 30-32, Side, anterior, and dorsal (apertural) views of a pedicle valve, $\times 1$, showing the mass of round, slender rhizoid spines, hypotype USNM 154049a; 33, 34, another attached specimen in anterior and partial dorsal views, $\times 1$, hypotype USNM 154050a. [Bone Spring Formation, USNM 728c.]

Richthofenia species: 35-37, Three views of a specimen longitudinally broken, $\times 1$, showing the abundance of vesicular plates in the body of the cup, and the myocoelidium, figured specimen USNM 154051b; 38, apical or ventral view of another specimen, $\times 1$, figured specimen USNM 154051a; 39, 40, dorsal and anterior views of the myocoelidium, $\times 1$, hypotype USNM 154051f; 41, side view of a nearly complete specimen, $\times 1$, hypotype USNM 154051c. [Sanwans, Salt Range, Pakistan.]

PLATE 200.—*Acritosia* and *Richthofenia*

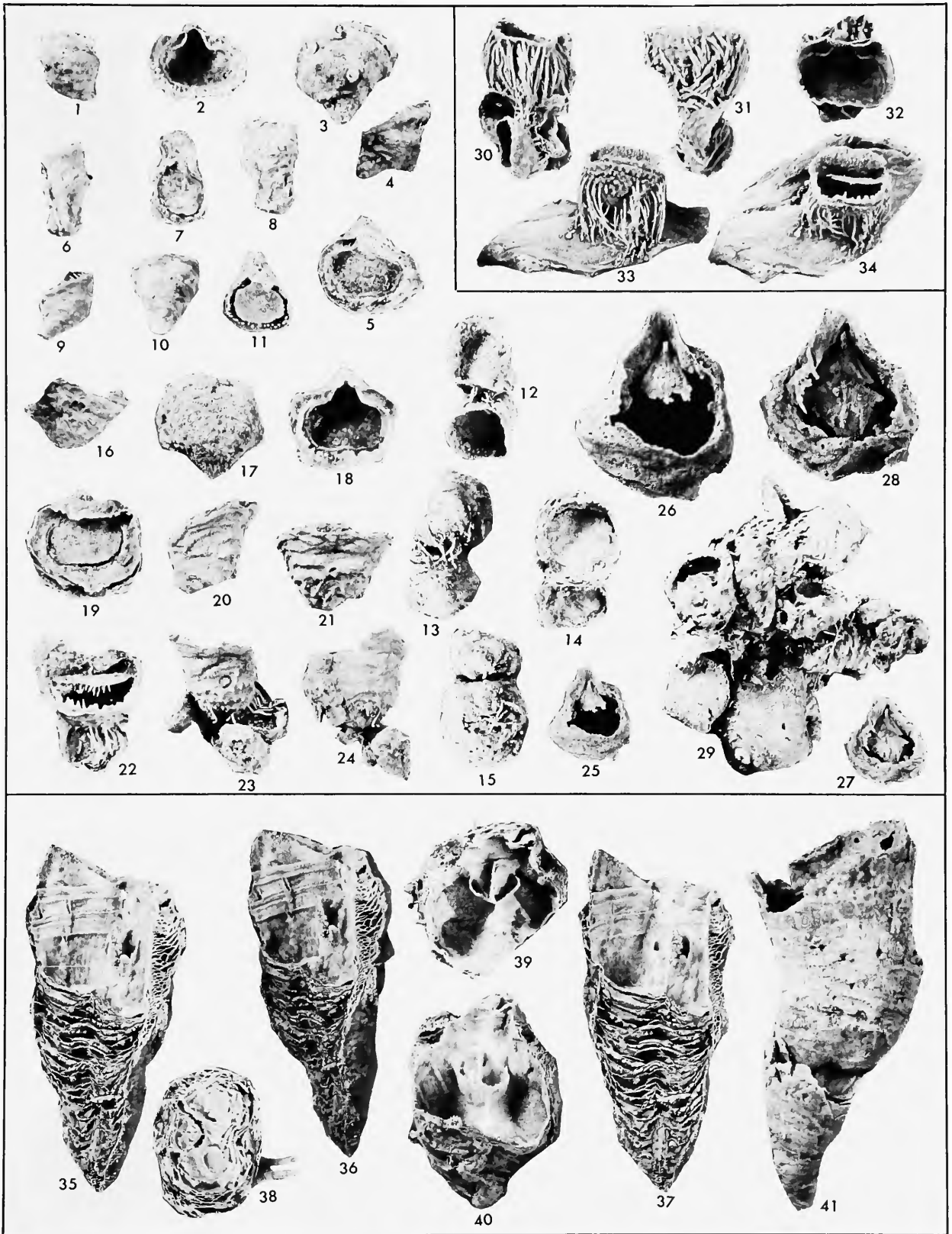


PLATE 201

Acritosia

Acritosia peculiaris, new species: 1–3, Side, dorsal, and apertural views of a large, well-formed individual, $\times 1$, holotype USNM 151756a; 4–6, interior and exterior, $\times 1$, and exterior, $\times 2$, showing spines of the brachial valve of the preceding specimen; 7, 8, side and apertural views of a young specimen, $\times 1$, paratype USNM 151756b. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

9, 10, Side and apertural views of a young specimen, $\times 1$, showing spines on anterior side, paratype USNM 154045a; 11–13, apertural, anterior, and side views of a pedicle valve, $\times 1$, paratype USNM 154045b; 14–16, side, apertural, and anterior views of a small specimen with both valves, $\times 1$, paratype USNM 154045e; 17–19, side, anterior, and apertural views, and apertural view tilted to show adductor callosity, $\times 1$, paratype USNM 154045c; 20, apertural view of a complete specimen, $\times 1$, paratype USNM 154045h; 21, 22, apertural view, showing adductor platform, and side view, $\times 1$, paratype USNM 154045d; 23, brachial valve interior $\times 2$, paratype USNM 154045f; 24, 25, brachial valve interior, $\times 1$, $\times 2$, showing cardinal process and endospines, paratype USNM 154045g. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

26–28, Anterior, apertural, and side views of a pedicle valve, $\times 1$, paratype USNM 154046a; 29–31, side, apertural, and anterior views of a specimen with brachial valve in place, $\times 1$, paratype USNM 154046b; 32, 33, anterior and side views of a small individual, $\times 1$, paratype USNM 154046d. [Bone Spring Formation, USNM 725c.]

34, 35, Side and anterior views, $\times 1$, of a large individual, paratype USNM 151776a; 36, 37, side and anterior views of an attached specimen showing rhizoid spines, $\times 1$, paratype USNM 151776b. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707g.]

38–41, Interior and exterior views, $\times 1$, and interior and side views, $\times 2$, of a brachial valve showing cardinal process, paratype USNM 154048. [Hess Formation (top), USNM 726n.]

42, 43, Interior of a broken specimen, $\times 1$, $\times 2$, showing the brachial valve in place, paratype USNM 154047; 44, 45, interior of the piece detached from the preceding specimen, $\times 1$, $\times 2$, showing spines on cup rim and ends of rhizoid spines inside the cup. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722h.]

PLATE 201.—*Acritosia*

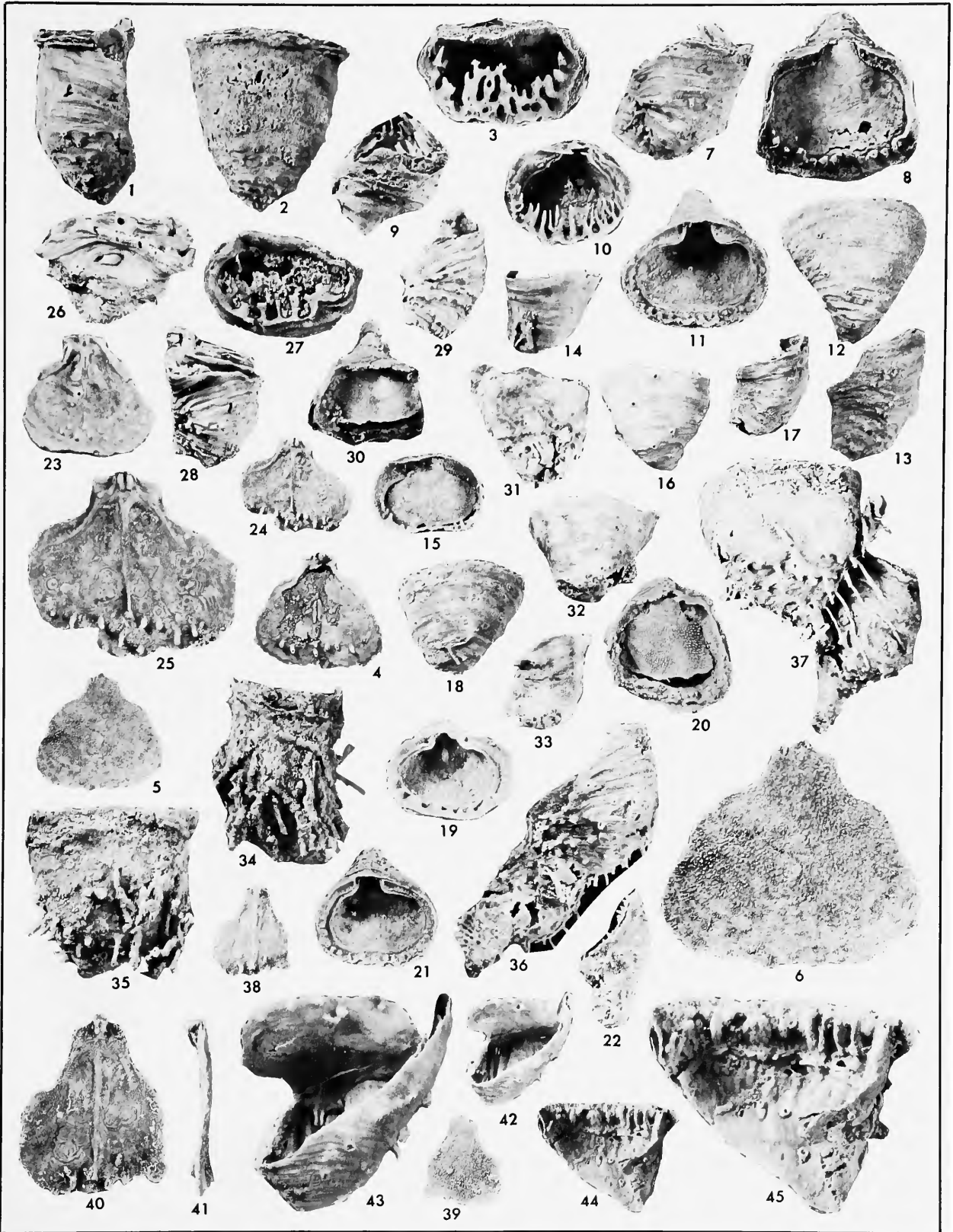


PLATE 202

Acritosia

Acritosia teguliferoides (R. E. King): 1, 2, Interior and exterior, \times 1, of a brachial valve, hypotype USNM 154049b; 3, 4, interior and side of the preceding brachial valve, \times 2, showing cardinal process and protective endospines; 5, 6, interior and exterior, \times 1, of another brachial valve, hypotype USNM 154049c; 7, 8, interior and side, \times 2, of the preceding brachial valve; 16–18, anterior, side, and dorsal (apertural) views of a specimen with brachial valve in place, \times 1, hypotype USNM 154049d; 19–21, anterior, dorsal views of a pedicle valve, \times 1, showing granulose interior, hypotype USNM 154049f; 22–24, anterior, side, and dorsal views of another specimen with its rhizoid spines, \times 1, hypotype USNM 154049h; 25–27, side, dorsal, and anterior views of a small, squat specimen with rhizoid spines, \times 1, hypotype USNM 154049i; 29, dorsal view of preceding specimen, \times 2, showing granular exterior of brachial valve; 29–31, anterior side, and dorsal views of a small complete specimen, \times 1, hypotype USNM 154049k; 32, dorsal view of the preceding specimen, \times 2, showing granular brachial valve and rhizoid spines; 33, 34, dorsal and ventral (apical) views of a small cluster, \times 1, showing attachment by round, slender spines, hypotype USNM 154050b; 35, 36, anterior and dorsal views of another small cluster, \times 1, hypotype USNM 154050c; 37, 38, side and ventral (apical) views of three attached specimens, \times 1, hypotype USNM 154050d; 39, 40, anterior and dorsal views of a specimen, \times 1, showing its strong and numerous attachment spines, hypotype USNM 154050e; 41, 42, ventral (apical) and side views of a specimen, \times 1, showing spine bases, hypotype USNM 154050f. [Bone Spring Formation, USNM 728e.]

9, 10, Ventral and anterior views of a pedicle valve, \times 1, hypotype USNM 154052a; 11, 12, dorsal and anterior views of an elongated specimen, \times 1, hypotype USNM 154052b; 13, 14, dorsal and anterior views of a specimen with brachial valve in place, \times 1, hypotype USNM 154052d; 15, anterior view of another pedicle valve, \times 1, hypotype USNM 154052e. [Skinner Ranch Formation (base), USNM 705a.]

Acritosia solida, new species: 43–45, Dorsal, side, and anterior views of a pedicle valve, \times 1, paratype USNM 151741e; 46–48, side, anterior, and dorsal (apertural) views of another pedicle valve, \times 1, paratype USNM 151741b; 49, imperfect specimen, showing the cardinal process of the brachial valve through a break in the anterior side, \times 1, paratype USNM 151741g; 50–52, dorsal, anterior and side views of a small specimen with long protective spines, \times 1, paratype USNM 151741c; 53–55, anterior, side, and dorsal views of a moderately wide cup, \times 1, paratype USNM 151741a; 56–58, side, dorsal, and anterior views of a well formed cup, \times 1, paratype USNM 151740a; 59–61, dorsal, anterior, and side views of a large, well formed cup, \times 1, holotype USNM 151740b. [Hess Formation (Taylor Ranch Member), USNM 702d.]

PLATE 202.—*Acritosia*

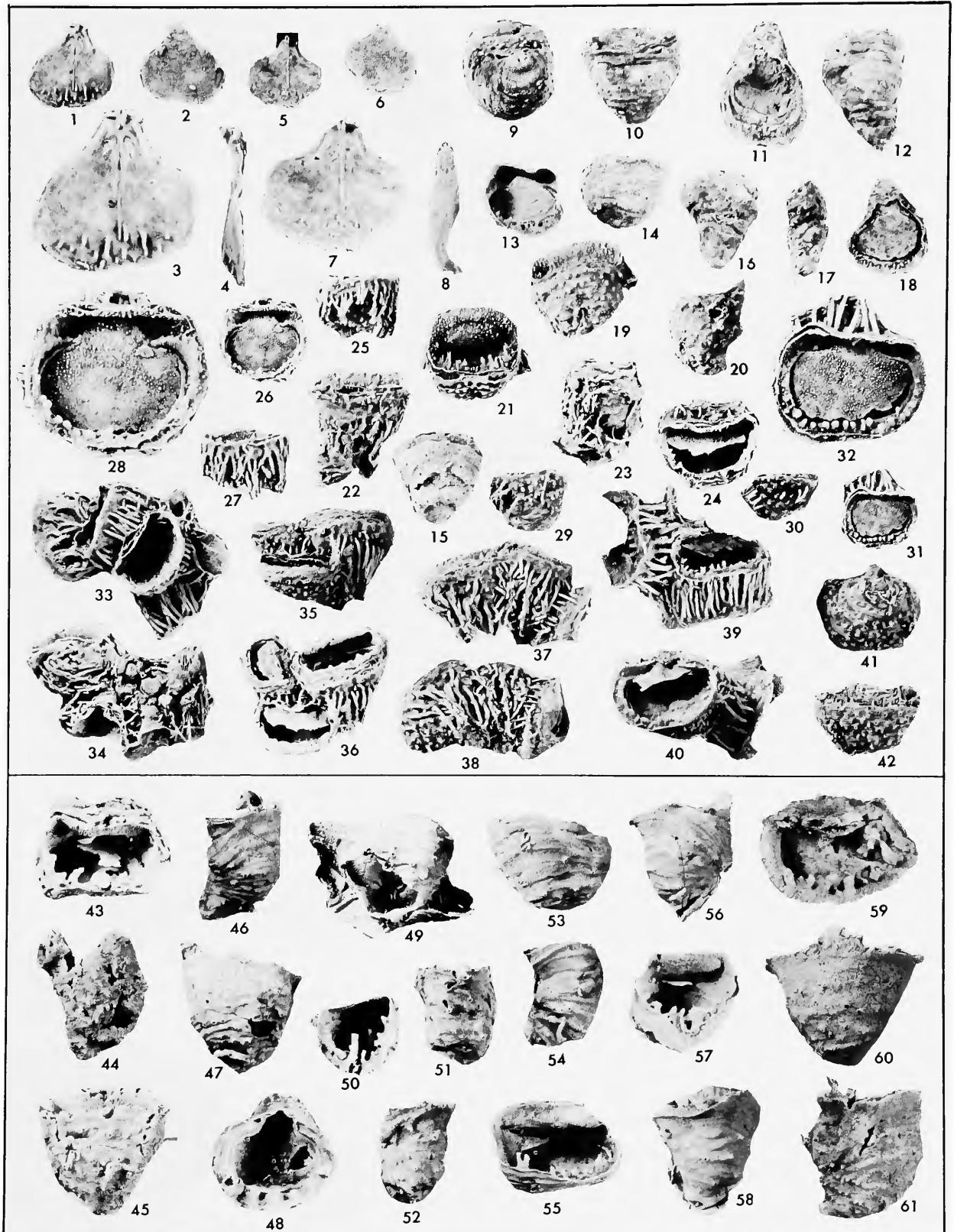


PLATE 203

Acritosia and Teguliferina

Acritosia teguliferoides (R. E. King): 1, 2, Side and anterior views of a decorticated specimen, $\times 1$, paratype YPM 11952; 3, dorsal view, $\times 2$, of the preceding specimen. [Skinner Ranch Formation (base), R. E. King locality 208 = USNM 705a.]

Teguliferina boesei R. E. King: 4, 5, Dorsal and side views of a small specimen with flattened spines, $\times 1$, hypotype USNM 154091b; 6, 7, anterior and dorsal views of another small specimen with both valves, $\times 1$, hypotype USNM 154091a; 16, side of a specimen $\times 1$, showing piled up rims (cone-in-cone structure), hypotype USNM 154091c. [Neal Ranch Formation (upper 15 feet of bed 2 of P. B. King), USNM 701.]

8, 9, Dorsal view of an immature specimen, $\times 1$, $\times 2$, hypotype USNM 151346a; 10, 11, dorsal view of another immature individual, $\times 1$, $\times 2$, hypotype USNM 151346b; 12, 13 dorsal view of a half grown specimen, $\times 1$, $\times 2$, showing margin without protective spines, hypotype USNM 151346c; 14, two individuals attached to a *Derbyia* valve, $\times 1$, hypotype USNM 154092b; 18, 19, side and ventral views of a specimen, preserving its flattened spines, $\times 1$, hypotype USNM 154092c; 20, 21, dorsal and ventral views of a specimen with marginal protective spines and flattened attachment spines, $\times 1$, hypotype USNM 151347n; 22, dorsal view of a cluster having one specimen with well developed protective spines on the anterior side of the aperture, $\times 1$, hypotype USNM 154092d; 23, a cluster of attached specimens, $\times 1$, hypotype USNM 154092e; 24, side view of another cluster, $\times 1$, hypotype USNM 154092f; 25, dorsal view of two specimens attached to a bryozoan, $\times 1$, hypotype USNM 154092a. [Neal Ranch Formation (bed 4), USNM 701d.]

15, Side, showing the flattened attachment spines, $\times 1$, hypotype USNM 154093a. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701k.]

17, Dorsal view of a pedicle valve attached to *Eolyttonia*, $\times 1$, hypotype USNM 154094a. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701c.]

Acritosia teguliferoides (R. E. King): 26, Cluster of small individuals, $\times 1$, hypotype USNM 154058a; 27, interior of a pedicle valve, $\times 1$, showing protruding ends of the rhizoid spines, hypotype USNM 154058-1; 28, fragmentary specimen, $\times 1$, showing rhizoid spines, hypotype USNM 154058b; 29, 30, interior, $\times 1$, $\times 2$, showing the brachial valve and its cardinal process, hypotype USNM 154058c; 31, 32, another brachial valve and part of pedicle valve, $\times 1$, $\times 2$, showing endospines, hypotype USNM 154058d; 33, broken pedicle valve, $\times 2$, showing brachial valve in position, hypotype USNM 154058g; 34, immature specimen in dorsal view, $\times 1$, showing granulose exterior of brachial valve, hypotype USNM 154058m; 35, 36, interior of the pedicle valve, $\times 1$, $\times 2$, showing adductor track and internal spine bases, hypotype USNM 154058f; 37, 38, anterior view of a broken pedicle valve showing the dorsal valve in place, $\times 1$, $\times 2$, hypotype USNM 154058e; 39, interior of a pedicle valve, $\times 2$, showing the proximal ends of the rhizoid spines, hypotype USNM 154058h; 40, *Elliottella* pedicle valve occupied by the young of *Acritosia teguliferoides*, $\times 2$, hypotype USNM 154058i. [Bone Spring Formation, USNM 728e.]

PLATE 203.—*Acritosia* and *Teguliferina*

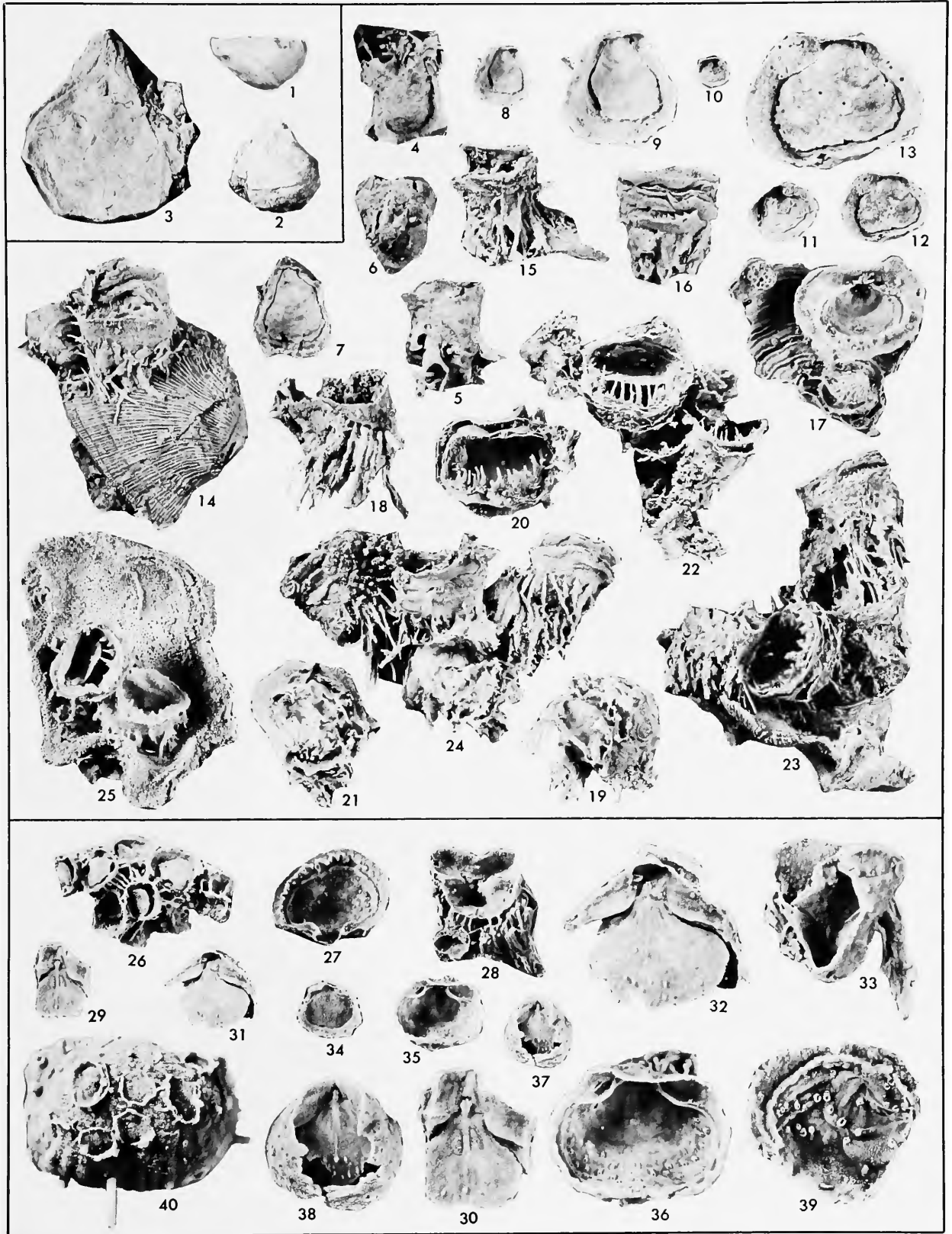


PLATE 204

Teguliferina

Teguliferina boesei R. E. King: 1–3, Interior and side, $\times 2$, and exterior, $\times 1$, views of a brachial valve, hypotype USNM 154095a; 14–16, interior, $\times 2$, posterior, $\times 3$, and side, $\times 2$, views of another brachial valve, showing erect cardinal process, hypotype USNM 154095b. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 712w.]

4, Broken specimen showing brachial valve in place, $\times 2$, hypotype USNM 154110; 12, 13, anterior and ventral views of a pedicle valve, $\times 1$, showing webbed attachment spines, hypotype USNM 154091f; 17, 18, ventral and side views of a specimen, $\times 1$, showing fine striae, hypotype USNM 154091e. [Neal Ranch Formation (upper 15 feet of bed 2 of P. B. King), USNM 701.]

5, 6, Dorsal, view, $\times 2$, and anterior view, $\times 1$, showing the brachial valve in place but no protective spines, hypotype USNM 151352c; 7, 8, anterior view, $\times 1$, dorsal view, $\times 2$, of another specimen, showing the brachial valve in place but no protective spines yet developed, hypotype USNM 151352d; 9–11, dorsal, side, and anterior views of an adult with webbed spines and short protective spines, $\times 1$, hypotype USNM 154093b; 19–21, anterior, $\times 2$, dorsal, $\times 1$, and anterior, $\times 1$, views, showing the large webbed, rhizoid spines, hypotype USNM 154093c; 27, dorsal view of a small, cylindrical individual with long protective spines, $\times 1$, hypotype USNM 154093d; 28, 29, dorsal and ventral views of a small cluster showing brachial valve in place and mat of attachment spines, $\times 1$, hypotype USNM 154093f. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701k.]

22, 23, *Limbella* with three attached *Teguliferina*, $\times 1$, hypotype USNM 154094c. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701c.]

24–26, Ventral and side views, $\times 1$, and ventral view $\times 2$, of two attached specimens, showing the webbed attachment spines binding them together, hypotype USNM 154092g; 30, dorsal view of a small cluster of attached specimens, $\times 1$, hypotype USNM 154092h. [Neal Ranch Formation (bed 4), USNM 701d.]

PLATE 204.—*Teguliferina*

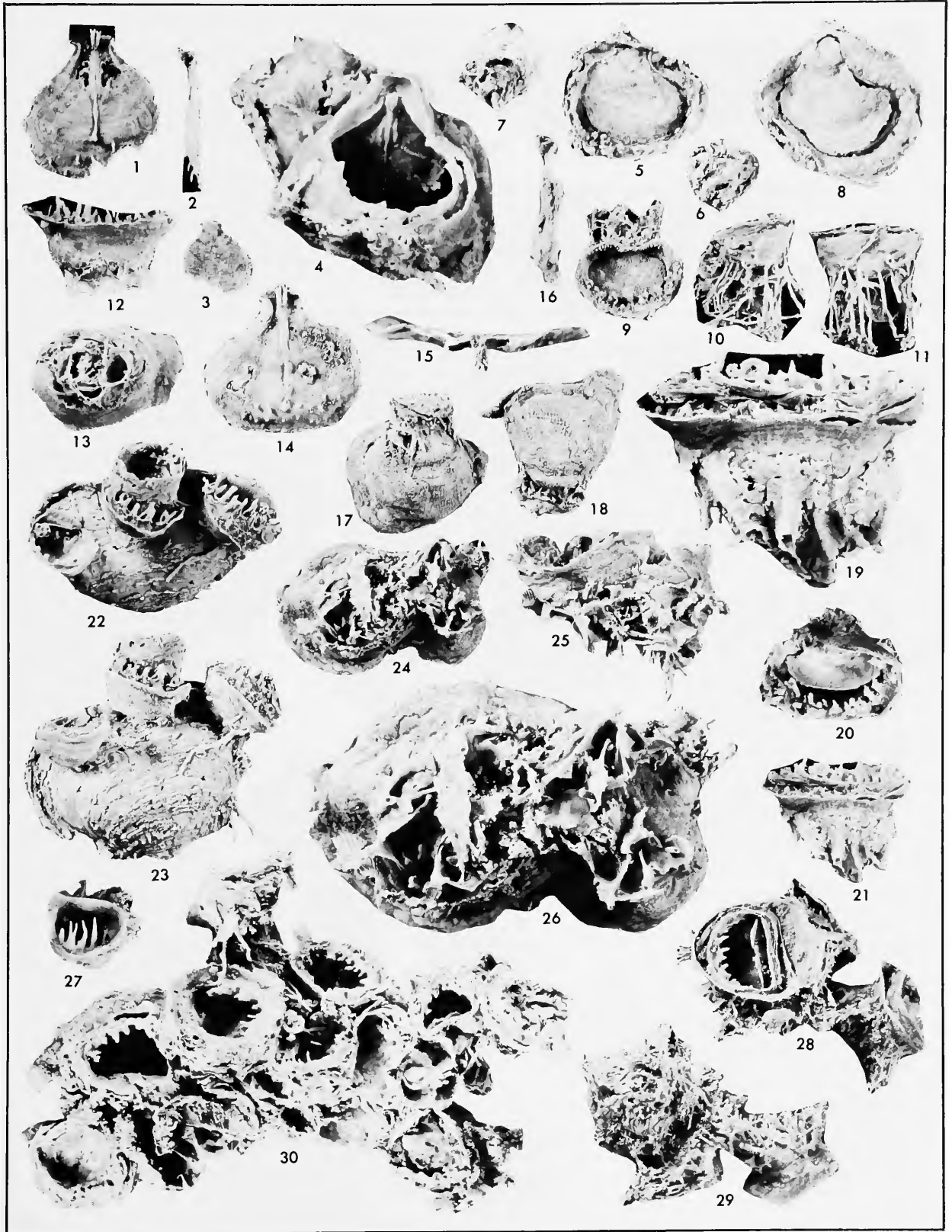


PLATE 205

Teguliferina

Teguliferina conida (Stehli): 1-4, Dorsal, side, anterior, and ventral views, $\times 1$, of a specimen with both valves, hypotype USNM 154097c; 5-8, ventral, dorsal, side, and anterior views, $\times 1$, showing bases of webbed rhizoid spines, hypotype USNM 154097b; 9-12, side, anterior, ventral, and dorsal views of a complete specimen, showing brachial valve in feeding (?) position, webbed spines and protective spines, hypotype USNM 154097a; 13-16, dorsal, ventral, anterior, and side views of a complete specimen, $\times 1$, hypotype USNM 154097d; 17, anterior view of the preceding specimen, $\times 2$, showing the webbed, rhizoid spines. [Bone Spring Formation, AMNH 625.]

18-21, Ventral, side, anterior, and dorsal views of a young individual, $\times 1$, hypotype USNM 154096a; 22-24, side and anterior views, $\times 1$, and side view, $\times 2$, showing webbed spines on a small adult, hypotype USNM 154096b; 25, 26, side and anterior views, $\times 1$, of a small specimen, hypotype USNM 154096c; 27, anterior view, $\times 2$, of the preceding specimen, showing the webbed, rhizoid spines; 28, large adult attached to a small coral colony, $\times 1$, hypotype USNM 154096m; 29-31, dorsal, ventral, and anterior views of a young individual with webbed spines, $\times 1$, hypotype USNM 154096d; 32, ventral view of the preceding specimen, $\times 2$, showing the webbed rhizoid spines; 33, dorsal view of an immature specimen, $\times 1$, hypotype USNM 154096f; 34, 35, interior of a broken specimen, $\times 1$, $\times 2$, showing the brachial valve in place, hypotype USNM 154096e. [Bone Spring Formation, USNM 728e.]

PLATE 205.—*Teguliferina*

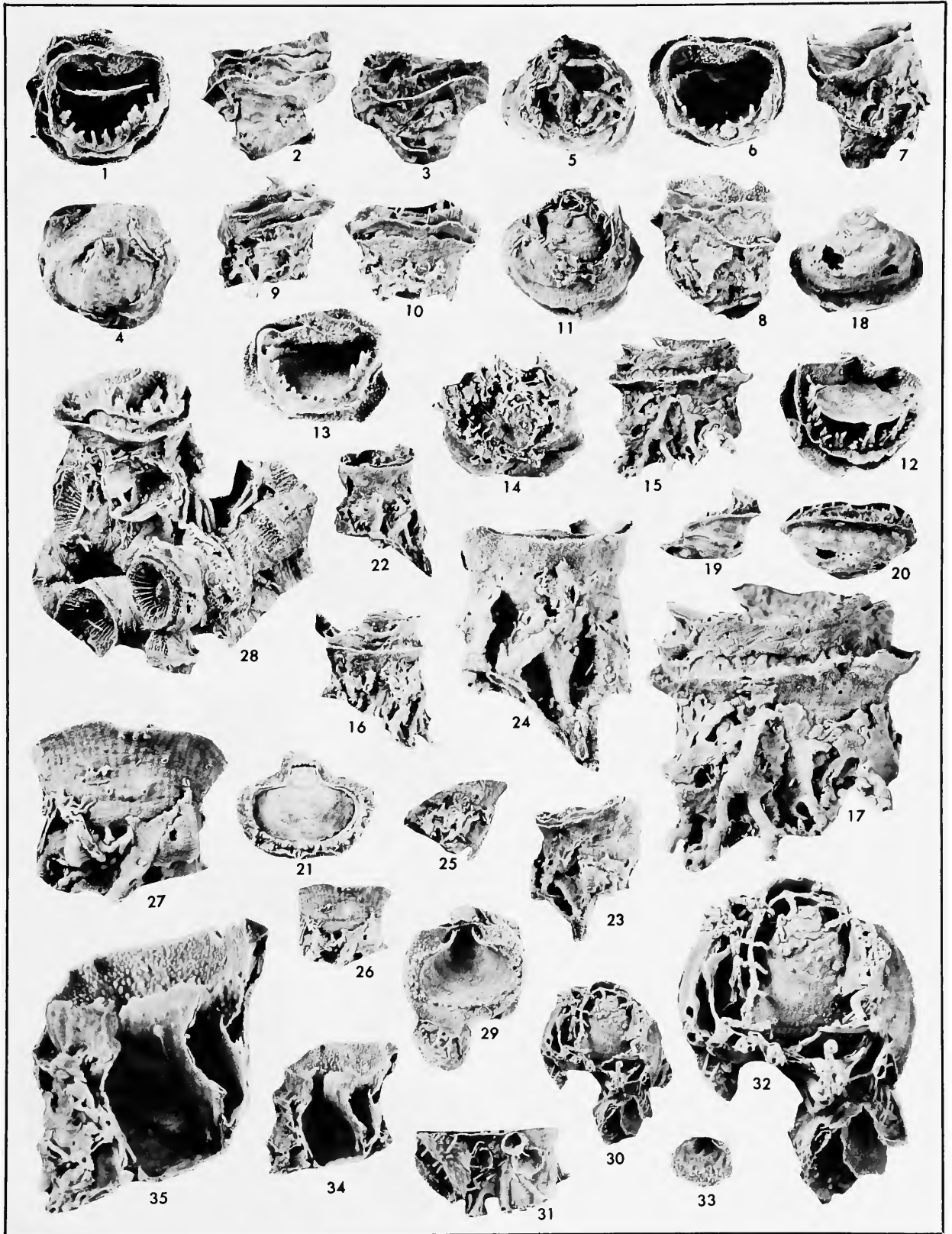


PLATE 206

Teguliferina

Teguliferina conida (Stehli): 1, 2, Anterior and dorsal views of a young pedicle valve, $\times 1$, hypotype USNM 154098a. [Bone Spring Formation, 728f.]

8, Dorsal view, $\times 1$, of a young specimen with both valves but not yet having developed protective spines, hypotype USNM 154096j; 24–26, interior, $\times 1$, interior and side, $\times 2$, of a brachial valve, showing erect cardinal process and endospines, hypotype USNM 154099a; 27–29, interior, $\times 1$, and side and interior, $\times 2$, of another brachial valve, showing erect cardinal process, hypotype USNM 154099b; 30–32, interior, $\times 1$, and interior and side, $\times 2$, of a wide brachial valve, showing cardinal process and brevisseptum, hypotype USNM 154099c; 33–36, anterior, side, dorsal, and posterior views of a large specimen, $\times 1$, hypotype USNM 154096g; 37, ventral view of the preceding hypotype, $\times 2$, showing webbed attachment spines; 38, 39, dorsal and anterior views of a pedicle valve, showing the webbed spines, $\times 1$, hypotype USNM 154096h; 40, 41, dorsal and side views of another pedicle valve, $\times 1$, showing the webbed rhizoid spines, hypotype USNM 154096–1. [Bone Spring Formation, USNM 728c.]

3–6, Dorsal, ventral, anterior, and side views of a young specimen, $\times 1$, hypotype USNM 151375i; 7, dorsal view of a specimen distorted by crowding, $\times 1$, hypotype USNM 151375c; 9–12, dorsal, ventral, side, and anterior views of a complete specimen, $\times 1$, hypotype USNM 151375e; 13, anterior of the preceding specimen, $\times 2$, showing the webbed rhizoid spines; 14–17, dorsal, anterior, side, and ventral views of a specimen stripped of its spines, $\times 1$, hypotype USNM 151375d; 18, 19, dorsal and side views of a large pedicle valve, $\times 1$, hypotype USNM 151375a; 20, exterior of a brachial valve, $\times 1$, hypotype USNM 151375j; 21–23, posterior view, $\times 3$, and interior and side views, $\times 2$, of the preceding specimen, showing cardinal process, brevisseptum and endospines. [Skinner Ranch Formation (base), USNM 705a.]

42, 43, Dorsal view of a complete specimen, $\times 1$, $\times 2$, showing granulose surface and long protective spines, hypotype USNM 123889. [Bone Spring Formation, AMNH 625.]

PLATE 206.—*Teguliferina*

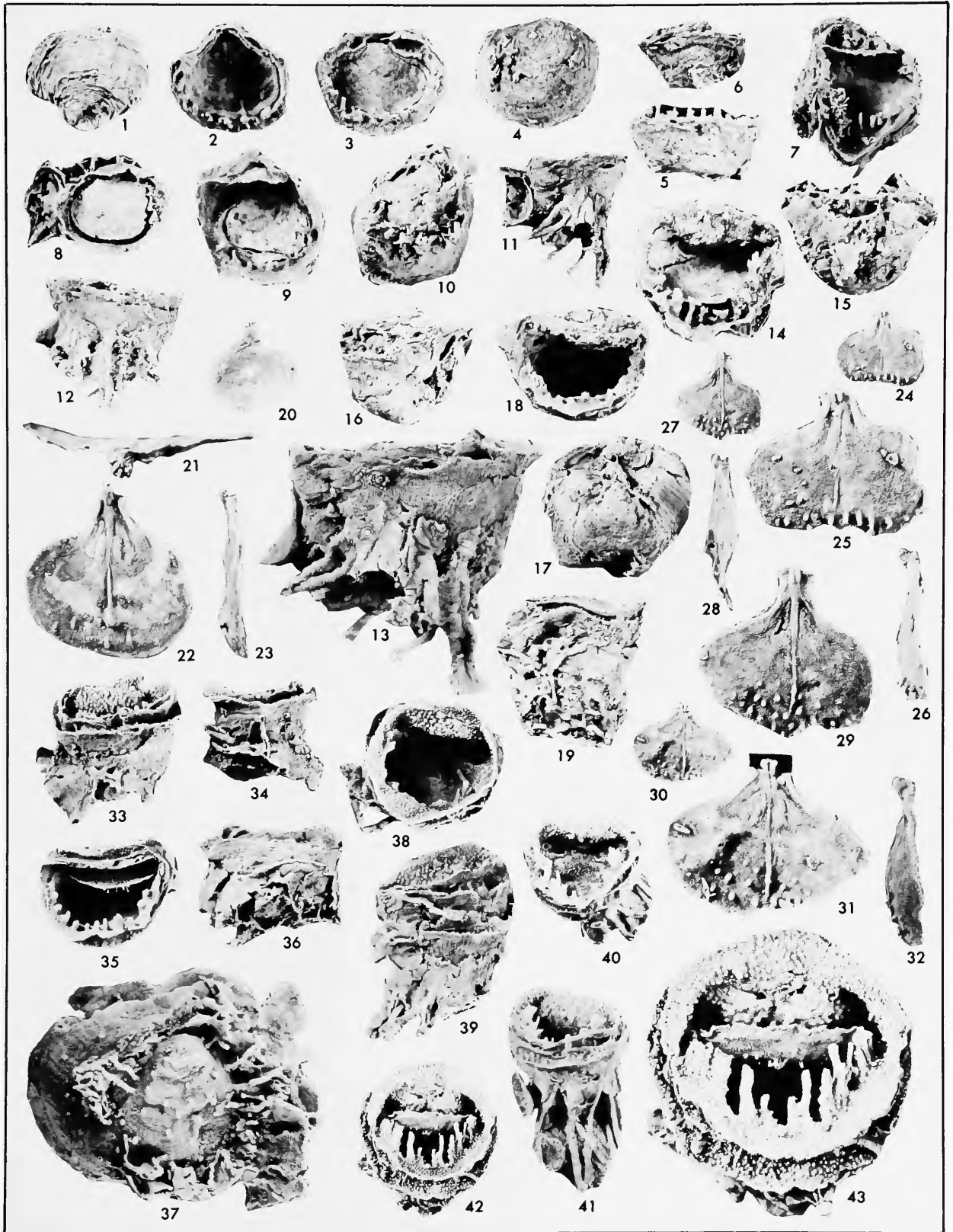


PLATE 207

Teguliferina

Teguliferina compacta, new species: 1–3, Dorsal, anterior, and ventral views of a specimen, $\times 1$, showing the protective spines, holotype USNM 151370a; 4–6, anterior, dorsal, and ventral views of a wide specimen, $\times 1$, paratype USNM 151370c; 7–9, dorsal, anterior, and ventral views of another paratype, USNM 151370b. [Skinner Ranch Formation (top), USNM 705r.]

10, Anterior view of a specimen, $\times 2$, showing remnants of the webbed attachment spines, paratype USNM 151369a. [Hess Formation (Taylor Ranch Member), USNM 702d.]

Teguliferina parva, new species: 11, 12, Anterior and side views of two large pedicle valves, $\times 1$, paratype USNM 151372a, b; 13, 14, anterior and dorsal views, $\times 1$, of a depressed specimen, paratype USNM 151372f; 15, 16, anterior and dorsal views of another complete specimen, $\times 1$, holotype USNM 151372e; 17, 18, ventral view of a broken specimen, $\times 1$, $\times 2$, showing the brachial valve, paratype USNM 151372c. [Red Eagle Formation, USNM 761.]

Teguliferina solidispinosa, new species: 19–21, Anterior, side, and posterior views of a pedicle valve, $\times 1$, showing tiered marginal flanges (cone-in-cone structure) and webbed spines, $\times 1$, paratype USNM 154100b; 22, side view of the preceding specimen, $\times 2$, showing the webbed, rhizoid spines; 23–25, posterior, anterior and dorsal views, $\times 1$, of a pedicle valve, showing the strong protective spines, paratypes USNM 154100c; 26, 27, anterior and side views of another pedicle valve, $\times 1$, showing the protective spines over the aperture and webbed, rhizoid spines, holotype USNM 154100a. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701c.]

Teguliferina boesei R. E. King: 28, 29, interior of two brachial valves, $\times 2$, showing large, erect cardinal process, hypotypes USNM 154101b, c; 30, interior of another brachial valve, $\times 2$, showing a few aborted endospines, hypotype USNM 154101a. [Neal Ranch Formation (bed 4), USNM 701d.]

31, Exterior of a large brachial valve, $\times 1$, hypotype USNM 154091h; 32, 33, interior and side views of the preceding specimen, $\times 2$; 34, posterior of the preceding specimen, $\times 4$, showing the myophore; 35, 36, interior and side views of another brachial valve, $\times 2$, hypotype USNM 154091g; 37, posterior view of the preceding specimen, $\times 4$, showing its myophore; 38, cluster of specimens, $\times 1$, hypotype USNM 154091i. [Neal Ranch Formation (bed 2 of P. B. King), USNM 701.]

PLATE 207.—*Teguliferina*

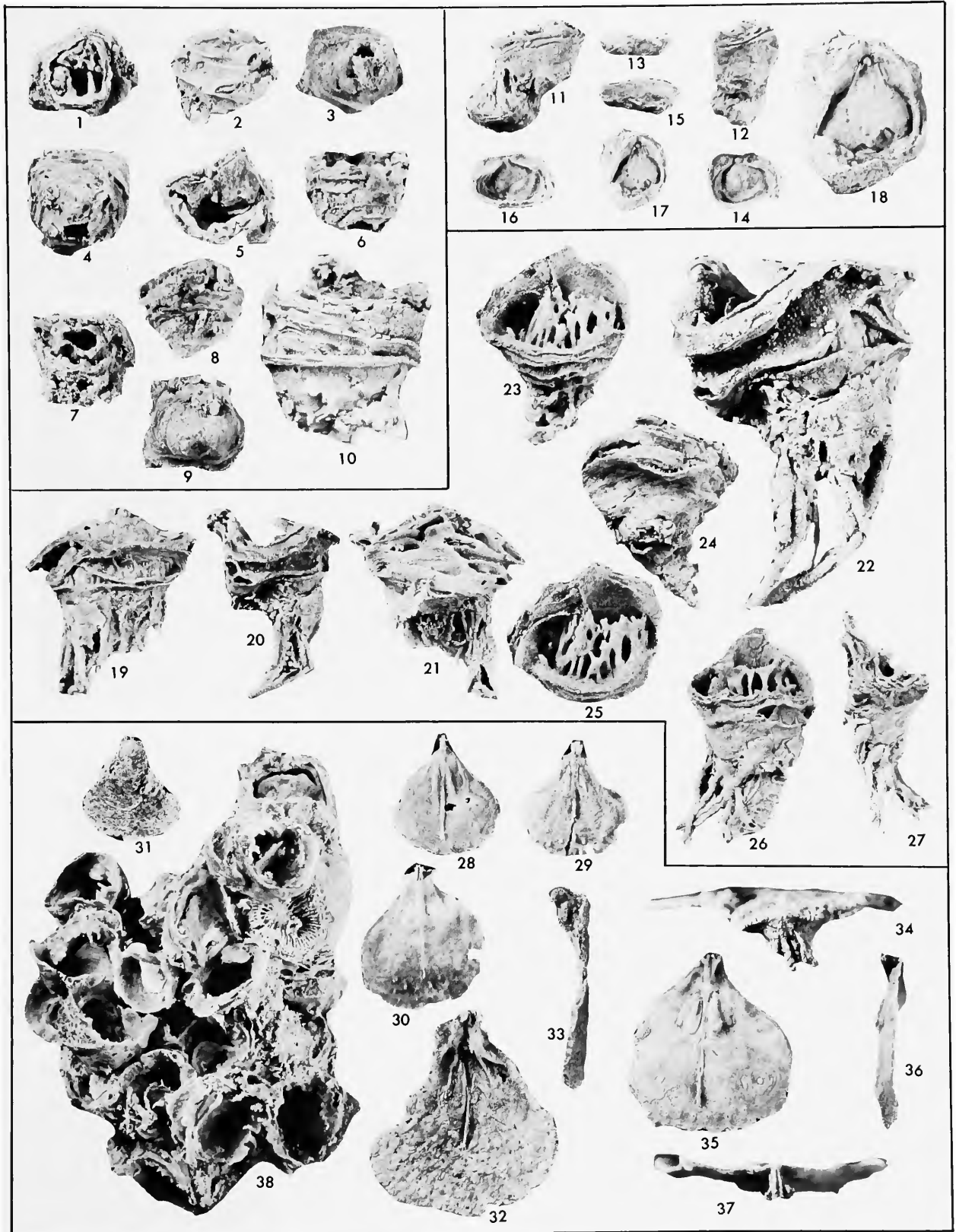


PLATE 208

Paucispinifera, *Liosotella*, *Glyptosteges*, *Cooperina*, and *Horridonia*

Paucispinifera magnispina, new species: 1–4, Dorsal, posterior, ventral, and side views of a complete specimen, $\times 1$, paratype USNM 149562a. [Word Formation (Willis Ranch Member), USNM 706e.]

Liosotella texana (Girty): 5–8, Posterior, dorsal, ventral, and side views, $\times 1$, of the holotype USNM 118526a. [Delaware Mountain Formation, USGS 2903 (grcen).]

Glyptosteges angustus (R. E. King): 9–12, Anterior, side, posterior, and ventral views, $\times 1$, of the lectotype YPM 11807a. [Skinner Ranch Formation, R. E. King locality 4.]

Cooperina parva, new species: 13, 14, An attached pedicle valve, $\times 1$, $\times 2$, paratype USNM 154174; 20–25, posterior, dorsal, side, anterior, and ventral views of a complete specimen, $\times 8$, holotype USNM 152638a; 33–35, exterior, interior, and anterior views of a brachial valve, $\times 8$, paratype USNM 152638b; 36, 37, interior and exterior of another brachial valve, $\times 8$, showing adductor platforms, paratype USNM 152638c. [Road Canyon Formation (base), USNM 702c.]

15, 16, Interior of an attached pedicle valve, $\times 1$, $\times 2$, paratype USNM 154175a. [Cathedral Mountain Formation (Wedin Member), USNM 700x.]

17–19, Anterior, dorsal, and posterior views of a complete specimen, $\times 8$, paratype USNM 152639d; 26–30, anterior, posterior, side, ventral, and interior views of a pedicle valve, $\times 8$, paratype USNM 152639e; 31, 32, ventral and dorsal views of a complete specimen, $\times 8$, paratype USNM 152639f; 38, interior of a brachial valve, $\times 8$, showing adductor platforms, paratype USNM 152639g (lost). [Hess Formation (Taylor Ranch Member), USNM 702d.]

Horridonia texana R. E. King: 39–42, Side, dorsal, ventral, and posterior views of the holotype, $\times 1$, YPM 11508. [Road Canyon Formation, R. E. King locality 255.]

43–46, Interior, side, posterior, and exterior views of a brachial valve, $\times 1$, showing median fold, and ear spines, hypotype USNM 154176a; 47, myophore of the cardinal process, $\times 2$, of the preceding specimen. [Road Canyon Formation, USNM 735a.]

PLATE 208.—*Paucispinifera*, *Liosotella*, *Glyptosteges*, *Cooperina*,
and *Horridonia*

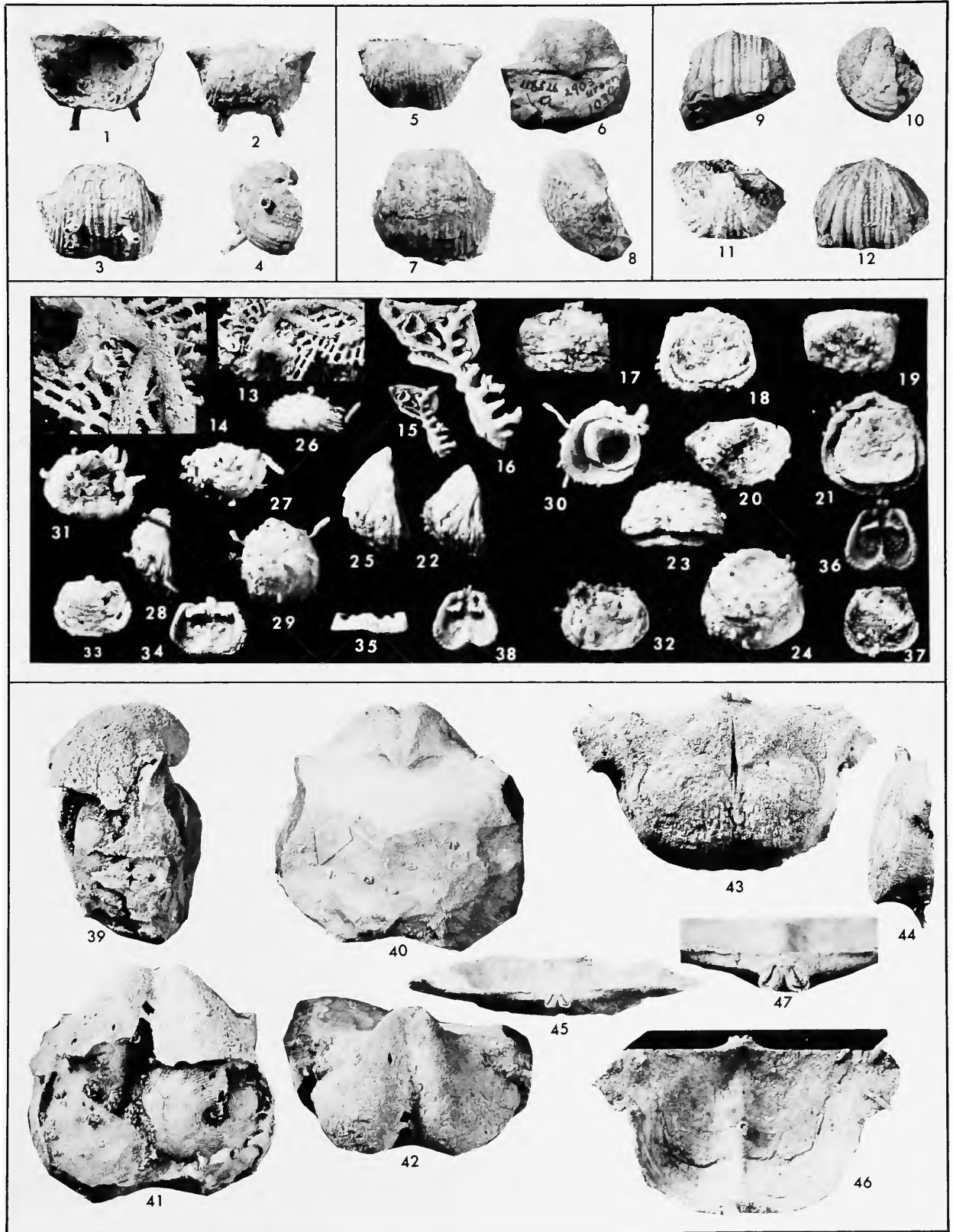


PLATE 209

Cooperina

Cooperina triangulata, new species: 1, 2, Ventral view of a specimen with umbonal region removed to show lobed cardinal process and adductor platforms, $\times 8$, paratype USNM 152640e; 3–6, side, interior, exterior, and anterior views, $\times 8$, of another brachial valve having a strongly lobate cardinal process, paratype USNM 152640g; 22–26, posterior, anterior, dorsal, side, and pedicle views, $\times 8$, paratype USNM 152640d; 27–31, side, anterior, ventral, and posterior views of another complete specimen, $\times 8$, holotype USNM 152640c; 36, 37, side views of two specimens attached to the pedicle valve of *Diplanus*, $\times 3$, paratypes USNM 152640i, h. [Neal Ranch Formation (bed 4), USNM 701d.]

7–11, Anterior, exterior, interior, side, and oblique views, $\times 8$, of a brachial valve, showing the lobate cardinal process and adductor platforms, paratype USNM 154138a; 12–16, exterior, side, oblique, interior, and anterior views of another, very attenuate brachial valve, $\times 8$, paratype USNM 154138b. [Neal Ranch Formation (bed 4), USNM 721g.]

17–21, Side, dorsal, posterior, anterior, and ventral views of a complete specimen, $\times 8$, paratype USNM 154139b; 32–35, exterior, oblique, interior, and anterior views of a brachial valve, $\times 8$, showing prominent adductor platforms, paratype USNM 154139a. [Neal Ranch Formation (bed 9 of Cooper), USNM 701a³.]

Cooperina subcuneata, new species: 38–40, Side, anterior, and interior views of an attached pedicle valve, $\times 3$, paratype USNM 154140. [Road Canyon Formation, USNM 722e.]

41–45, Interior tilted, side, anterior, interior, and exterior views of a brachial valve, $\times 8$, paratype USNM 154141, showing adductor platforms. [Road Canyon Formation, USNM 720d.]

46–50, Ventral, posterior, side, anterior, and dorsal views of a complete specimen, $\times 8$, holotype USNM 151241a; 51, 52, piece of shell occupied by four pedicle valves, $\times 1$, $\times 3$, paratype USNM 151241c; 58, 59, dorsal and side views of a complete, attached specimen, $\times 8$, paratype USNM 151241b. [Road Canyon Formation, USNM 721j.]

53–57, Dorsal, anterior, posterior, ventral, and side views of a complete specimen, $\times 8$, paratype USNM 152641a. [Road Canyon Formation, USNM 726d.]

PLATE 209.—*Cooperina*

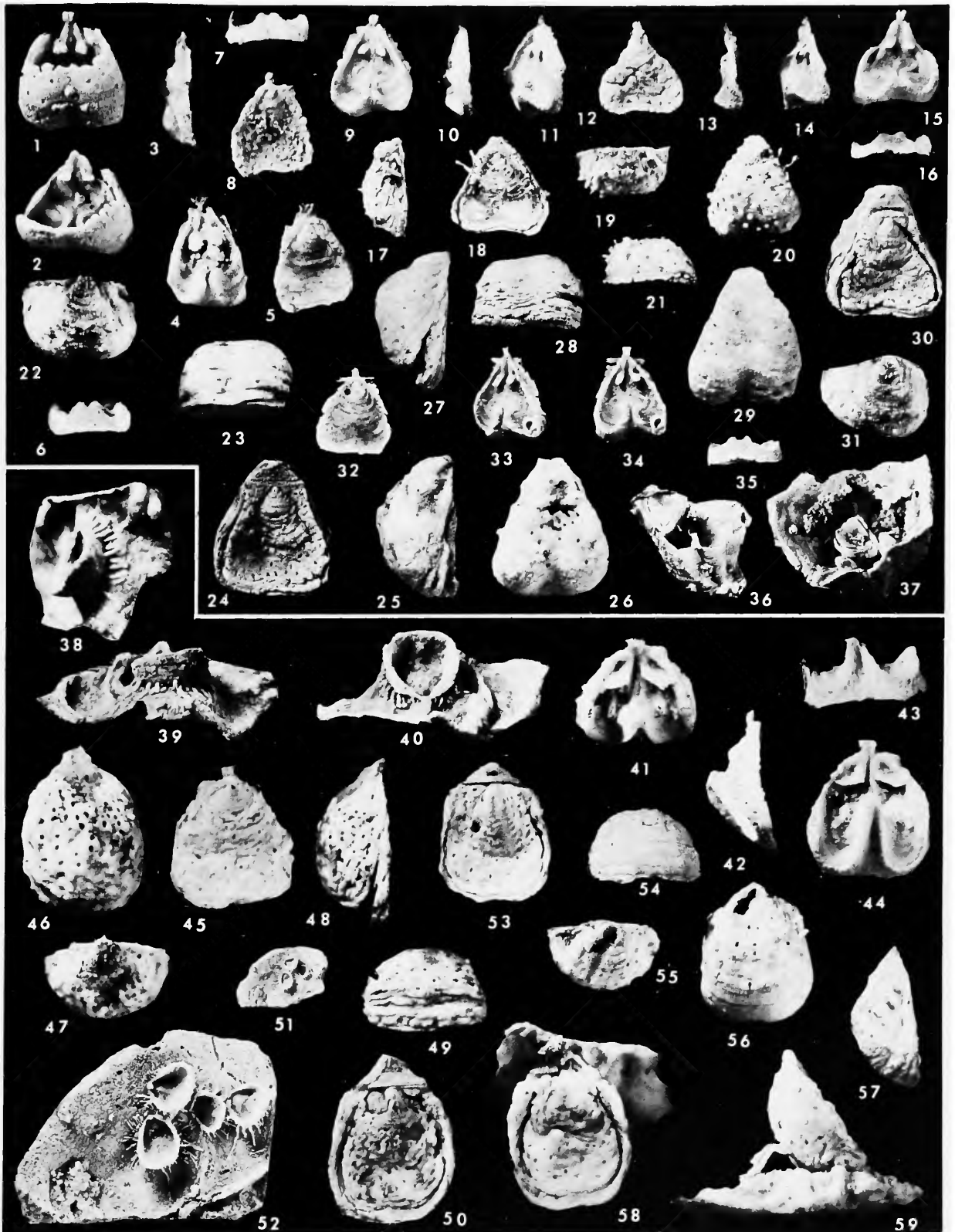


PLATE 210

Cooperina

Cooperina inexpectata, Termier, Termier, and Pajaud: 1, Dorsal view of four hypotypes, $\times 1$, USNM 153198k, a, j, c (see figures 11–14, 42–45, and 55, 56, below); 4, 5, dorsal and ventral views of a complete specimen with aureole of rhizoid spines, and huge cicatrix, $\times 6$, hypotype USNM 153198e; 6, 7, another pedicle valve in interior view, $\times 6$, showing aureole of attachment spines and huge cicatrix, hypotype USNM 153198f; 8, 9, ventral view, $\times 6$, showing spines on exterior, and interior view, $\times 3$, hypotype USNM 153198g; 10, interior of a pedicle valve, $\times 3$, showing median ridge, hypotype USNM 153198h; 11–14, side, posterior, anterior, and interior views, $\times 6$, of a pedicle valve, showing cicatrix and median ridge, hypotype USNM 153198j; 15, fragment of pectenoid shell occupied by a specimen of *Cooperina*, $\times 2$, hypotype USNM 154142f (see plate 212: figure 16, for natural size view); 16–18, side, ventral, and dorsal views of a complete specimen, $\times 6$, hypotype USNM 152637d; 19, interior of a brachial valve, $\times 6$, showing large, lobed cardinal process and adductor platforms, hypotype USNM 153198–1; 20–24, anterior, exterior, posterior, side, and interior views of a brachial valve, $\times 6$, showing median elevation, lobate cardinal process and adductor platforms, hypotype USNM 153198m; 25–29, anterior and posterior, exterior, interior and side views of a long slender individual, $\times 6$, having well defined brachial ridges, hypotype USNM 153198b; 30–34, anterior and posterior, interior, side, and exterior views of a small specimen, $\times 6$, showing adductor platforms, hypotype USNM 153198n; 35–39, posterior, anterior, interior, side, and exterior views of a brachial valve, $\times 6$, showing spines on exterior, adductor platforms and typically productid cardinal process, hypotype USNM 153198d; 40, six brachial valve interiors, $\times 1$, hypotypes USNM 153198b (for enlarged views, see figures 25–29, 30–34, 35–39, 20–24, 19); 42–45, ventral, interior, side and anterior views of a spiny pedicle valve, $\times 6$, showing broad interarea; hypotype USNM 153198c; 46–49, anterior, ventral, side, and interior views of a pedicle valve, $\times 6$, showing large cicatrix of attachment and rhizoid spines, hypotype USNM 153198a; 50, exterior of a pedicle valve, $\times 6$, showing the numerous ornament spines, hypotype USNM 153198p; 55, 56, ventral and dorsal views of a complete attached specimen, $\times 6$, hypotype USNM 153198k; 57–60, dorsal, side, ventral, and anterior views of a specimen stripped of its spines, $\times 6$, hypotype USNM 152637g; 61, interior of a pedicle valve, $\times 6$, showing anterior end of the median ridge, hypotype USNM 153198i. [Word Formation (Willis Ranch Member), USNM 706e.]

2, 3, Small leptodid, $\times 1$, $\times 2$, showing several attached individuals, hypotype USNM 154143a; 41, interior of a brachial valve, $\times 3$, hypotype USNM 154143b; 51, 52, ventral and interior views of a pedicle valve, $\times 3$, hypotype USNM 154153d; 53, 54, ventral and dorsal views of a complete specimen, $\times 3$, hypotype USNM 154143c. [Word Formation (China Tank Member), USNM 706c.]

PLATE 210.—*Cooperina*

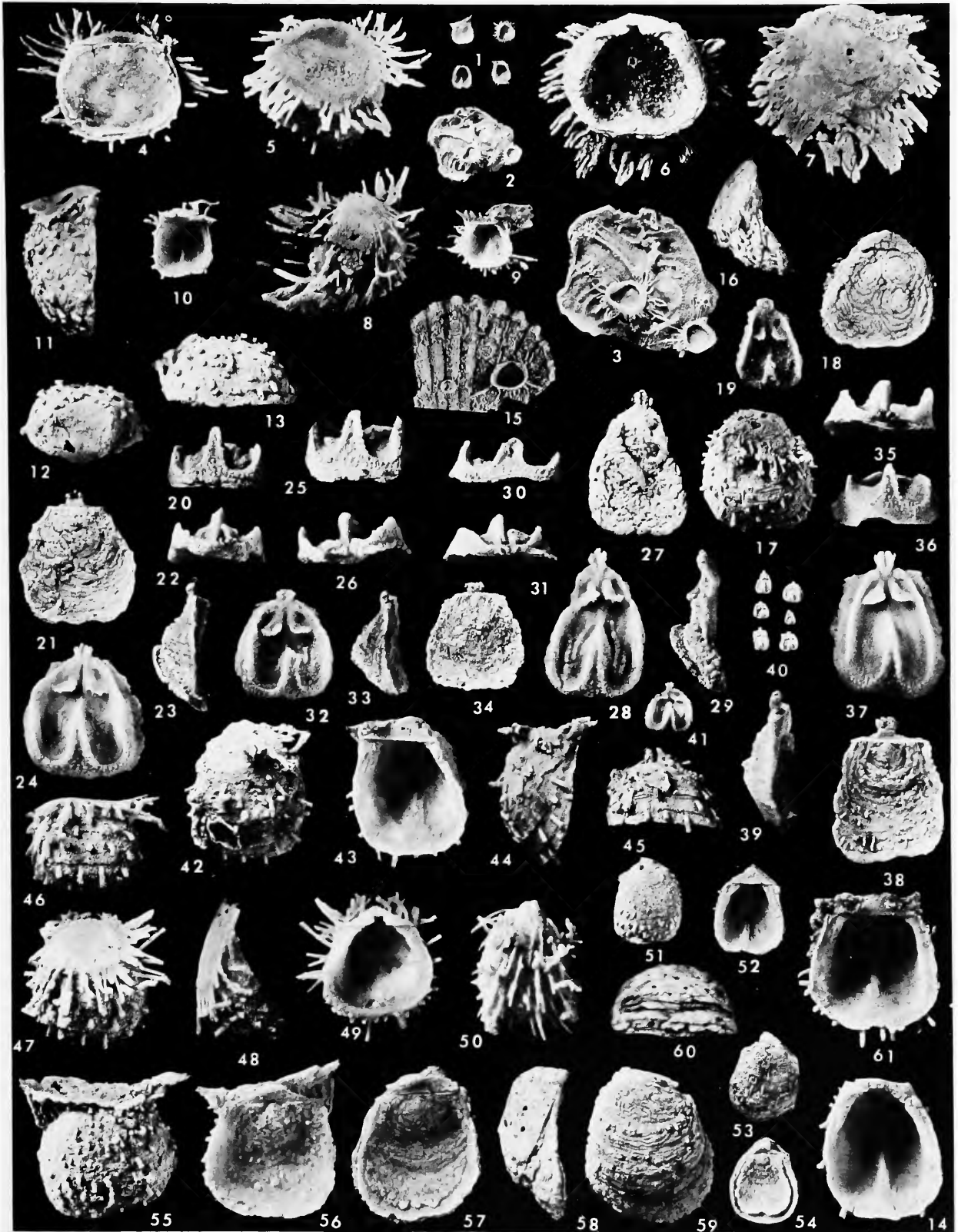


PLATE 211

Atelestegastus

Atelestegastus marginatus, new species: 1-3, Interior, side, and exterior views, $\times 6$, of a brachial valve, showing lobate cardinal process, paratype USNM 154135a; 8-10, interior, exterior, and posterior, $\times 6$, of another brachial valve, paratype USNM 154135b; 27-31, posterior, anterior, dorsal, ventral, and side views of a large complete specimen, $\times 6$, holotype USNM 154135c. [Neal Ranch Formation (bed 4), USNM 721g.]

4-7, Side, exterior, interior, and posterodorsal views, $\times 6$, of a brachial valve having a lobate cardinal process, USNM 150877f; 11, posterior of a brachial valve, $\times 6$, showing a poorly lobed cardinal process, paratype USNM 150877-1; 12-16, dorsal, anterior, posterior, ventral, and side views of a complete specimen, preserving some of its body spines, $\times 6$, paratype USNM 150877g; 17-20, dorsal, ventral, posterior, and side views of a complete specimen, $\times 6$, paratype USNM 150877h; 21-24, posterior, anterior, and ventral views, $\times 6$, of a pedicle valve, paratype USNM 150877i; 25, 26, exterior and interior of a brachial valve with lobate cardinal process, $\times 6$, paratype USNM 150877j; 32-35, side, dorsal, ventral, and posterior views of a complete specimen, $\times 6$, paratype USNM 150877b; 37, posterior of a pedicle valve, $\times 6$, showing rhizoid spines, and inter-area, paratype USNM 150877k; 51, dorsal view of two complete specimens, $\times 1$, paratypes USNM 150877g, h. [Neal Ranch Formation (bed 4), USNM 701d.]

36, Interior of the pedicle valve of *Geyerella* occupied by several specimens of *Atelestegastus*, $\times 1$, paratype USNM 154136; 38, brachial valve of *Derbyia* with *Atelestegastus* attached, $\times 1$, paratype USNM 150878a; 39, 40, pedicle valve of young *Meekella* occupied by *Atelestegastus*, $\times 1$, $\times 2$, paratype USNM 150878b. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701h.]

41, Exterior of the brachial valve of *Limbella* with attached *Atelestegastus*, $\times 1$, paratype USNM 154137a; 47-50, anterior, posterior, ventral, and dorsal views of a complete specimen, $\times 6$, paratype USNM 154137b. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

42-46, Interior, anterior, posterior, ventral, and side views of a pedicle valve, $\times 6$, paratype USNM 150875. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701c.]

PLATE 211.—*Atelestegastus*

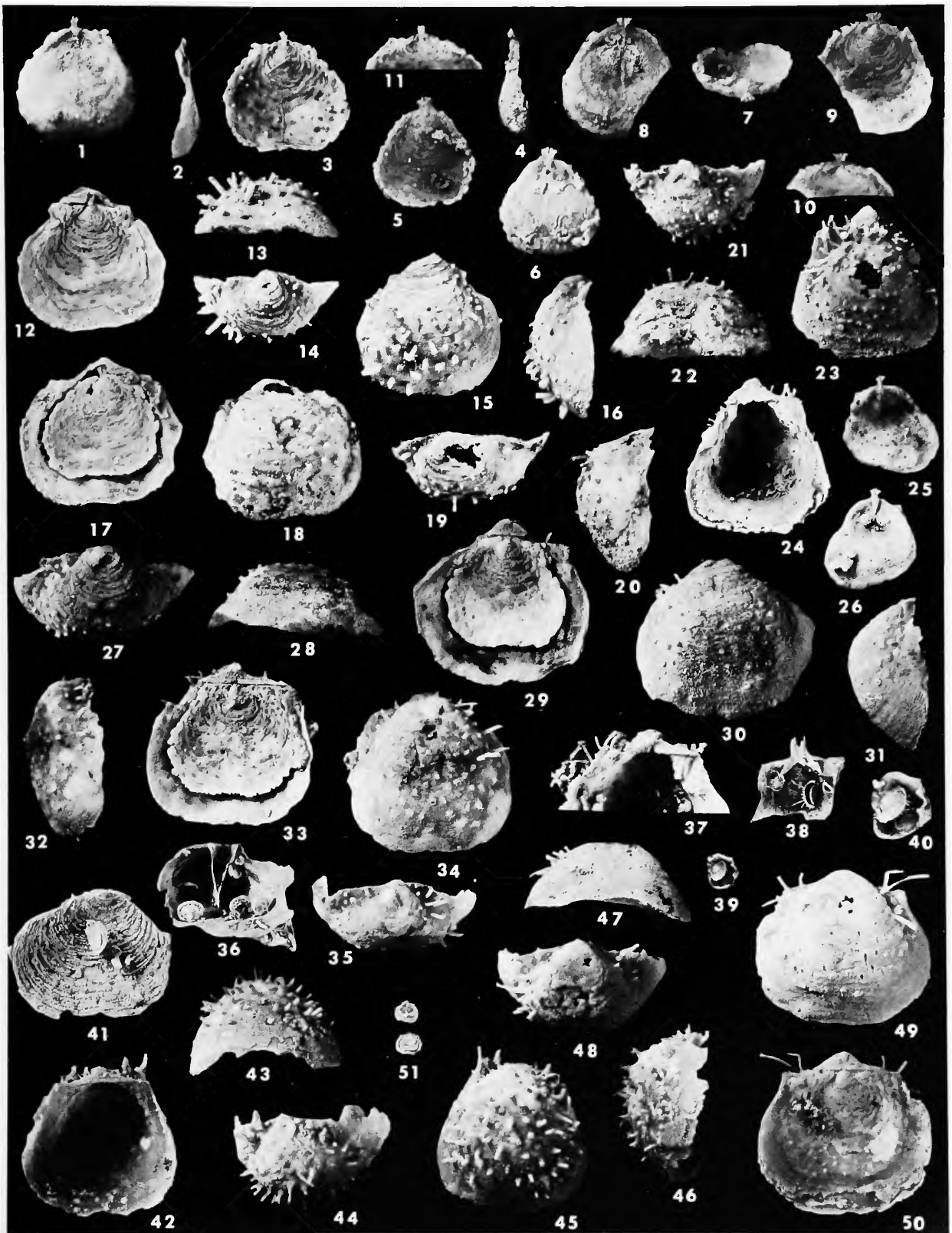


PLATE 212

Chonosteges and *Cooperina*

Chonosteges variabilis, new species: 1, 2, Interior of a brachial valve, $\times 3$, $\times 4$, showing cardinal process in the immature stage, paratype USNM 154162c; 3, immature brachial valve, $\times 3$, showing open V-shaped cardinal process, paratype USNM 154162a; 4, interior of a misshapen brachial valve, the victim of crowding, $\times 3$, showing an obese cardinal process, paratype USNM 154162b. [Cathedral Mountain Formation, USNM 702.]

5, Posterodorsal view of a brachial valve, $\times 3$, showing the myophore, paratype USNM 154154d; 6, myophore of an obese specimen, $\times 3$, showing extreme lobation, paratype USNM 154154e; 7, anterior of a brachial valve showing needles (above) that form a strainer device, $\times 3$, paratype USNM 123903b; 8, another view of a brachial valve showing inlet spines on anterior margin, $\times 3$, paratype USNM 123903a; 9, anterior of another brachial valve, $\times 4$, showing the needle-like strainers and the anterior flange, paratype USNM 123903d; 10, interior of the preceding brachial valve, $\times 3$, showing overgrown cardinal process, strongly entrenched adductor scars and brachial ridges. [Cathedral Mountain Formation, USNM 702un.]

Cooperina inexpectata Termier, Termier, and Pajaud: 11, *Echinosteges* with brachial valve overloaded with epifauna consisting of *Cyclacantharia* and *Cooperina*, $\times 1$, hypotype USNM 153185a; 12, detail of the preceding specimen, $\times 2$, showing *Cooperina* with its hairlike ornament spines; 13, two attached tetracorals with *Cooperina* occupying the angle between them, $\times 1$, hypotype USNM 154142b; 14, 15, brachial valve of *Echinauris* occupied by four individuals, $\times 1$, $\times 2$, showing erect mode of attachment, hypotype USNM 154142e; 16, fragment of pectenoid shell, $\times 1$, with attached *Cooperina*, hypotype USNM 154142f; 17, 18, *Grandaurispina*, $\times 1$, $\times 2$, with attached *Cooperina*, hypotype USNM 154142h; 19, *Cooperina* in a secluded niche between two *Cyclacantharia* valves, $\times 2$, hypotype USNM 154142a; 20, fragment of a *Derbyia* valve with several attached individuals of *Cooperina*, $\times 1$, hypotype USNM 153184; 21, 22, *Cooperina* occupying the brachial valve of a *Cyclacantharia*, $\times 1$, $\times 2$, hypotype USNM 153185b. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 212.—*Chonosteges* and *Cooperina*

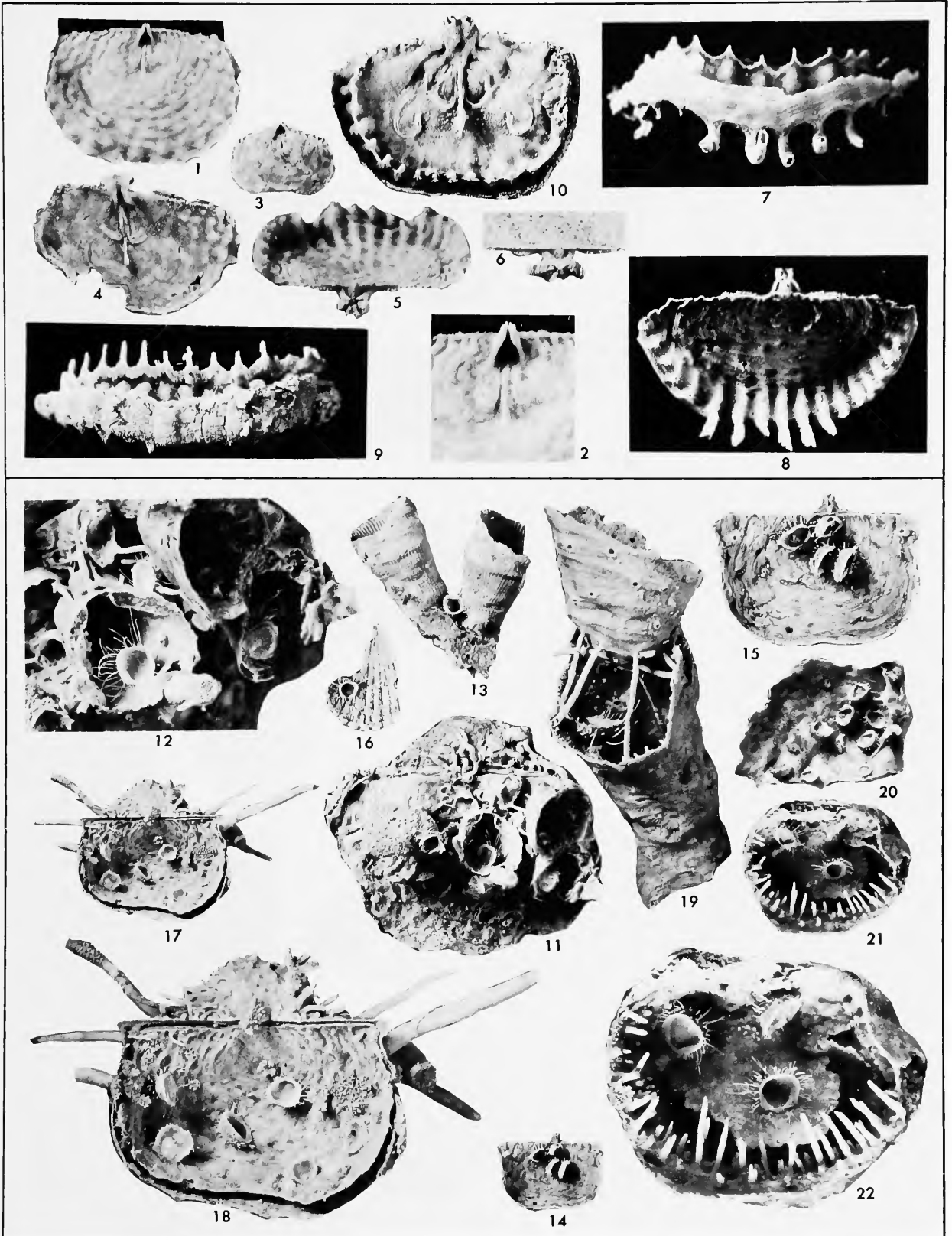


PLATE 213

Limbella

Limbella wolfcampensis (R. E. King): 1, Ventral view of a fragmentary pedicle valve, \times 1, paralectotype YPM 11849. [Lenox Hills Formation, R. E. King locality 193.]

2-5, Anterior, side, ventral and posterior views of another fragmentary pedicle valve, \times 1, paralectotype YPM 11839. [Gaptank Formation (*Uddenites*-bearing Shale Member), R. E. King locality 88s.]

6, Interior of a fragmentary brachial valve, \times 1, showing the cardinal process, lectotype YPM 11847a. [Neal Ranch Formation (bed 9 of R. E. King), R. E. King locality 93.]

7, Interior of a young brachial valve, \times 1, hypotype USNM 149061a; 8-10, ventral view of three immature pedicle valves, \times 1, hypotypes USNM 149061c, d, b; 15-17, ventral view, of three more half-grown pedicle valves, \times 1, showing rhizoid and ornament spines, hypotype USNM 149061f, j, h; 20-22, ventral, dorsal, and side views of a young but complete specimen, \times 1, hypotype USNM 149061g; 25-27, dorsal, ventral, and side views of a young adult, \times 1, hypotype USNM 149061i; 28, 29, dorsal and ventral views of an adult, \times 1, showing scaly pedicle valve and fragments of the flange, hypotype USNM 149061e. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

11-14, Side, posterior, exterior, and interior views, \times 1, of a brachial valve, hypotype USNM 154206; 23, 24, side and dorsal views of a complete young specimen, \times 1, hypotype USNM 149052d; 18, 19, dorsal and ventral views of a complete specimen, \times 1, showing marginal flange and long ornament spines, hypotype USNM 154207. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701k.]

PLATE 213.—*Limbella*

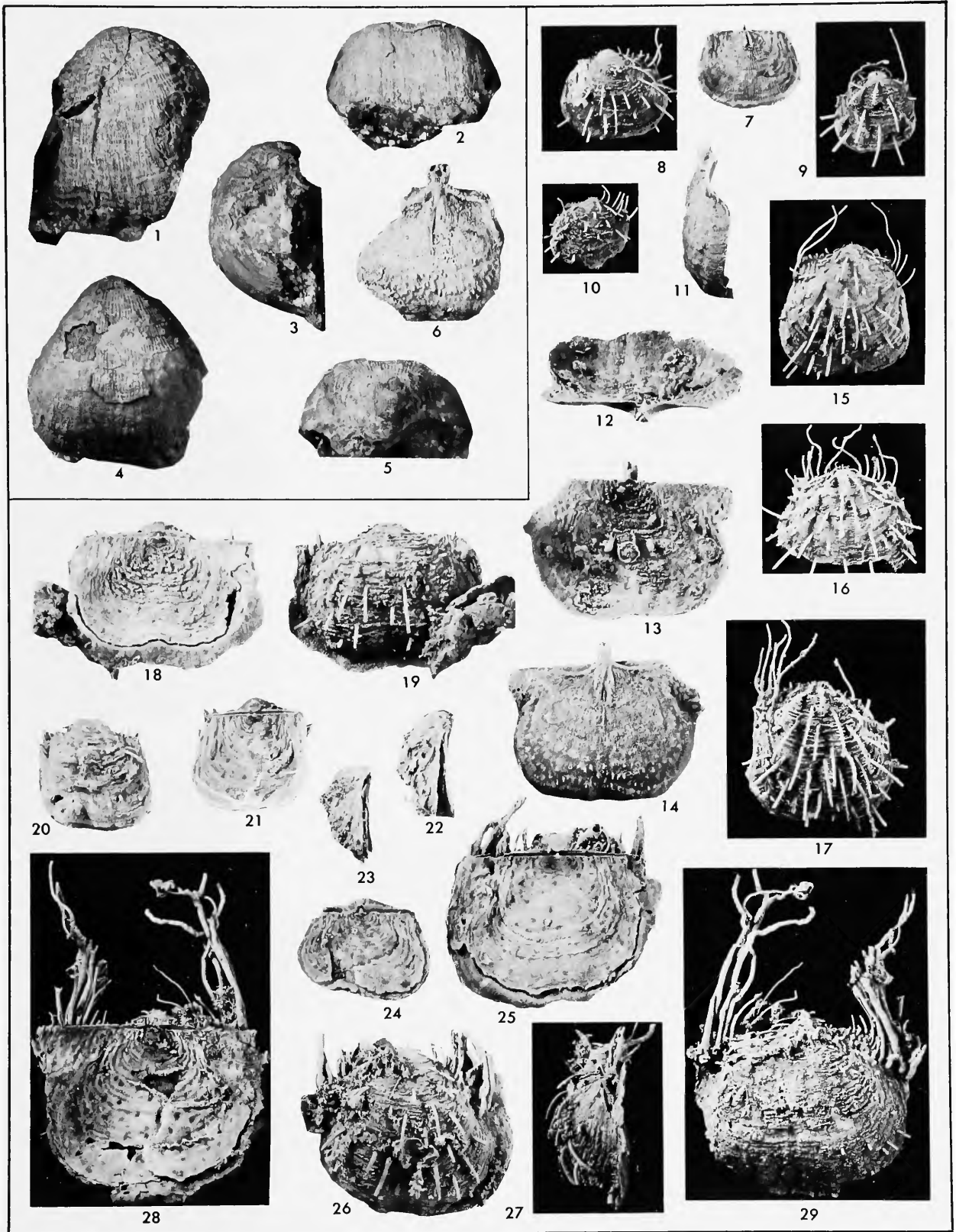


PLATE 214*Limbella*

Limbella wolfcampensis (R. E. King): 1-4, Anterior, dorsal, ventral, and side views of a complete specimen with large flange, $\times 1$, hypotype USNM 154203; 11, exterior of an old ventral valve, $\times 1$, showing scaly surface, hypotype USNM 154199. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701c.]

5, Dorsal view of a complete specimen with flange, $\times 1$, hypotype USNM 154204. [Neal Ranch Formation (bed 4), USNM 701-1.]

6, Interior of a pedicle valve, $\times 1$, showing muscle scars, hypotype USNM 124120d; 12, 13, posterior and interior, $\times 4$, showing cardinal process, narrowly lobed and small adductor scars, hypotype USNM 124120g; 14, ventral view of a young pedicle valve, $\times 1$, showing incipient geniculation and long ornament spines, hypotype USNM 124120c. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701k.]

7-10, Posterodorsal, posterior, and exterior views of a pedicle valve, $\times 1$, showing the cardinal process, hypotype USNM 154205; 15-18, anterior, ventral, side, and dorsal views, $\times 1$, of a complete specimen with flange and scaly pedicle valve, hypotype USNM 149049b; 19-21, dorsal, ventral, and side views, $\times 1$, showing marginal flange, rhizoid spines, scaly exterior of the pedicle valve and ornament spines, hypotype USNM 149049c. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701h.]

PLATE 214.—*Limbella*

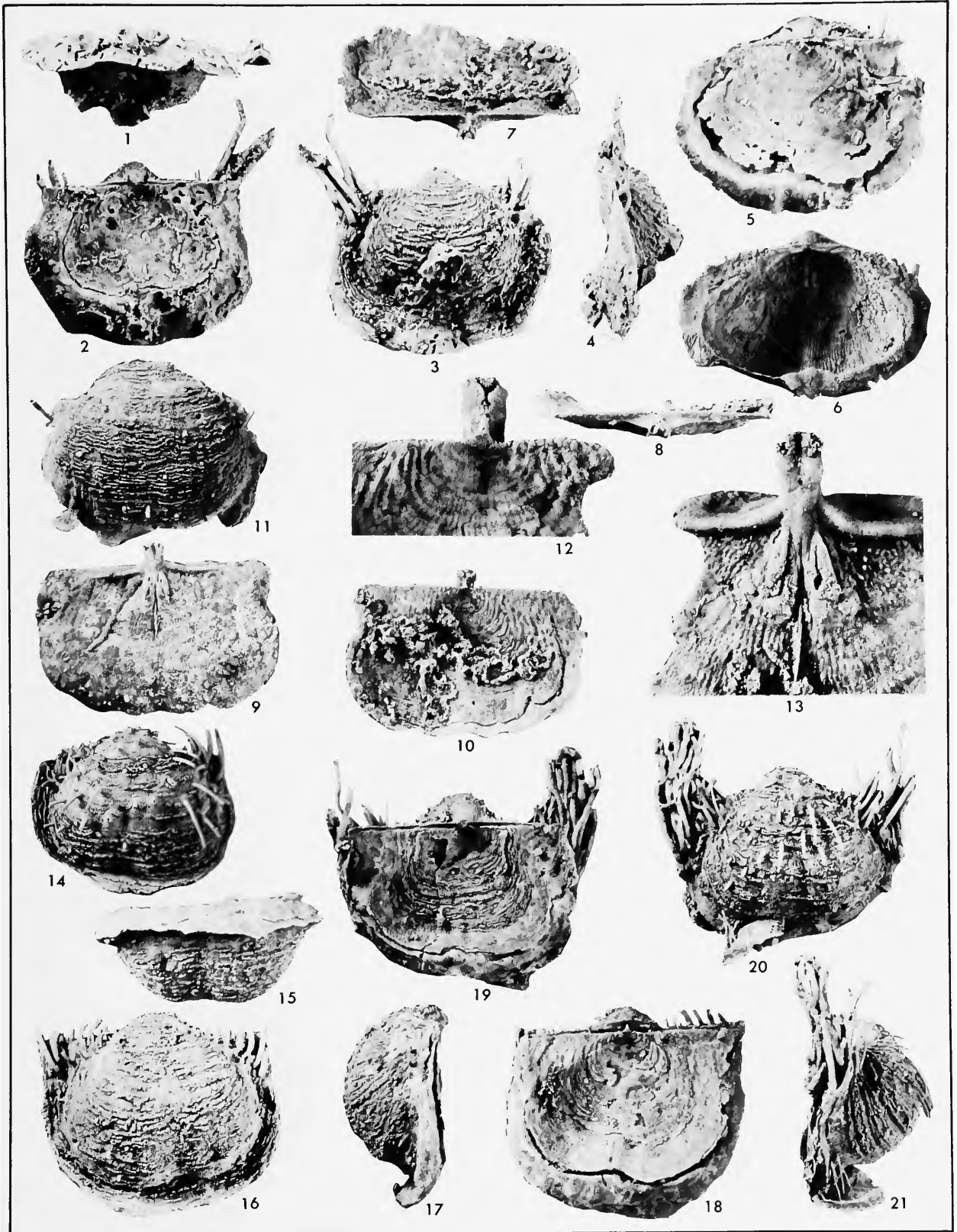


PLATE 215*Limbella*

Limbella wolfcampensis (R. E. King): 1-3, Ventral, side, and dorsal views, $\times 1$, of a large complete individual on which is perched a specimen of *Diplanus*, hypotype USNM 149053a. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701c.]

Limbella victorioensis Stehli: 4-6, Ventral view of three immature specimens, $\times 1$, hypotypes USNM 154200a-c; 7-9, posterior, ventral, and interior views of a young adult, $\times 1$, hypotype USNM 154200d; 10-12, interior, side, and ventral views of a young pedicle valve, $\times 1$, having a strong development of rhizoid spines, hypotype USNM 154200e; 13-16, exterior, posterior, side, and interior views, $\times 1$, of a brachial valve, hypotype USNM 154200f; 17-19, side, ventral and interior views of a large adult having a marginal flange and showing the muscle scars, $\times 1$, hypotype USNM 152648a; 20-24, anterior, ventral, posterior, and interior views, $\times 1$, of a large pedicle valve having a strong marginal flange, hypotype USNM 152648b; 25-27, anterior, ventral, and interior views of a small adult pedicle valve, $\times 1$, showing a flange and muscle scars, hypotype USNM 152648c. [Bone Spring Formation, USNM 728f.]

PLATE 215.—*Limbella*

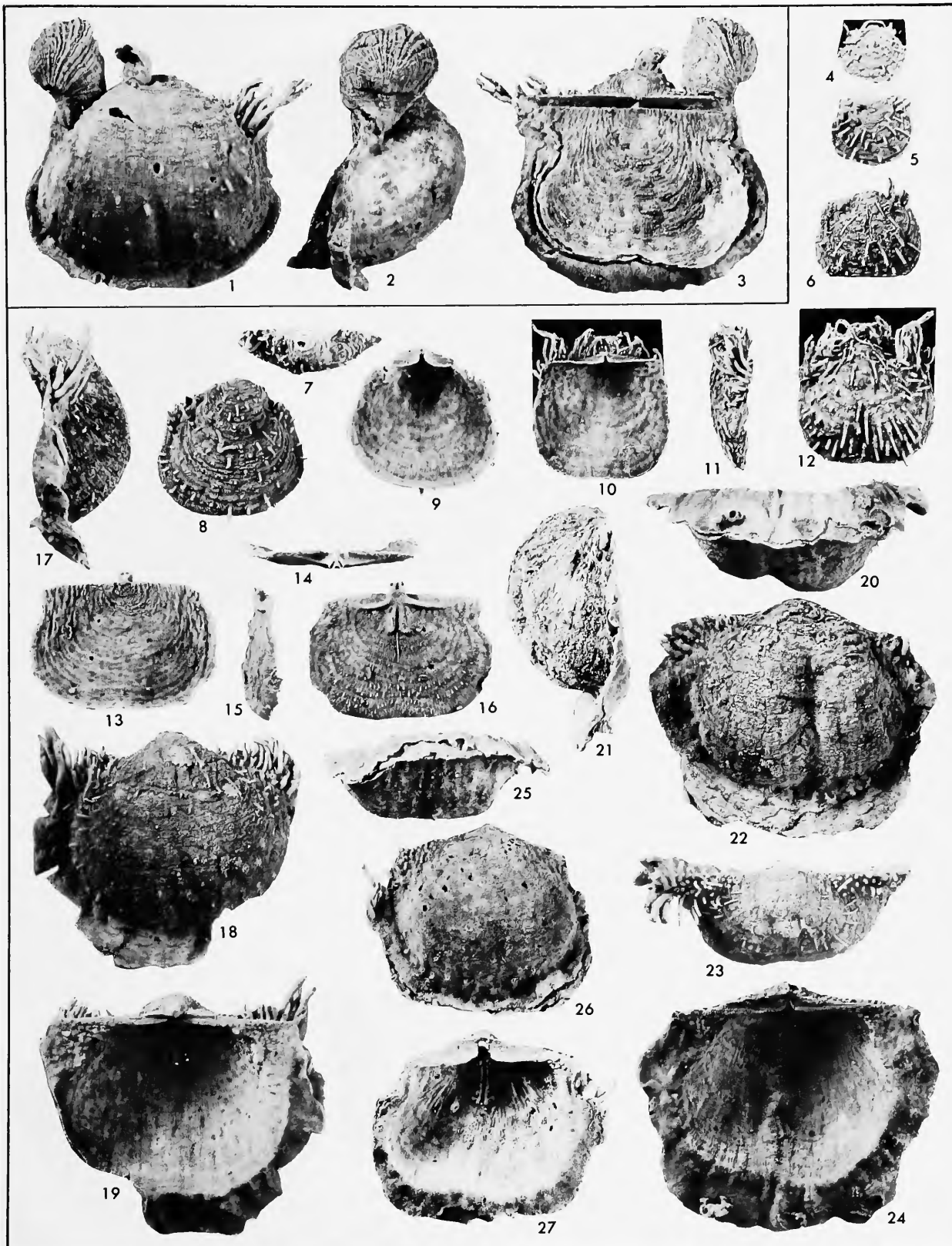


PLATE 216

Limbella

Limbella victorioensis Stehli: 1–4, Exterior, interior, posterior, and side views of a brachial valve, $\times 1$, showing brachial ridges, adductor platforms, and lateral ridges, hypotype USNM 154200h; 5–8, posterior, exterior, interior, and side views of another brachial valve, $\times 1$, hypotype USNM 154200g; 9, 10, interior and ventral views of a large pedicle valve, $\times 1$, showing a marginal flange and ornament spines, hypotype USNM 154200i. [Bone Spring Formation, USNM 728f.]

Limbella wolfcampensis (R. E. King): 11–13, Ventral, posterior, and side views of a large pedicle valve, $\times 1$, hypotype 154201. [Lenox Hills Formation, USNM 705k.]

15, Dorsal view of a complete specimen, $\times 1$, showing marginal flange and rhizoid spines, hypotype USNM 124120a. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701k.]

Limbella species 1: 14, Ventral view of a pedicle valve, $\times 1$, figured specimen USNM 152647. [Hess Formation (Taylor Ranch Member), USNM 713x.]

Limbella costellata, new species: 16–18, Side, ventral, and posterior views of a pedicle valve, $\times 1$, holotype USNM 149086a; 19, Dorsal view of a small, complete specimen, $\times 1$, paratype USNM 149086b. [Gaptank Formation, USNM 700g.]

20–23, Ventral, dorsal exterior, side, and dorsal views of a complete specimen, $\times 1$, paratype USNM 154202. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 702n.]

PLATE 216.—*Limbella*

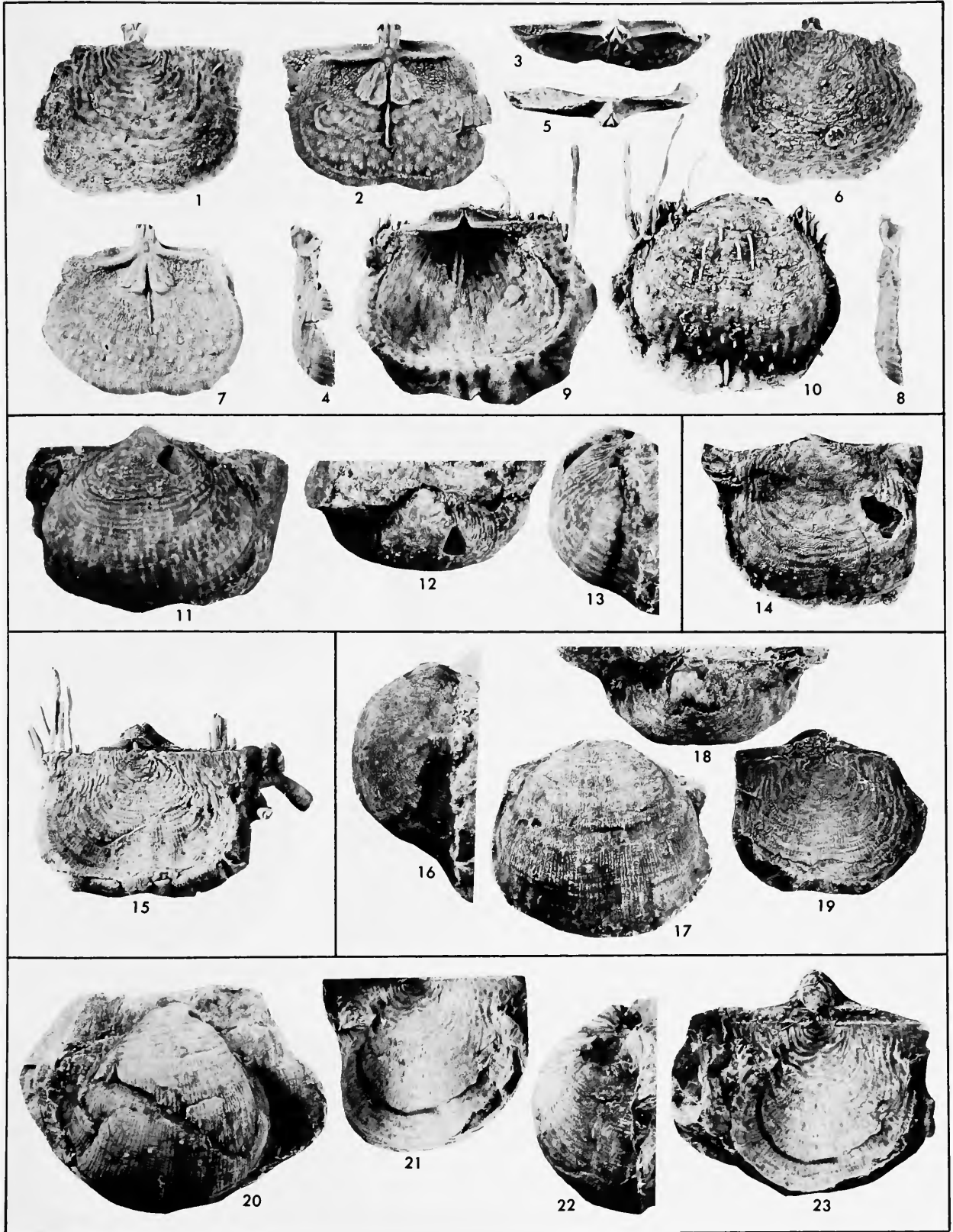


PLATE 217

Paucispinifera, *Cyclacantharia*, *Limbella*, and *Rhamnaria*

Paucispinifera latidorsata (Girty): 1–3, Dorsal, interior, and posterior views of a fragmentary brachial valve, $\times 2$, showing the cardinal process, zygidium, and brachial ridges, hypotype USNM 153952c. [Bell Canyon Formation (Hegler Member), USNM 731.]

Cyclacantharia kingorum, Cooper and Grant: 4, Interior of the brachial valve, $\times 6$, showing the cardinal process and the chilidium covering it, hypotype USNM 124140d. [Word Formation (Willis Ranch Member), USNM 706e.]

Limbella limbata, new species: 5–8, Interior, side, posterior, and exterior of a brachial valve, $\times 1$, paratype USNM 154208c; 9, 10, anterior and ventral views of a pedicle valve, $\times 1$, showing the marginal flange and rhizoid spines, paratype USNM 154208b; 11, 12, anterior and ventral views of another large pedicle valve, $\times 1$, showing the flange and fine radial ornament, holotype USNM 154208a; 13, 14, ventral view of an immature specimen, $\times 1$, $\times 3$, preserving the initial attachment ring, paratype USNM 154208e. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722–1.]

15–17, Anterior, ventral, and interior views of a pedicle valve, with marginal flange, and showing muscle scars, $\times 1$, paratype USNM 149075. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707d.]

Rhamnaria grandis, new species: 18–21, Ventral, posterior, anterior, and side views, $\times 1$, of paratype YPM 11613. [Cathedral Mountain Formation, R. E. King locality 15.]

PLATE 217.—*Paucispinifera*, *Cyclacantharia*, *Limbella*, and *Rhamnaria*

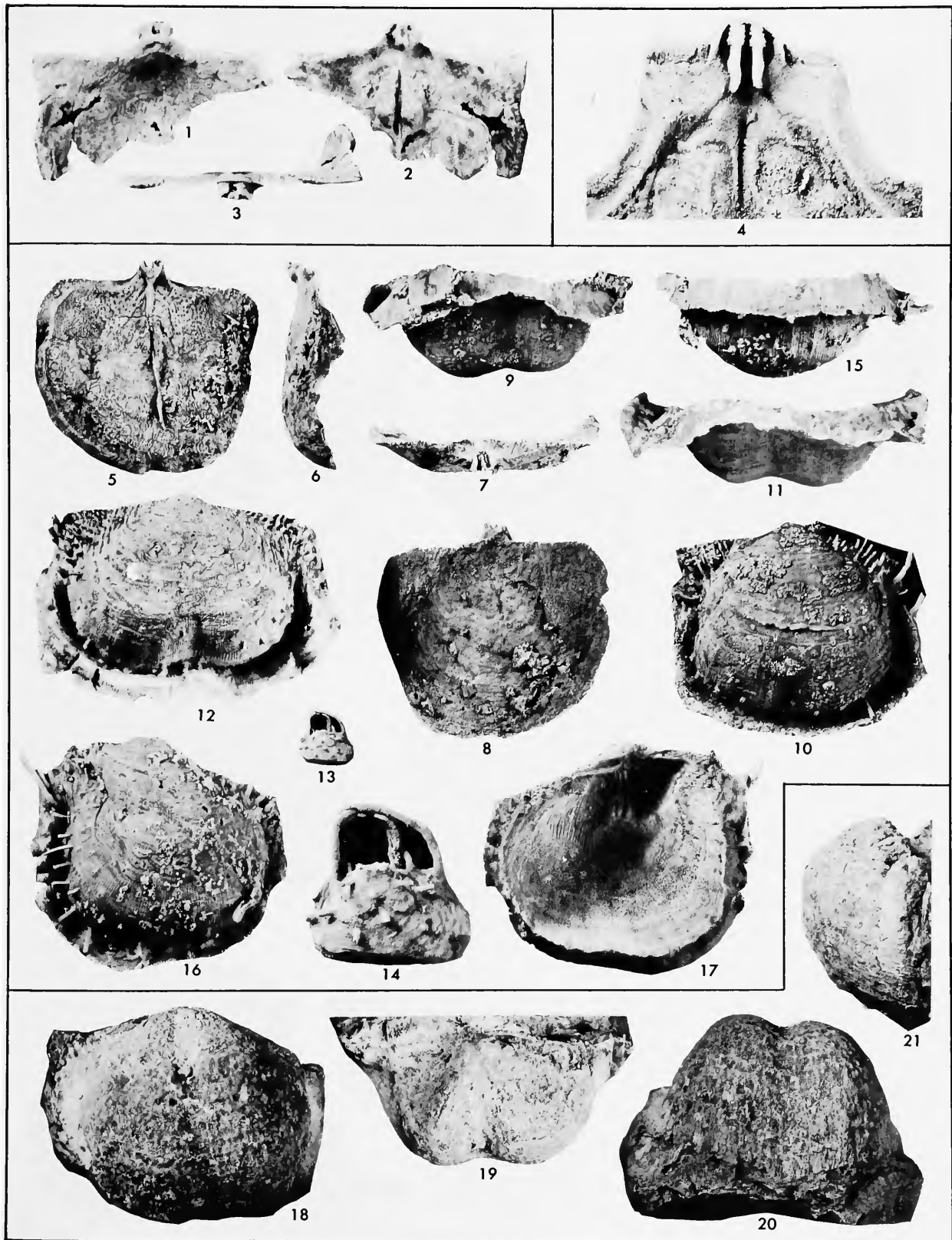


PLATE 218

*Edriostege*s

Edriostege multispinosus Muir-Wood and Cooper: 1, 2, Ventral and dorsal views of a complete specimen, $\times 1$, having a very long marginal flange, hypotype USNM 149122d; 4, large *Meekella* with attached *Edriostege*s, $\times 1$, hypotype USNM 154189a; 7-9, side, dorsal, and ventral views of a young complete specimen, $\times 1$, hypotype USNM 154184p; 10, ventral view, $\times 1$, of an attached young specimen, hypotype USNM 154189b; 11, dorsal view of a specimen with long marginal flange and rhizoid spines, much overgrown by epifauna, $\times 1$, hypotype USNM 154189c. [Road Canyon Formation (base), USNM 702c.]

3, Immature specimen with initial attachment ring and earliest ornament spines, $\times 4$, hypotype USNM 154188b; 5, 6, dorsal views, $\times 1$, of two specimens distorted by crowding, hypotypes USNM 154183b, d. [Road Canyon Formation (base), USNM 703a.]

Edriostege beedei (R. E. King): 12-14, Dorsal view, $\times 1$, and dorsal and ventral views, $\times 2$, of a specimen distorted by crowding, hypotype USNM 149119; 15, 16, interior of the ventral and brachial valves of the preceding specimen, $\times 2$; 17, the myophore of the cardinal process of the preceding specimen, $\times 3$; 18-20, side, ventral, and dorsal views of a complete specimen, $\times 1$, hypotype USNM 149120. [Cathedral Mountain Formation, USNM 702.]

PLATE 218.—*Edriosteges*

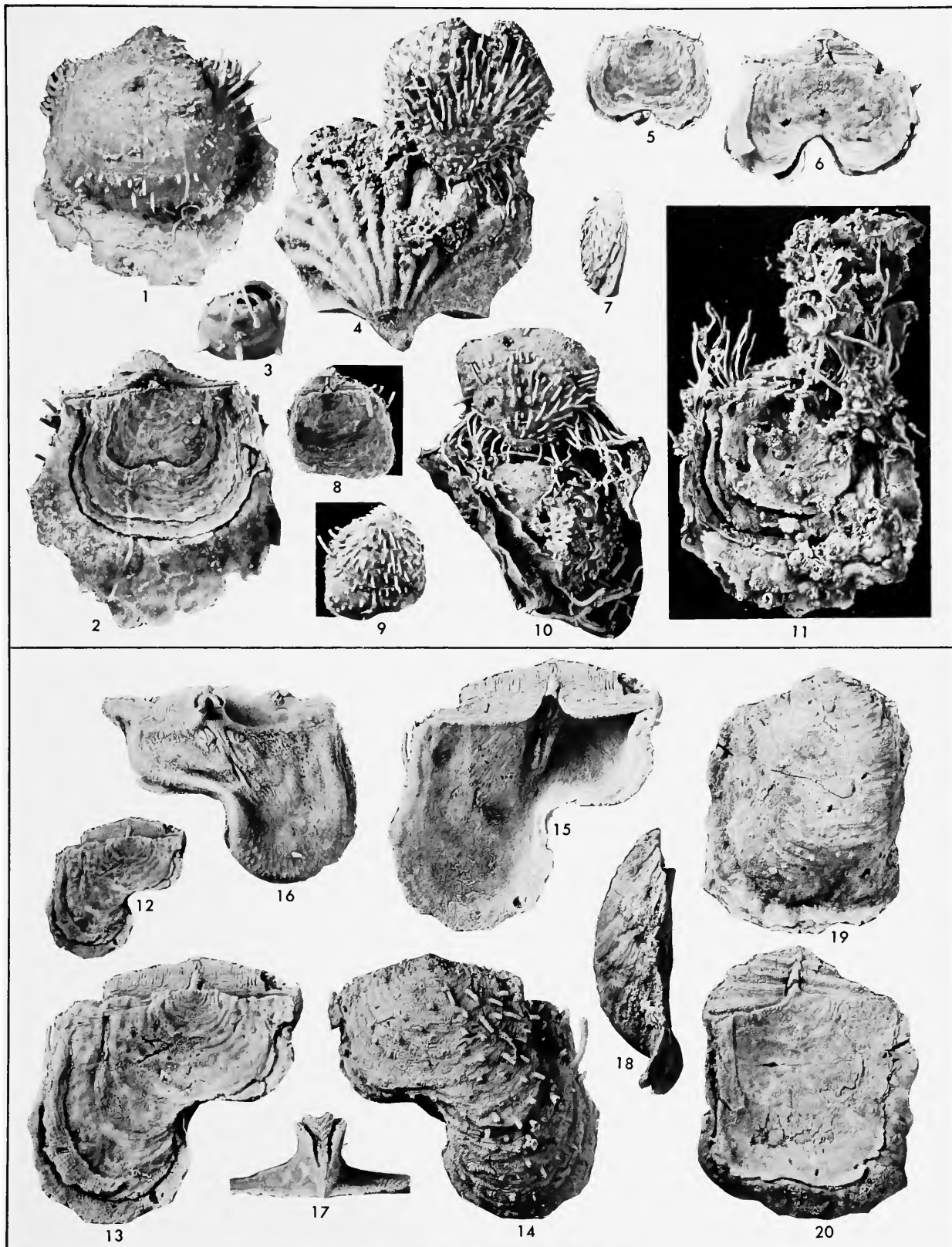


PLATE 219

*Edriostege*s

*Edriostege*s *multispinosus* Muir-Wood and Cooper: 1, 2, Ventral and dorsal views of a large individual with long marginal flange and long rhizoid spines, $\times 1$, hypotype USNM 149115a; 4, ventral view of a young pedicle valve, $\times 1$, hypotype USNM 154183m; 6, ventral view of another young pedicle valve with slender rhizoid spines, $\times 1$, hypotype USNM 154185c; 12, ventral view of an immature pedicle valve, $\times 1$, hypotype USNM 154185b; 13, another young pedicle valve with long rhizoid spines, $\times 1$, hypotype USNM 154183s; 19, an immature pedicle valve with long rhizoid spines, $\times 1$, hypotype USNM 154185a; 20, immature pedicle valve with most of its umbonal region cemented to its substrate, $\times 1$, hypotype USNM 154185e; 22, an immature pedicle valve, $\times 1$, hypotype USNM 154185f; 25, an immature pedicle valve with long ornament spines, $\times 1$, hypotype USNM 154185d; 26, 27, dorsal views of two individuals with exceptionally long rhizoid spines, $\times 1$, hypotypes USNM 149115b, c. [Road Canyon Formation (base), USNM 703a.]

3, Ventral view of a young pedicle valve, $\times 1$, hypotype USNM 154184a; 5, ventral view of an immature pedicle valve with long ornament spines, $\times 1$, hypotype USNM 154184g; 7–9, ventral views of immature pedicle valves with rhizoid and ornament spines, $\times 1$, hypotypes USNM 154184q, h, c; 10, 11, dorsal and ventral views of an immature specimen distorted by crowding, $\times 1$, hypotype USNM 154184e; 14–16, immature pedicle valves, $\times 1$, hypotypes USNM 154184b, k, f; 17, 18, interior of an immature pedicle valve, $\times 2$, $\times 1$, showing use of rhizoid spines, hypotype USNM 154184d; 21, 23, 24, ventral view of two immature pedicle valves, $\times 1$, showing attachment surfaces and rhizoid spines hypotypes USNM 154184i, m, l. [Road Canyon Formation (base), USNM 702c.]

PLATE 219.—*Edriostege*

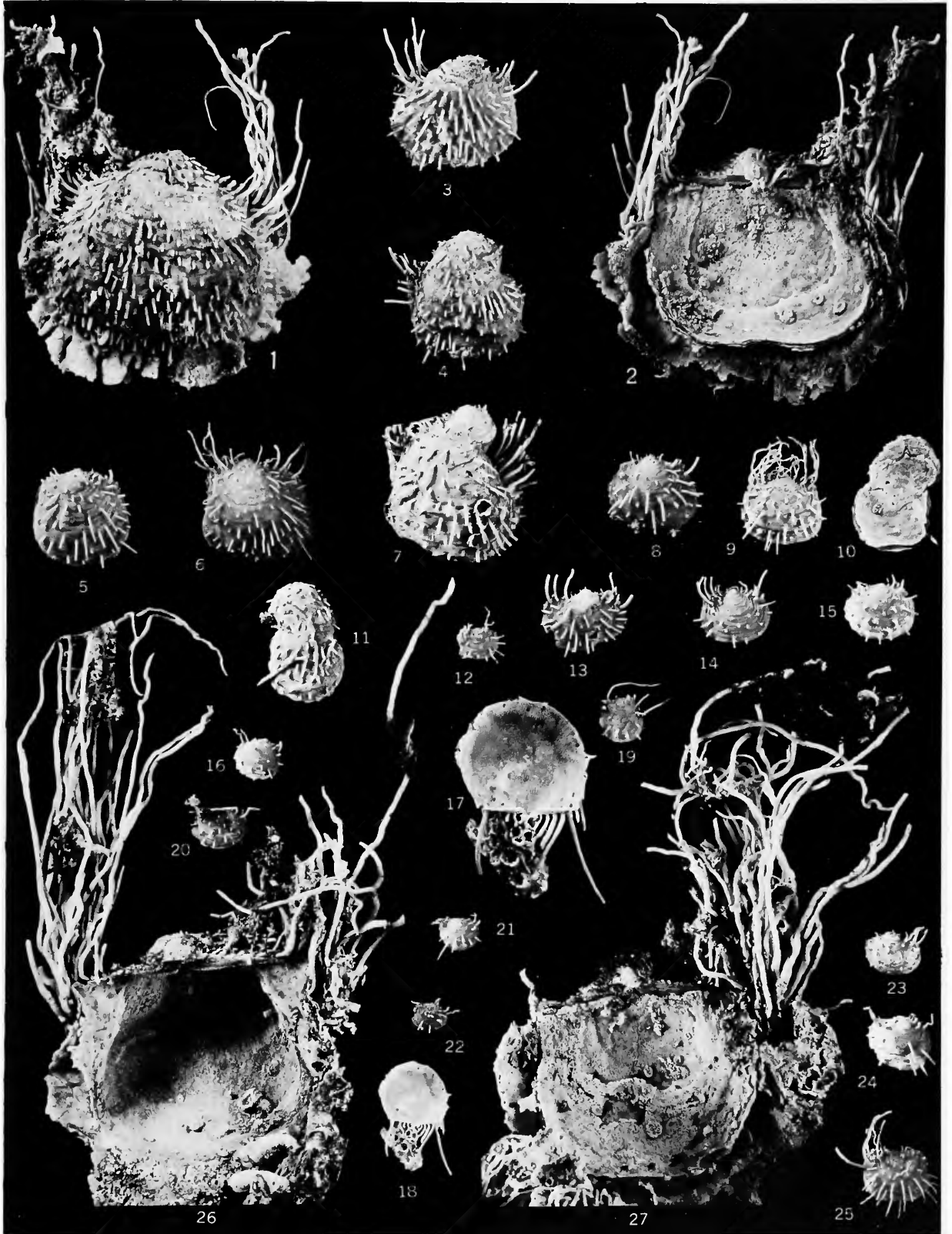


PLATE 220

*Edriostege*s

Edriostege multispinosus Muir-Wood and Cooper: 1-4, 29, Ventral, side, dorsal, anterior, and posterior views, $\times 1$, of a small complete specimen without its spines, hypotype USNM 154183t; 5, interior of the brachial valve of the preceding specimen, $\times 1$, showing a normal cardinal process; 6, 7, dorsal and ventral views of another complete specimen, $\times 1$, showing ornament spines on the pedicle valve but a naked brachial valve, hypotype USNM 154187; 8-10, side, posterior, and interior views of the brachial valve of the preceding specimen, $\times 1$; 11-14, posterior, interior, side, and exterior views of a medium-sized brachial valve with normal cardinal process, $\times 1$, hypotype USNM 154183f; 15-18, posterior, side, exterior, and interior views of an obese brachial valve, $\times 1$, hypotype USNM 154183i; 19, myophore of the preceding specimen, $\times 2$; 20, posterior part of a small obese brachial valve having a greatly thickened cardinal process, $\times 1$, hypotype USNM 154183u; 21-24, exterior, side, posterior, and interior views of a young brachial valve having a cardinal process with juvenile characters, $\times 1$, hypotype USNM 154183j; 25-28, side, exterior, posterior, and interior of a brachial valve with moderately developed cardinal process, $\times 1$, hypotype USNM 154183g; 30, interior of a young brachial valve, $\times 1$, hypotype USNM 154183v; 31, 32, side and interior views of an old brachial valve with greatly thickened and lobate cardinal process, $\times 2$, hypotype USNM 154183w. [Road Canyon Formation (base), USNM 703a.]

PLATE 220.—*Edriosteges*

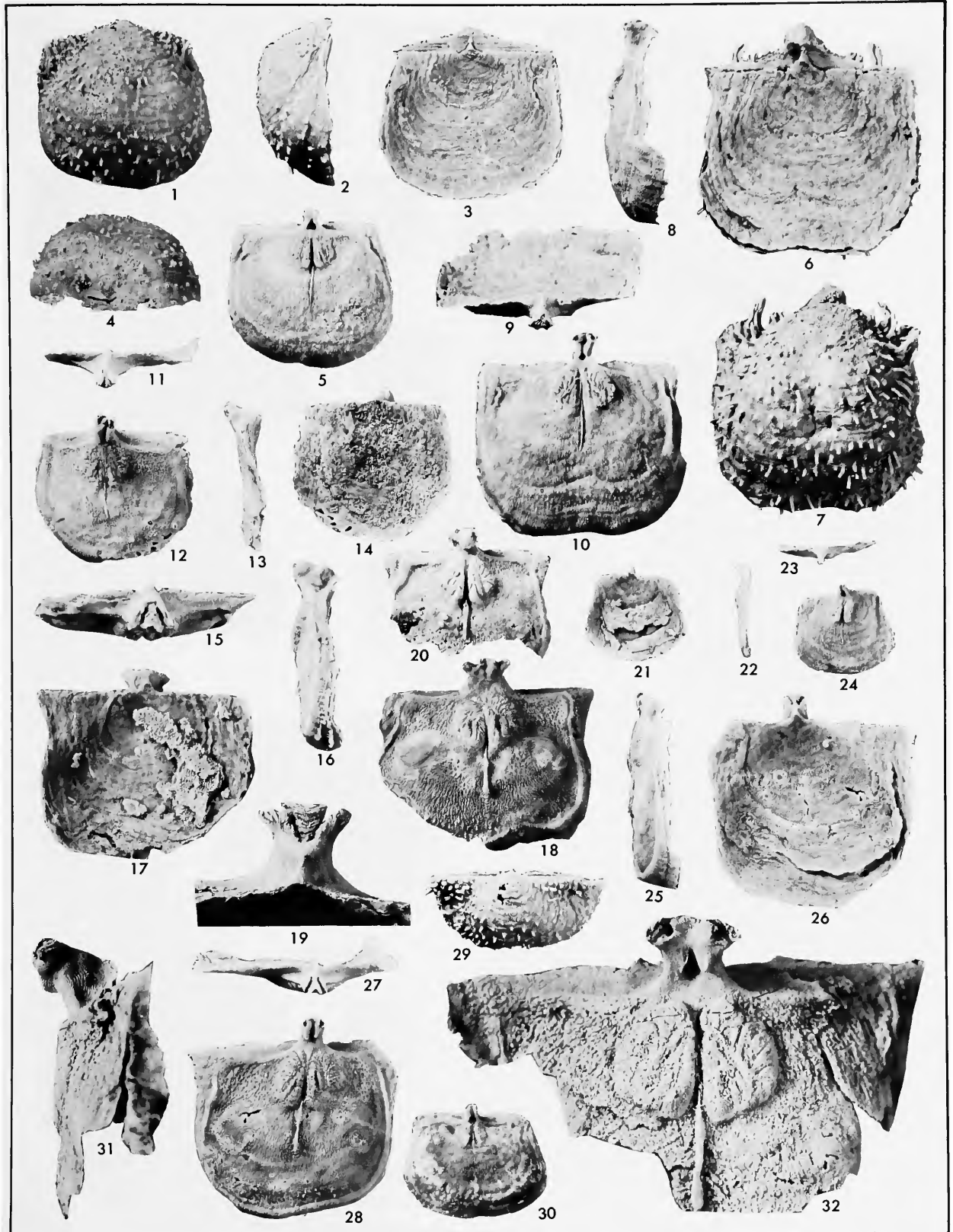


PLATE 221*Edriostege*s

Edriostege multispinosus Muir-Wood and Cooper: 1, 2, Ventral view of two immature specimens, × 1, hypotypes USNM 154183p, q; 3, 4, exterior and interior of a young pedicle valve, × 1, hypotype USNM 154183n; 5–7, ventral, side, and dorsal views of a large adult with well developed marginal flange and numerous rhizoid spines, × 1, paratype USNM 123906b; 8, 9, dorsal and ventral views of a young specimen with the brachial valve in place, × 1, hypotype USNM 154183b; 10, 18, ventral and interior views of an immature pedicle valve, × 1, hypotype USNM 154183r; 11–14, anterior, dorsal, ventral, and side views, × 1, of the holotype USNM 123906a; 15, interior of the pedicle valve of the holotype, × 1, showing muscle scars; 16, 17, interior of the brachial valve of the holotype, × 1, × 2, showing adult cardinal process, muscle scars and brachial ridges; 19, interior of another immature pedicle valve, × 1, hypotype USNM 154183p (for exterior view see figure 1); 20–23, exterior, side, and interior views of an immature brachial valve, × 1, hypotype USNM 154183k. [Road Canyon Formation (base), USNM 703a.]

PLATE 221.—*Edriosteges*

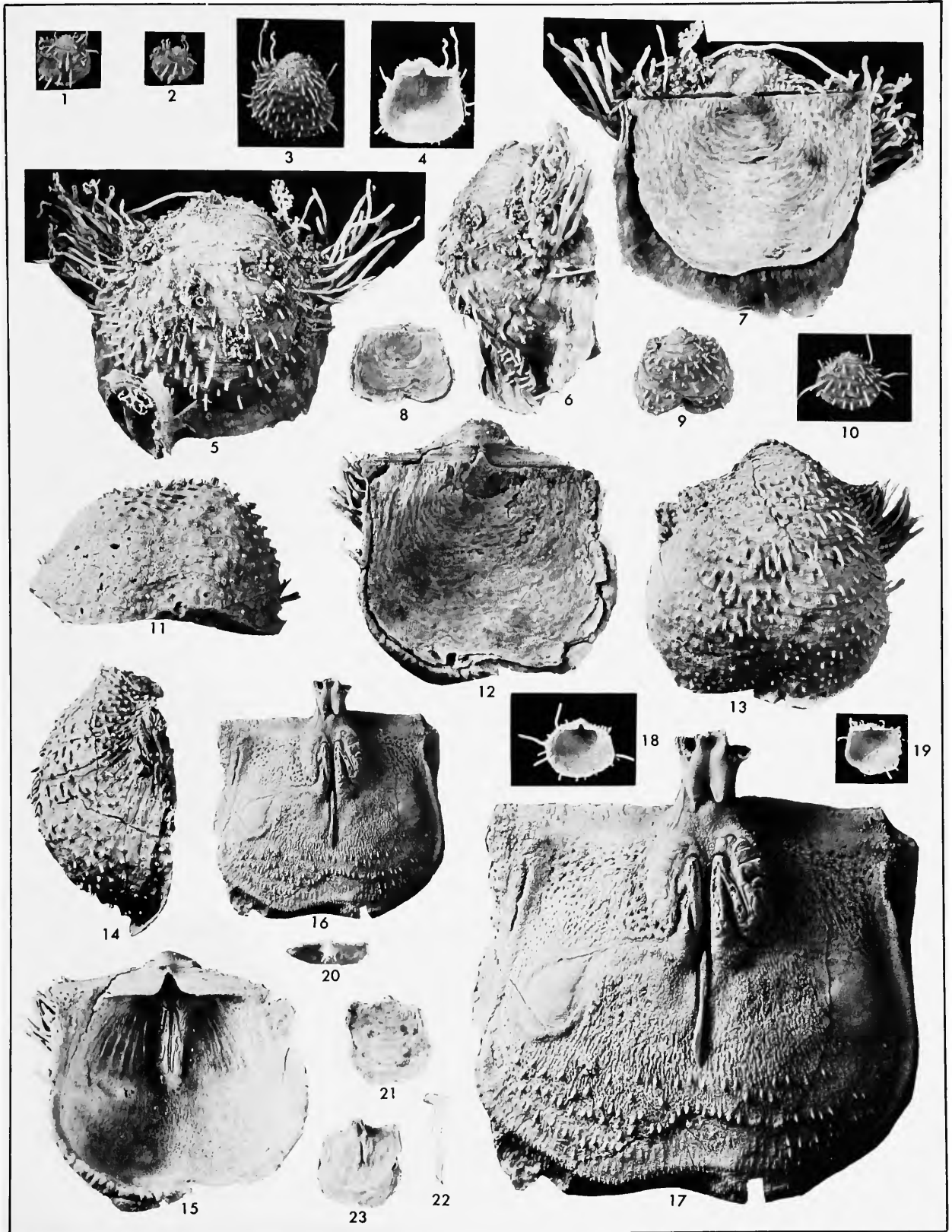


PLATE 222*Edriostege*s

Edriostege tenuispinosus, new species: 1-5, Anterior, posterior, side, dorsal, and ventral views of a complete specimen, $\times 1$, holotype USNM 152650. [Cathedral Mountain Formation, USNM 703a¹.]

Edriostege multispinosus Muir-Wood and Cooper: 6, 7, Side and dorsal views of a complete specimen, $\times 1$, showing a marginal flange, hypotype USNM 149121; 8, Detail of the ornament, $\times 3$, of the preceding specimen. [Road Canyon Formation (base), USNM 702c.]

9-11, Side, dorsal, and ventral views of a complete specimen with marginal flange and rhizoid spines, $\times 1$, paratype USNM 123907; 12, interior of the brachial valve of the preceding specimen, $\times 1$, showing lobate cardinal process, thick adductor callosities and thick marginal rim; 13, ventral view of an immature pedicle valve, $\times 4$, showing ornament and rhizoid spines, paratype USNM 123906c. [Road Canyon Formation (base), USNM 703a.]

PLATE 222.—*Edriostege*

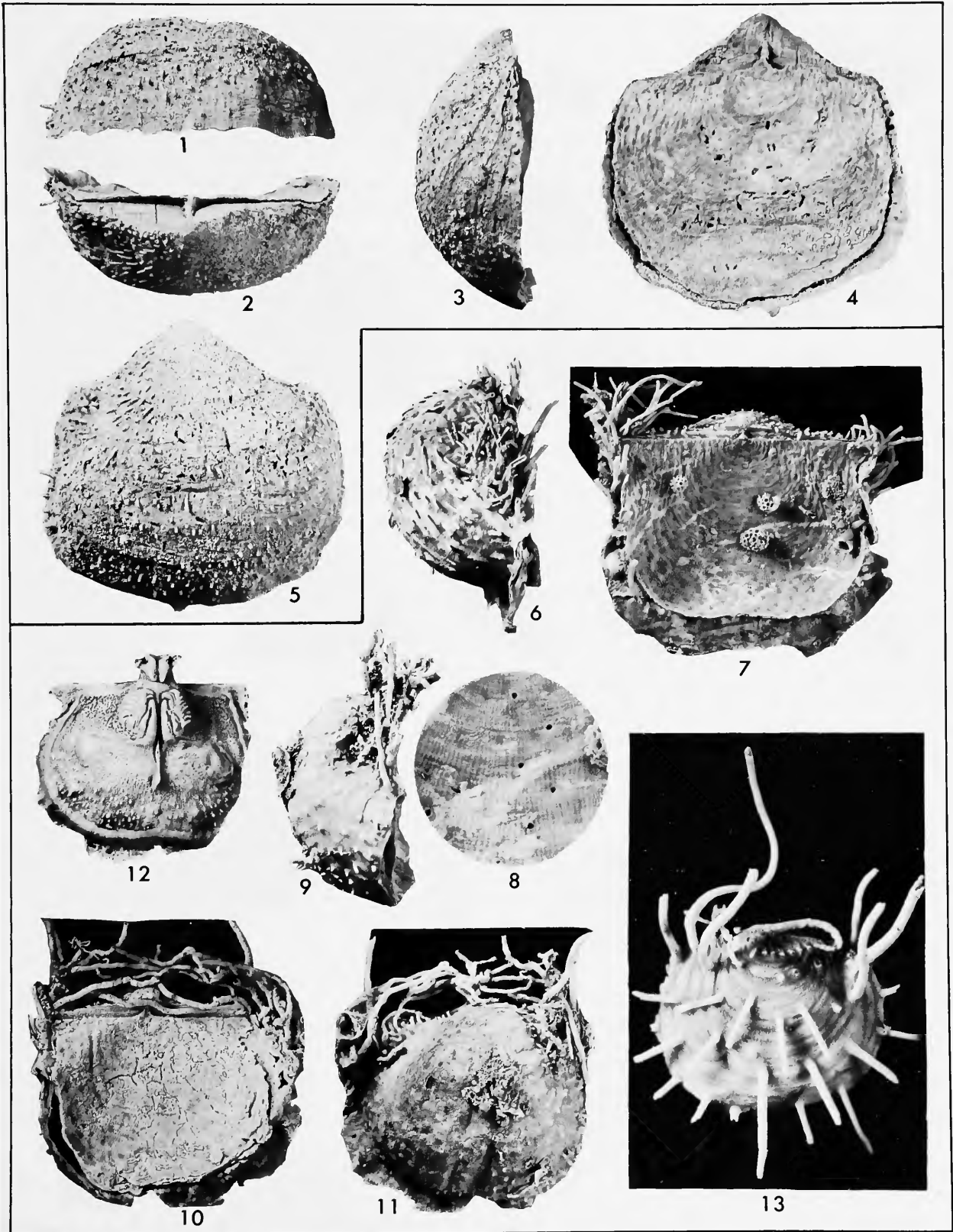


PLATE 223

*Edriostege*s and *Echinostege*s

Edriostege compactus, new species: 1–4, Ventral anterior, posterior, and dorsal views of a complete specimen burdened by tetracorals, $\times 1$, paratype USNM 149137e. [Road Canyon Formation, USNM 709c.]

5–9, Posterior, dorsal, ventral, anterior, and side views of the holotype, $\times 1$, USNM 152651a; 10–14, anterior, dorsal, posterior, ventral, and side views of another complete specimen, $\times 1$, paratype USNM 152651c. [Road Canyon Formation, USNM 721t.]

15, 16, Posterior and interior views of the brachial valve interior, $\times 1$, paratype USNM 149140c. [Road Canyon Formation, USNM 710u.]

Edriostege multispinosus Muir-Wood and Cooper: 17, 18, Interior of the brachial and pedicle valves of the same specimen an obese form, $\times 1$, showing strongly lobed cardinal process and thickened muscle regions, hypotype USNM 154188a. [Road Canyon Formation (base), USNM 703a.]

Edriostege beedei (R. E. King): 19–22, Ventral, and side views, $\times 1$, and ventral and dorsal views, $\times 2$, of a complete specimen referable to *Edriostege*, lectotype YPM 11876a. [Cathedral Mountain Formation, R. E. King locality 123.]

Echinostege tuberculatus (R. E. King): 23, 24, Interior, $\times 1$, $\times 2$, of a brachial valve referable to this species, former paratype T11045. [Word Formation (Willis Ranch Member), R. E. King locality Tx.]

PLATE 223.—*Edriosteges* and *Echinosteges*

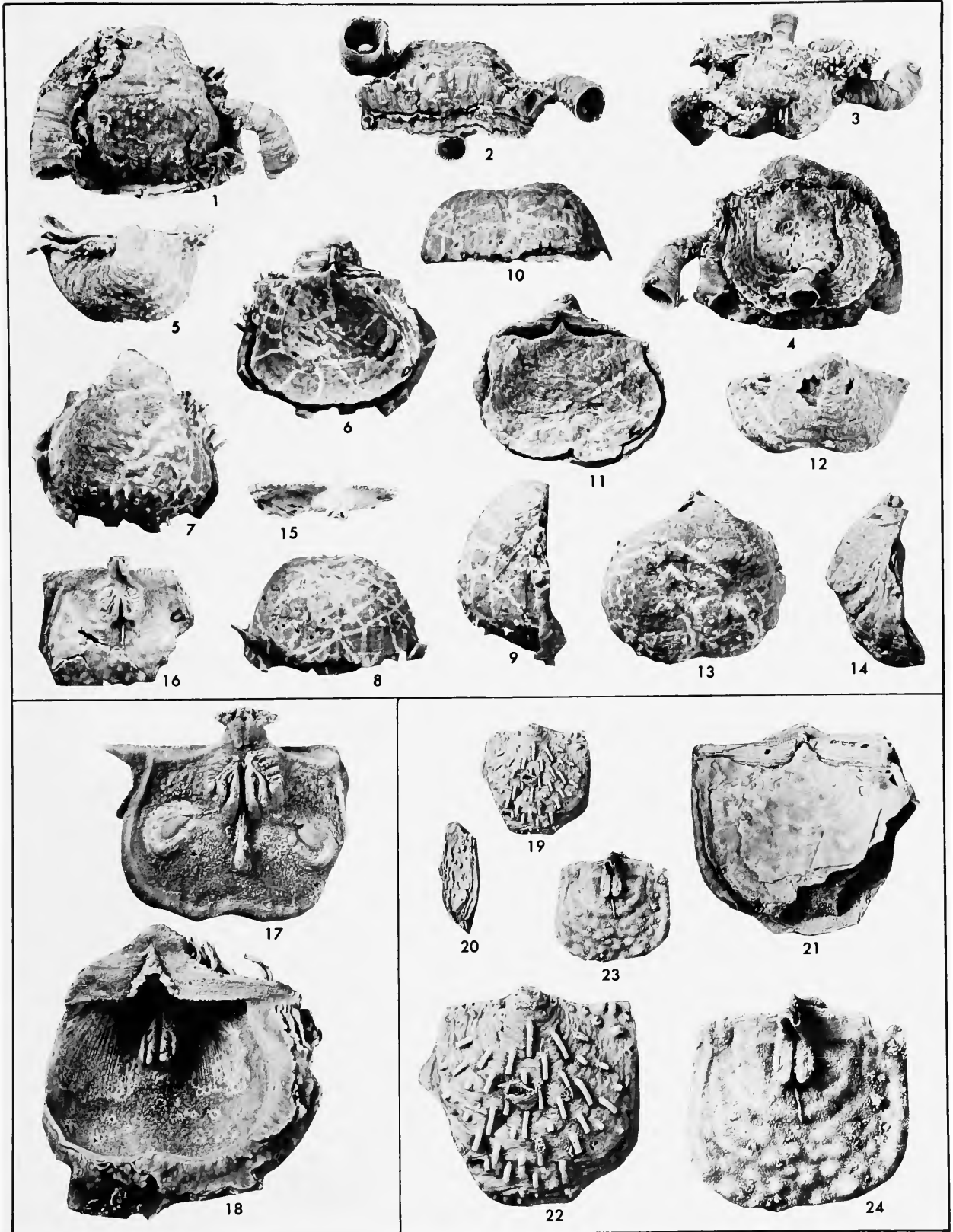


PLATE 224*Echinosteges*

Echinosteges tuberculatus (R. E. King): 1, Two pedicle valves with rhizoid spines entwined for attachment, $\times 1$, hypotype USNM 149039a; 2-4, interior and interior tilted posteriorly, $\times 2$, and interior $\times 1$, of an elongated brachial valve, showing adductor platforms and scars, and a juvenile cardinal process, hypotype USNM 123905b; 5, exterior of a pedicle valve, $\times 1$, showing anterior flange, hypotype USNM 123453k; 6, dorsal view of a specimen with the brachial valve in place, $\times 1$, hypotype USNM 123905i; 7, exterior of a fragmentary brachial valve, $\times 1$, showing long spines on the brachial valve, hypotype USNM 149019a; 8, ventral view of an attached specimen, $\times 1$, showing the mass of rhizoid spines used in fixation, hypotype USNM 123905k; 9, interarea showing spines emerging from the elytridium, $\times 2$, hypotype USNM 149039b. [Word Formation (Willis Ranch Member), USNM 706e.]

10, Side view of an attached specimen, $\times 1$, showing direction of rhizoid spines, hypotype USNM 154177a. [Word Formation (China Tank Member), USNM 706c.]

PLATE 224.—*Echinosteges*

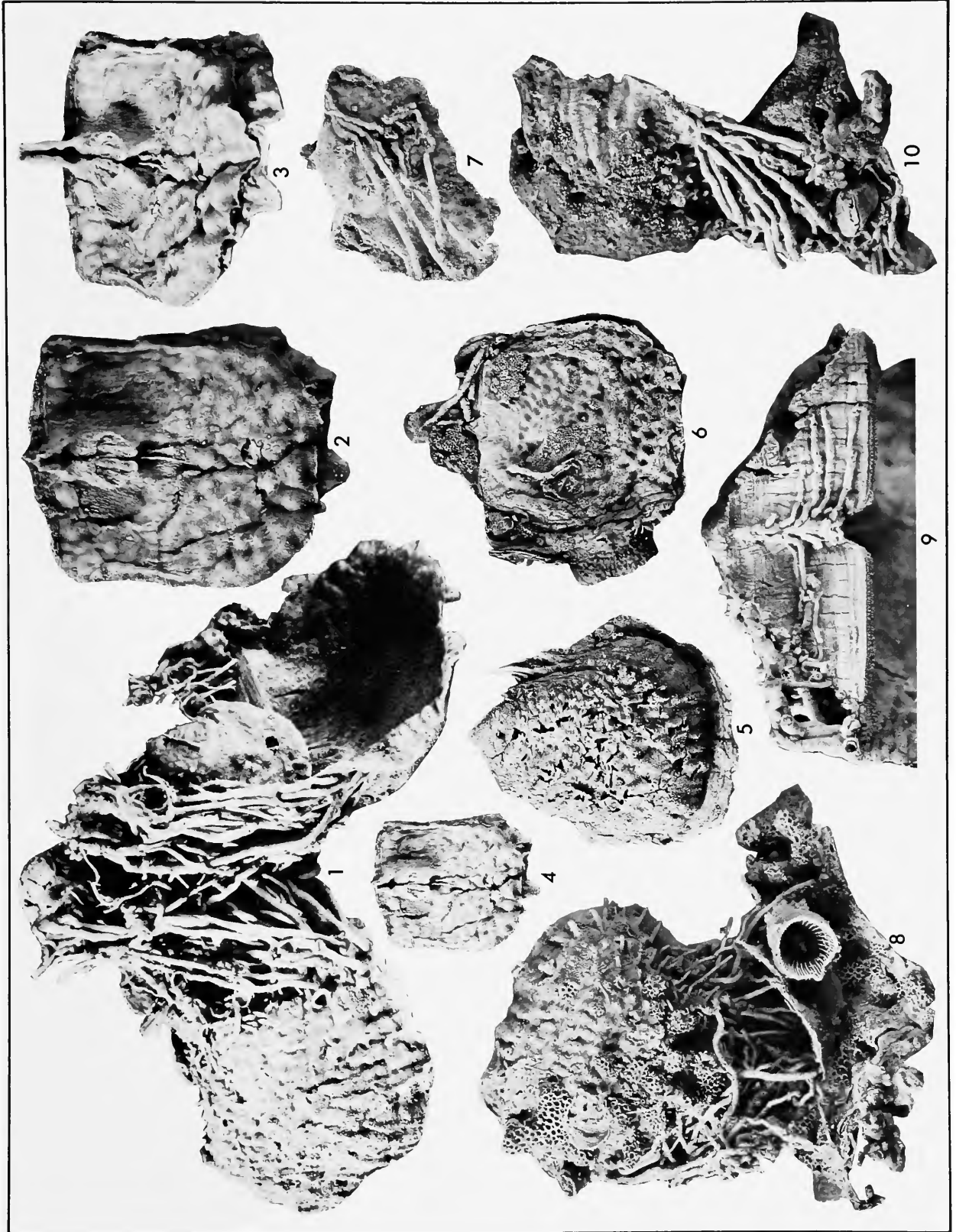


PLATE 225*Echinosteges*

Echinosteges tuberculatus (R. E. King): 1-3, Interior, ventral, and side views of a pedicle valve, $\times 1$, showing marginal flange, interarea, and rhizoid spines, hypotype USNM 149019b; 5, exterior of a pedicle valve with well preserved ornament spines, $\times 1$, hypotype USNM 124453c; 6, exterior of the preceding specimen, $\times 2$, showing details of the spiny surface; 7, interarea of an elongated specimen, $\times 2$, showing exceptional development of the elytridium, hypotype USNM 123905a; 8-10, ventral, side, and interior views of a young pedicle valve, $\times 1$, hypotype USNM 154178a; 11, 12, interior and exterior of another but younger specimen than the preceding, $\times 1$, hypotype USNM 154178b; 13, 14, interior and exterior of a greatly elongated pedicle valve having a much exaggerated interarea probably induced by crowding, $\times 1$, hypotype USNM 154178c; 15, 16, exterior and interior of a young pedicle valve, $\times 1$, hypotype USNM 154178d. [Word Formation (Willis Ranch Member), USNM 706e.]

4, Specimen with umbonal region stripped away to show cardinal process and adductor platforms, $\times 1$, hypotype USNM 154177. [Word Formation (China Tank Member) USNM 706c.]

17-19, Side, ventral, and dorsal views of a complete specimen with most of the brush of rhizoid spines retained, $\times 1$, hypotype USNM 149024a. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 225.—*Echinosteges*

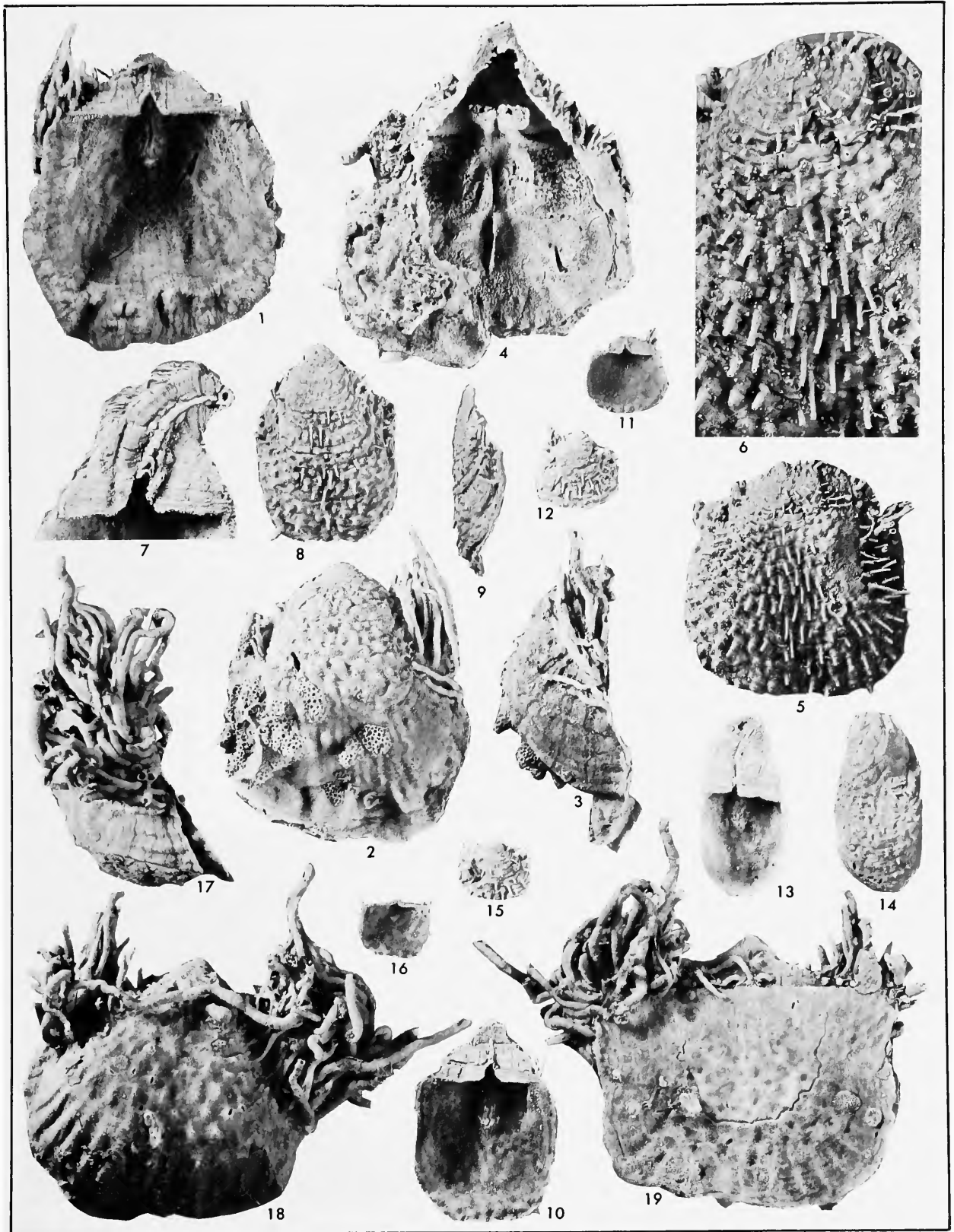


PLATE 226*Echinosteges*

Echinosteges tuberculatus (R. E. King): 1–3, Interior of the brachial valve, complete specimen with brachial valve in place and interior of the pedicle valve, showing all generic details to perfection, $\times 1$, hypotype USNM 149026. [Word Formation (China Tank Member), USNM 706c.]

4, Interior of an imperfect pedicle valve, $\times 1$, showing the thick adductor callosity and flabellate diductor scars, hypotype USNM 123453m; 5, interior of another pedicle valve, $\times 1$, showing broad interarea, narrow elytridium, and anterior end of adductor callosity, hypotype USNM 123453a; 11, interior of a young pedicle valve, $\times 1$, showing narrow adductor callosity, hypotype USNM 149019c; 18, interarea and rhizoid spines of an adult pedicle valve, $\times 2$, hypotype USNM 123452. [Word Formation (Willis Ranch Member), USNM 706e.]

6–8, Posterior, interior, and side views of a brachial valve distorted by crowding and having an old adult cardinal process, $\times 1$, hypotype USNM 154179a; 9, 10, ventral and side views of a pedicle valve with a great brush of rhizoid spines on the ears, $\times 1$, hypotype USNM 149024b; 12–14, interior, side, and posterior views of a small brachial valve with strongly adult cardinal process, $\times 1$, hypotype USNM 154179j; 15–17, posterior, side, and interior views of another brachial valve approximately the same size as the preceding one but having a juvenile cardinal process, $\times 1$, hypotype USNM 154179g. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 226.—*Echinosteges*

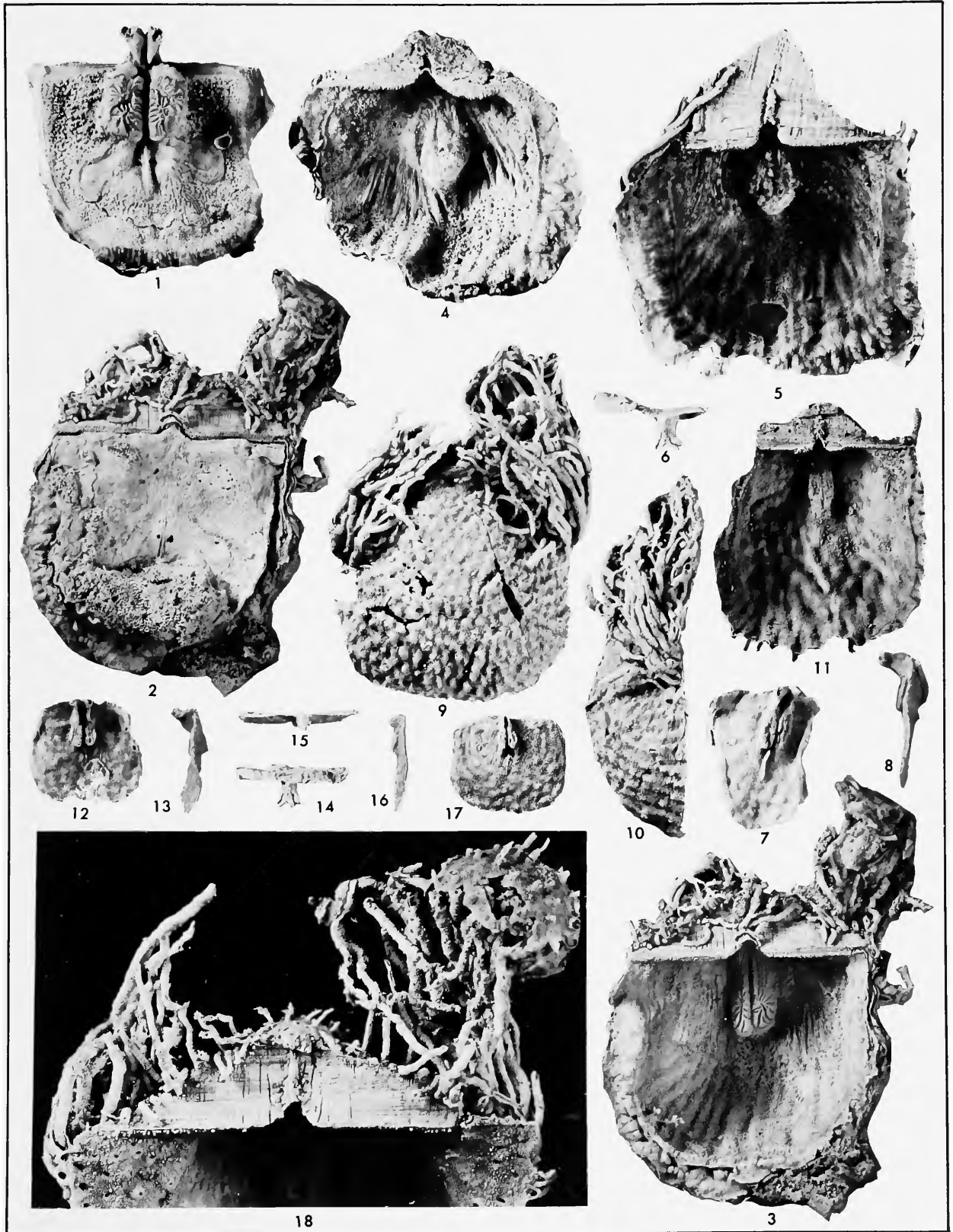


PLATE 227*Echinosteges*

Echinosteges tuberculatus (R. E. King): 1-5, Interior tilted slightly posteriorly, interior, exterior, posterior, and side views of a large, obese brachial valve, $\times 1$, showing greatly expanded cardinal process and thick adductor callosities, hypotype USNM 154179k; 6-9, interior slightly tilted posteriorly, posterior, side, and exterior views of another brachial valve, approximately the same size as the preceding but with poorly developed adductor callosities and a cardinal process still in a juvenile stage, $\times 1$, hypotype USNM 154179-l; 10-12, posterior, side, and interior views of a young brachial valve with juvenile cardinal process, $\times 1$, hypotype USNM 154179b; 13-15, side, posterior, and interior views of another obese brachial valve, $\times 1$, hypotype USNM 154179c; 20-22, side, posterior, and interior views of a precocious, young brachial valve with expanded cardinal process and thickened adductor platforms, $\times 1$, hypotype USNM 154179f; 23-25, posterior, side, and interior views of a brachial valve about equal in size to the preceding but retarded and having a juvenile cardinal process, $\times 1$, hypotype USNM 154179d. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

16, Small pedicel valve attached to *Rhamnaria*, $\times 1$, hypotype USNM 149019d; 17-19, side, posterior, and interior views of a medium-sized brachial valve with strongly lobate cardinal process, $\times 1$, hypotype USNM 123905f. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 227.—*Echinosteges*

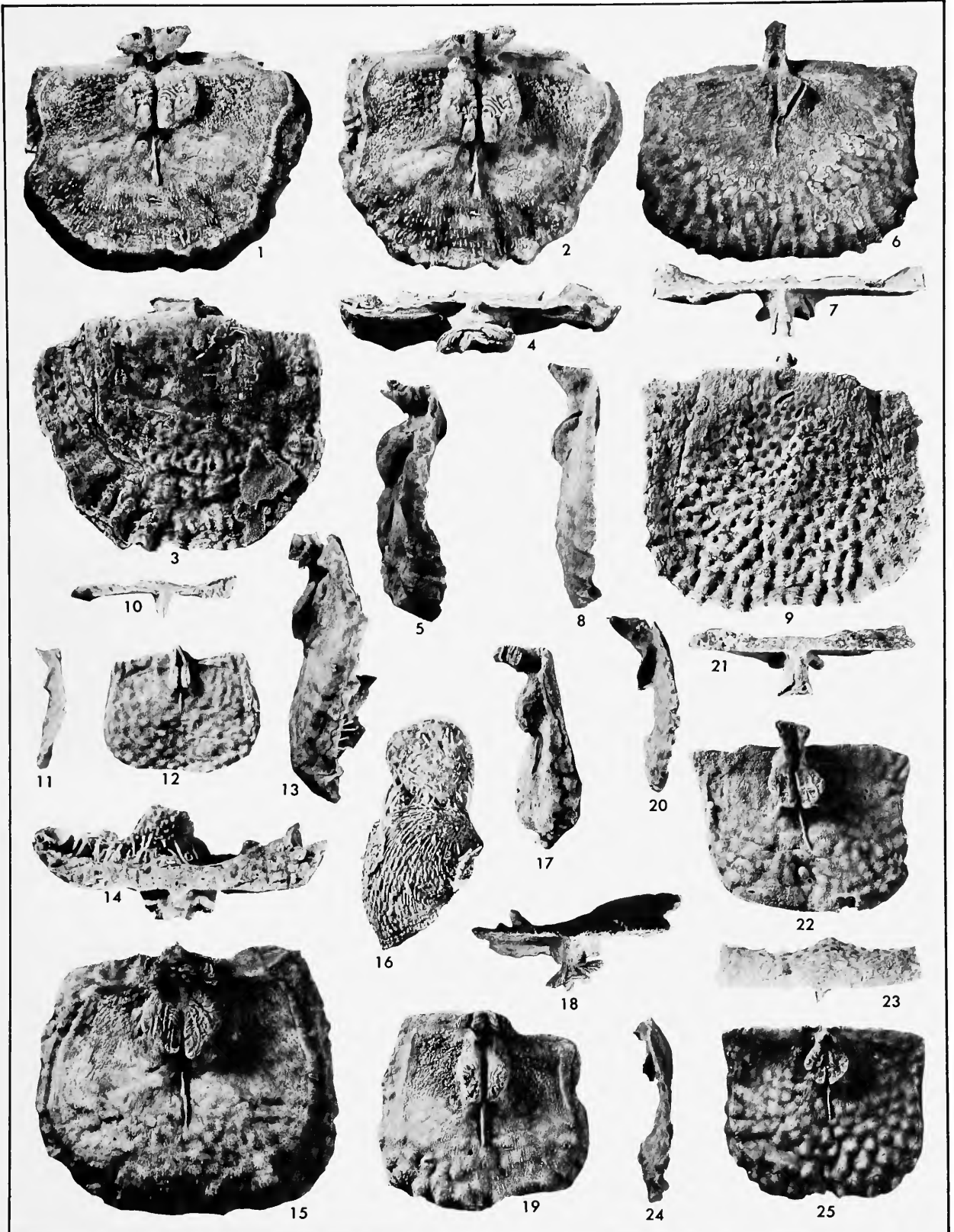


PLATE 228

Echinosteges

Echinosteges tuberculatus (R. E. King): 1, 2, Interior of an immature brachial valve, $\times 1$, $\times 3$, showing V-shaped cardinal process, hypotype USNM 123905e; 3, 4, interior, $\times 1$, $\times 2$, of another immature brachial valve, hypotype USNM 154180p; 5-7, posterior, side, and interior, $\times 1$, of another brachial valve, hypotype USNM 154180q; 8-10, posterior, side, and interior views of a young brachial valve, $\times 1$, showing a well developed cardinal process, hypotype USNM 154180f; 11, interior of a young brachial valve, $\times 1$, hypotype USNM 123453-1; 12, 13, side and interior views of the same brachial valve, $\times 2$, showing the immature cardinal process; 14-16, posterior, side, and interior views of a young brachial valve, $\times 1$, with juvenile cardinal process, hypotype USNM 154180n; 17-19, side, posterior, and interior views of a brachial valve equal in size to the preceding but having an advanced, lobate cardinal process, $\times 1$, hypotype USNM 154180-l; 20-22, posterior, side, and interior views of a small brachial valve with advanced internal characters, $\times 1$, hypotype USNM 154180k; 23-25, side, posterior and interior views of a fairly large specimen with retarded cardinal process, $\times 1$, hypotype USNM 154180b; 26-28, posterior, side, and interior views of a large brachial valve with retarded cardinal process, $\times 1$, hypotype USNM 154180a; 29-31, posterior, side and interior views of a medium-sized brachial valve having juvenile interior characters, $\times 1$, hypotype USNM 154180o; 32-34, posterior, side, and interior views of an obese brachial valve having a strongly lobed cardinal process and prominent marginal flange, $\times 1$, hypotype USNM 154180c; 35-37, posterior, side, and interior views of a specimen equal in size to that illustrated in figures 29-31 but having greatly advanced interior characters, $\times 1$, hypotype USNM 154180g; 38-40, posterior, side, and interior views of a brachial valve with marginal flange, a sure sign of old age, but with a juvenile-type cardinal process, $\times 1$, hypotype USNM 154178m; 41-43, posterior, side, and interior views of an old brachial valve, comparable in age to the preceding specimen but having a strongly lobed cardinal process, $\times 1$, hypotype USNM 154178-l. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 228.—*Echinosteges*

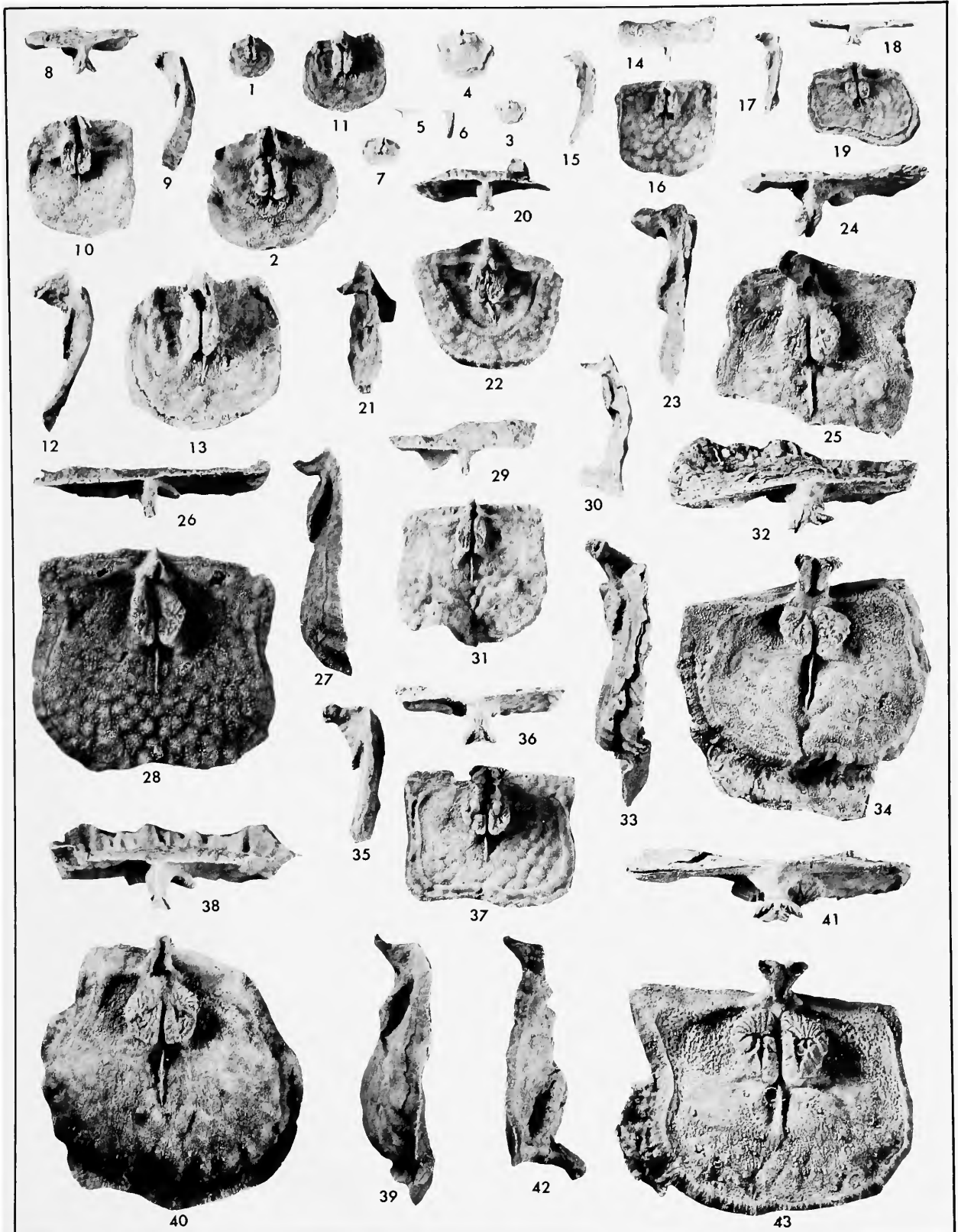


PLATE 229

Echinosteges

Echinosteges guadalupensis (Shumard): 1-3, Exterior, side, and interior views of a brachial valve, \times 1, showing the V-shaped cardinal process, hypotype USNM 152652-1; 4-6, interior, side, and exterior views of another brachial valve, \times 1, hypotype USNM 152652m; 7-9, side, interior, and ventral views of a small pedicle valve, \times 1, hypotype USNM 152652c; 10-12, side, interior, and exterior views of a pedicle valve with some of its rhizoid spines preserved, \times 1, hypotype USNM 152652a (for enlargement, see plate 258: figure 30); 15, posterior view of a brachial valve, \times 1, hypotype USNM 152652j. [Bell Canyon Formation (Rader Member), USNM 725f.]

13, 14, Interior and posterior of a fragmentary brachial valve, \times 1, hypotype USNM 154181. [Bell Canyon Formation (Hegler Member), USNM 731.]

16-18, Interior, side, and exterior views of a large brachial valve, \times 1, showing anteriorly open cardinal process, hypotype USNM 149407. [Bell Canyon Formation (Pinery Member), USNM 736.]

19, Interior of a fragmentary brachial valve, \times 1, hypotype USNM 154182a. [Bell Canyon Formation (Rader Member), AMNH 403.]

Echinosteges tuberculatus (R. E. King): 20, Dorsal view of a small specimen with both valves in contact, \times 1, hypotype USNM 149020u; 21, ventral view of a young specimen, \times 1, showing its body spines, hypotype USNM 149019e; 22, 23, ventral and interior views of a small pedicle valve, \times 1, hypotype USNM 154178h; 24, dorsal view of a complete specimen distorted by crowding, \times 1, hypotype USNM 149019f; 25, ventral view of two immature specimens preserving their rhizoid spines, \times 1, hypotypes USNM 149019g, h; 26, ventral view of pedicle valve preserving its long rhizoid spines, \times 2, hypotype USNM 123905h; 27, 28, side and ventral views of a young pedicle valve, \times 1, hypotype USNM 154178j; 29, young specimen attached to a fenestellid frond, \times 1, hypotype USNM 154178e; 30, 31, interior and exterior of an immature pedicle valve, \times 1, hypotype USNM 154178k; 32-34, side and ventral views, \times 1, and side, \times 2, of a young specimen attached to a pedicle valve of *Echinauris*, hypotype USNM 149019i; 35, side view of another young, attached specimen, \times 1, hypotype USNM 149019j; 36, ventral view of a young attached specimen, \times 1, USNM 149019-l; 37, 38, interior and exterior of an immature pedicle valve, \times 1, hypotype USNM 149019m. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 229.—*Echinosteges*

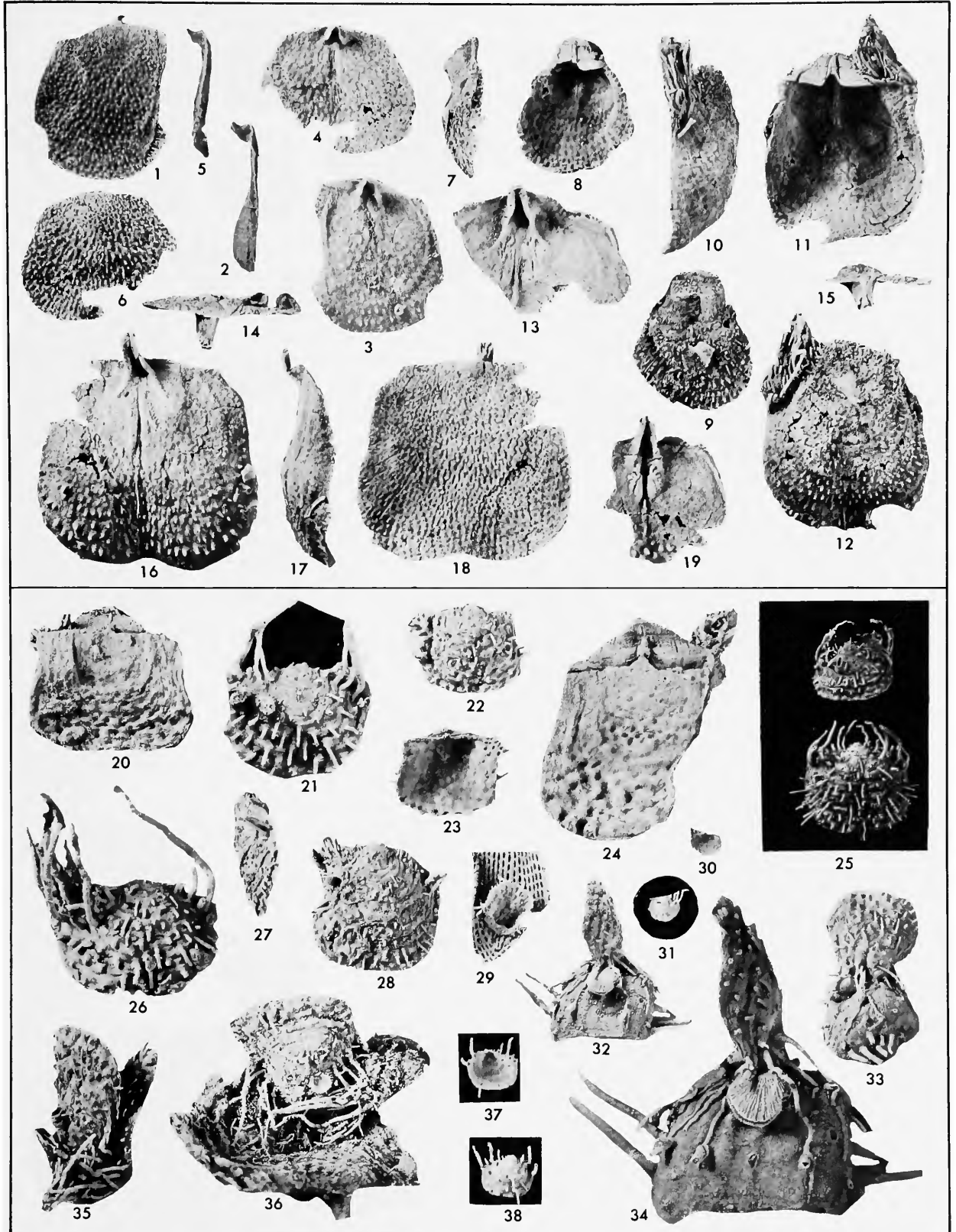


PLATE 230

Cactosteges

Cactosteges anomalus, new species: 1-7, Ventral, dorsal, posterior, anterior, and side views, $\times 1$, and dorsal and ventral views, $\times 2$, of the holotype, USNM 151297a; 8-13, anterior, interior, posterior, side, and ventral views, $\times 1$, and interior view, $\times 2$, of a pedicle valve, showing muscle area, paratype USNM 151297f; 14-18, dorsal, posterior, side, ventral, and anterior views of a small adult, $\times 1$, paratype USNM 151297d; 31-36, posterior, interior, interior tilted, side, ventral, and anterior views of a pedicle valve, $\times 1$, paratype USNM 151297e; 37-39, posterodorsal, posterior, and interior views of a brachial valve, $\times 2$, showing lobed cardinal process and excessive development of endospines, paratype USNM 154152b; 40, 41, interior and posterior views of another brachial valve with thickened cardinal process, $\times 2$, paratype USNM 154152c; 42, interior of a brachial valve, $\times 3$, showing an immature cardinal process, paratype USNM 154152d; 43, interior of another brachial valve damaged by overcrowding, $\times 3$, paratype USNM 154152e; 45, brachial valve interior, $\times 3$, showing adductor scars and a few endospines, paratype USNM 154152f; 46, interior of an obese brachial valve with greatly thickened cardinal process, $\times 3$, paratype USNM 154152g; 47, interior of a brachial valve, $\times 2$, showing rows of beads inside hinge, paratype USNM 154152h; 48, interior of a brachial valve, $\times 3$, showing immature cardinal process, paratype USNM 154152i; 49, another brachial valve interior, $\times 3$, showing brachial ridges, endospines and normal cardinal process, paratype USNM 154152j. [Word Formation (Willis Ranch Member), USNM 706.]

44, Interior of a brachial valve with stout cardinal process, $\times 3$, paratype USNM 154150c. [Word Formation (Willis Ranch Member), USNM 724u.]

19-24, Dorsal view, $\times 2$, and dorsal, anterior, posterior, side, and ventral views, $\times 1$, of a complete specimen, paratype USNM 154151c; 25-30, posterior, ventral, side, anterior, and posterior views, $\times 1$, and dorsal view, $\times 2$, of a complete paratype, USNM 154151d. [Word Formation (China Tank Member), USNM 706c.]

PLATE 230.—*Cactosteges*

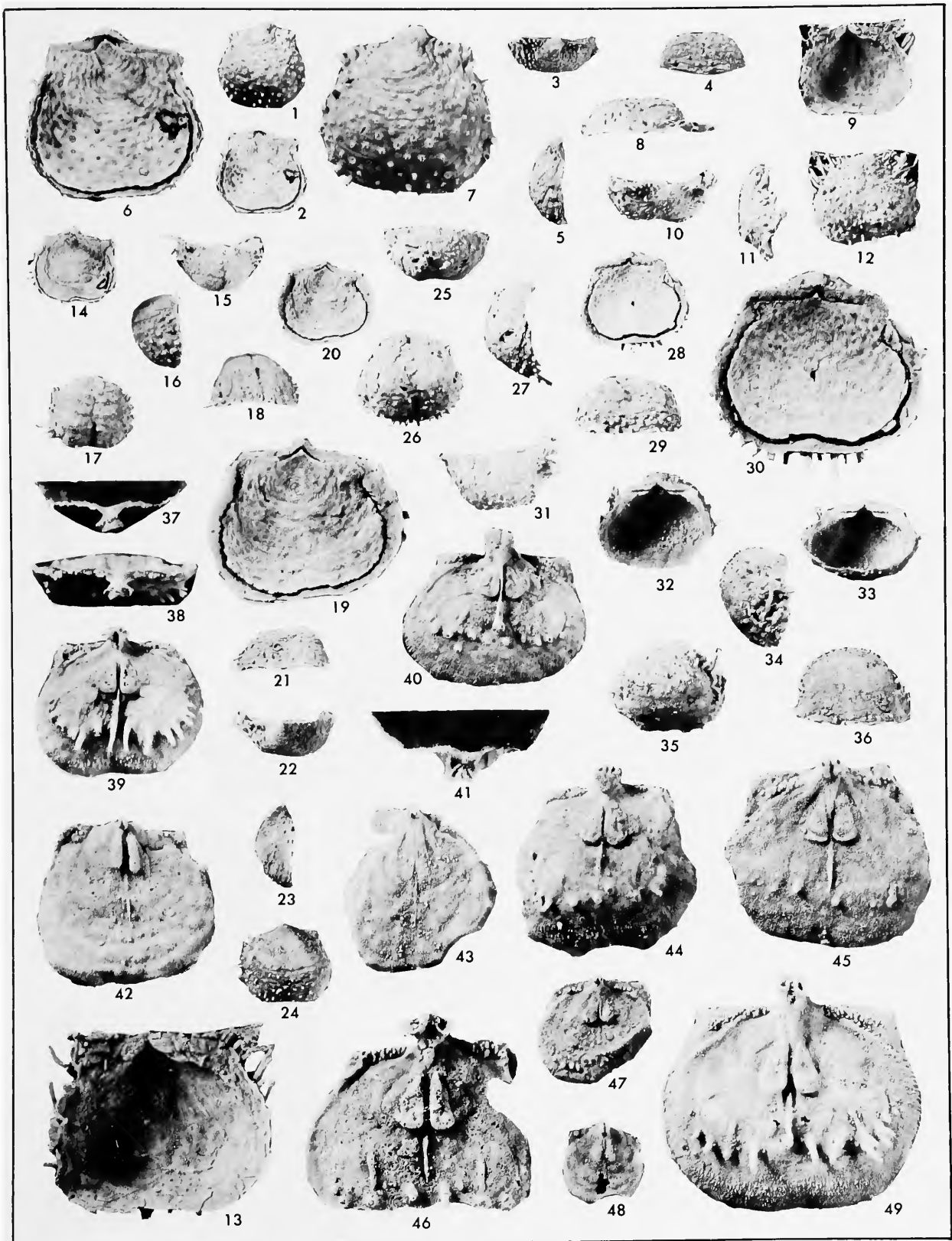


PLATE 231

Agelesia, *Spyridiophora*, and *Cactosteges*

Agelesia triangularis (R. E. King): 1-5, Dorsal, side, ventral, anterior, and posterior views of a complete specimen preserving some of its rhizoid spines, $\times 1$, hypotype USNM 151516b; 11-15, posterior, side, anterior, ventral, and dorsal views of a complete specimen devoid of spines, $\times 1$, hypotype USNM 151516e; 16-19, posterior and interior, $\times 2$, and exterior and interior, $\times 1$, of a brachial valve, hypotype USNM 151514a; 20-23, exterior and interior, $\times 1$, and posterior and interior, $\times 2$, showing adductor platforms and bilobed cardinal process, hypotype USNM 151514b; 25-28, anterior, posterior, side, and dorsal views of a complete specimen, $\times 1$, preserving some of its rhizoid spines, hypotype USNM 153834e; 29, 30, dorsal and ventral views $\times 1$, of a squarish specimen, hypotype USNM 153834f; 31, interior of a pedicle valve, $\times 1$, preserving some of the rhizoid spines and showing the apical muscle callosity, hypotype USNM 151515a. [Cathedral Mountain Formation, USNM 703bs.]

6-10, Anterior, dorsal, side, ventral, and posterior views of a complete specimen but lacking its spines, $\times 1$, hypotype USNM 151520d; 24, dorsal view of another specimen lacking its spines, $\times 1$, hypotype USNM 151520b. [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

35-38, Side, ventral, posterior and anterior views, $\times 1$, of the holotype YPM 11883; 39-41, anterior, dorsal, and ventral views, $\times 2$, of the holotype. [Cathedral Mountain Formation, R. E. King locality 247.]

42, 43, Ventral and dorsal views of a paratype, T11014. [Cathedral Mountain Formation, R. E. King locality Tx.]

Spyridiophora reticulata (R. E. King): 32, Exterior of an imperfect pedicle valve, $\times 1$, hypotype USNM 154149a; 33, 34, interior of the brachial valve, $\times 1$, $\times 2$, showing raised adductor platforms, hypotype USNM 154149b. [Cathedral Mountain Formation, USNM 721u.]

Cactosteges anomalus, new species: 44-46, Posterodorsal, posterior, and interior views of the brachial valve, $\times 2$, paratype USNM 154150a; 52, interior of a pedicle valve, $\times 2$, showing interarea, paratype USNM 154150b. [Word Formation (Willis Ranch Member), USNM 724u.]

47, 48, Interior and exterior of a brachial valve, $\times 2$, showing the trilobed cardinal process, paratype USNM 154151a; 49, 50, exterior and interior views of another brachial valve, $\times 2$, showing adductor platforms, paratype USNM 154151b. [Word Formation (China Tank Member), USNM 706c.]

51, Ventral view of a pedicle valve, $\times 2$, showing the short body spines and long rhizoid spines, paratype USNM 151296a; 55, another pedicle valve, $\times 2$, showing the same features as the preceding specimen, paratype USNM 151296b; 56, interior of a pedicle valve tilted posteriorly to show elevated muscle scars, $\times 2$, paratype USNM 154152a. [Word Formation (Willis Ranch Member), USNM 706.]

53, 54, Side and ventral views of a specimen attached to a tetracoral, $\times 2$, showing numerous rhizoid spines, paratype USNM 151298. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 231.—*Agelesia*, *Spyridiophora*, and *Cactosteges*

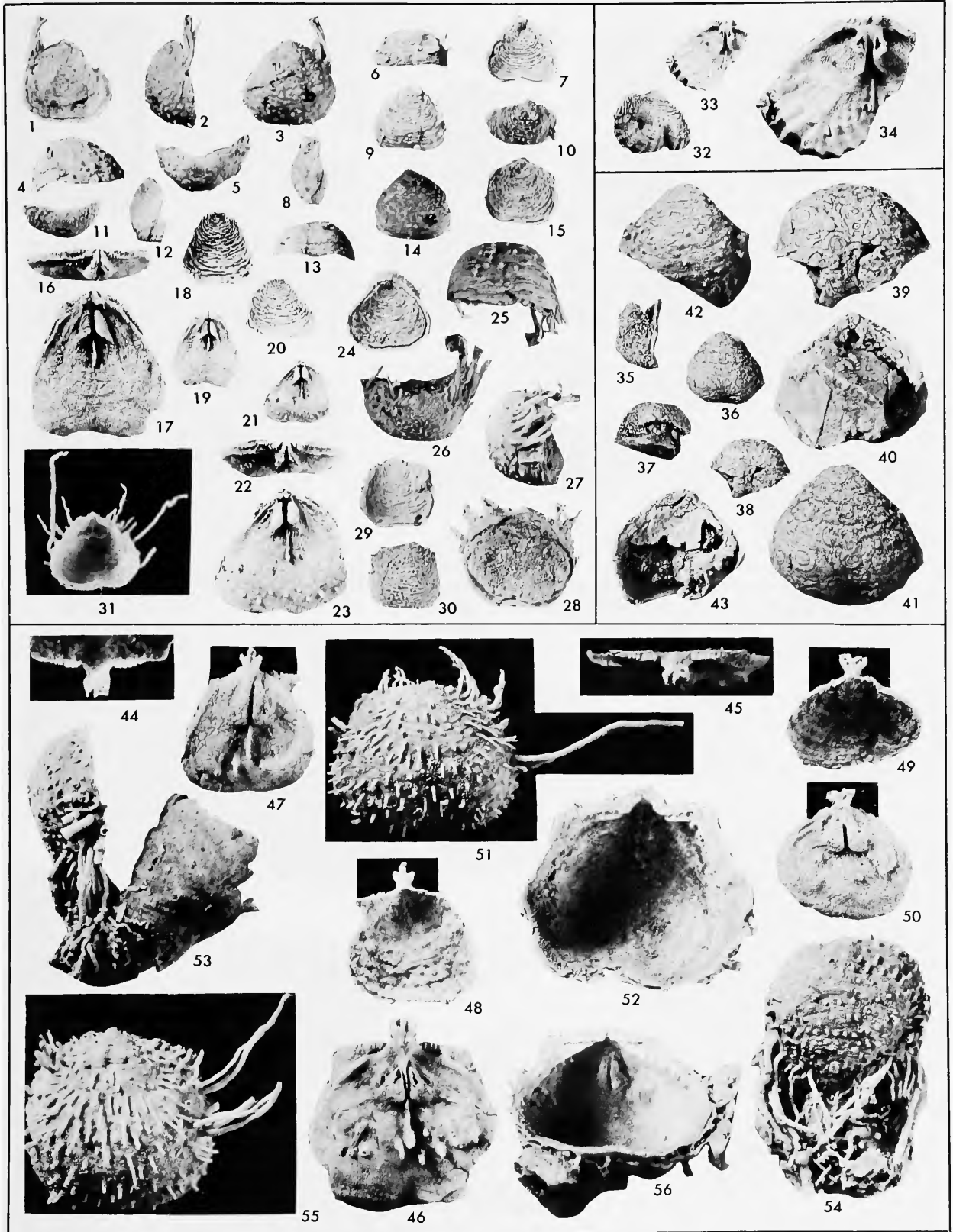


PLATE 232

*Xenostege*s

Xenostege adherens Muir-Wood and Cooper: 1, Ventral view of an immature pedicle valve, $\times 1$, showing rhizoid spines, hypotype USNM 154236 (for enlarged view, see plate 233: figure 40); 4–6, ventral, side, and dorsal views, $\times 1$, of a wide specimen, hypotype USNM 149230c; 7–9, exterior, side, and interior views, $\times 1$, of a brachial valve, hypotype USNM 149230d. [Cathedral Mountain Formation, USNM 703b.]

2, Ventral view of two immature pedicle valves, $\times 1$, hypotypes USNM 154248a, b; 3, ventral view of the lower of the preceding two specimens enlarged, $\times 3$, to show the rhizoid spines. [Cathedral Mountain Formation, USNM 702b.]

10–12, Posterior, interior, and exterior views of a brachial valve, $\times 2$, hypotype USNM 154249b; 13–18, dorsal, ventral, side, anterior, and posterior views, $\times 2$, and dorsal view, $\times 1$, of a complete specimen, hypotype USNM 154249d; 19–23, ventral, posterior, side, dorsal, and anterior views, $\times 2$, of a complete specimen, hypotype USNM 154249c; 24–28, ventral, interior, side, and anterior views, $\times 2$, and ventral view, $\times 1$, of a large pedicle valve, hypotype USNM 154249a. [Cathedral Mountain Formation, USNM 721u.]

29, Interior view of a small attached pedicle valve, $\times 1$, showing long rhizoid spines, hypotype USNM 154250. [Cathedral Mountain Formation, USNM 702un.]

30–35, Ventral view, $\times 1$, and anterior, side, interior, exterior, and posterior views, $\times 2$, of a large pedicle valve, hypotype USNM 154251a; 36–38, ventral and interior views, $\times 2$, and ventral view of an attached pedicle valve, $\times 1$, showing rhizoid spines, hypotype USNM 154251d; 39–43, ventral, posterior, side, interior, and anterior views, $\times 2$, of a large brachial valve, hypotype USNM 154251b; 44, 45, exterior and interior, $\times 2$, of a brachial valve, hypotype USNM 154251c. [Cathedral Mountain Formation, USNM 726u.]

46, 47, Interior of a *Lepidospirifer* pedicle valve, $\times 1$, $\times 2$, with attached *Xenostege*s, paratype USNM 124128a, and showing long rhizoid spines; 48, *Xenostege*s attached inside the pedicle valve of *Hercosia*, $\times 2$, hypotype USNM 149170. [Cathedral Mountain Formation, USNM 702.]

PLATE 232.—*Xenosteges*

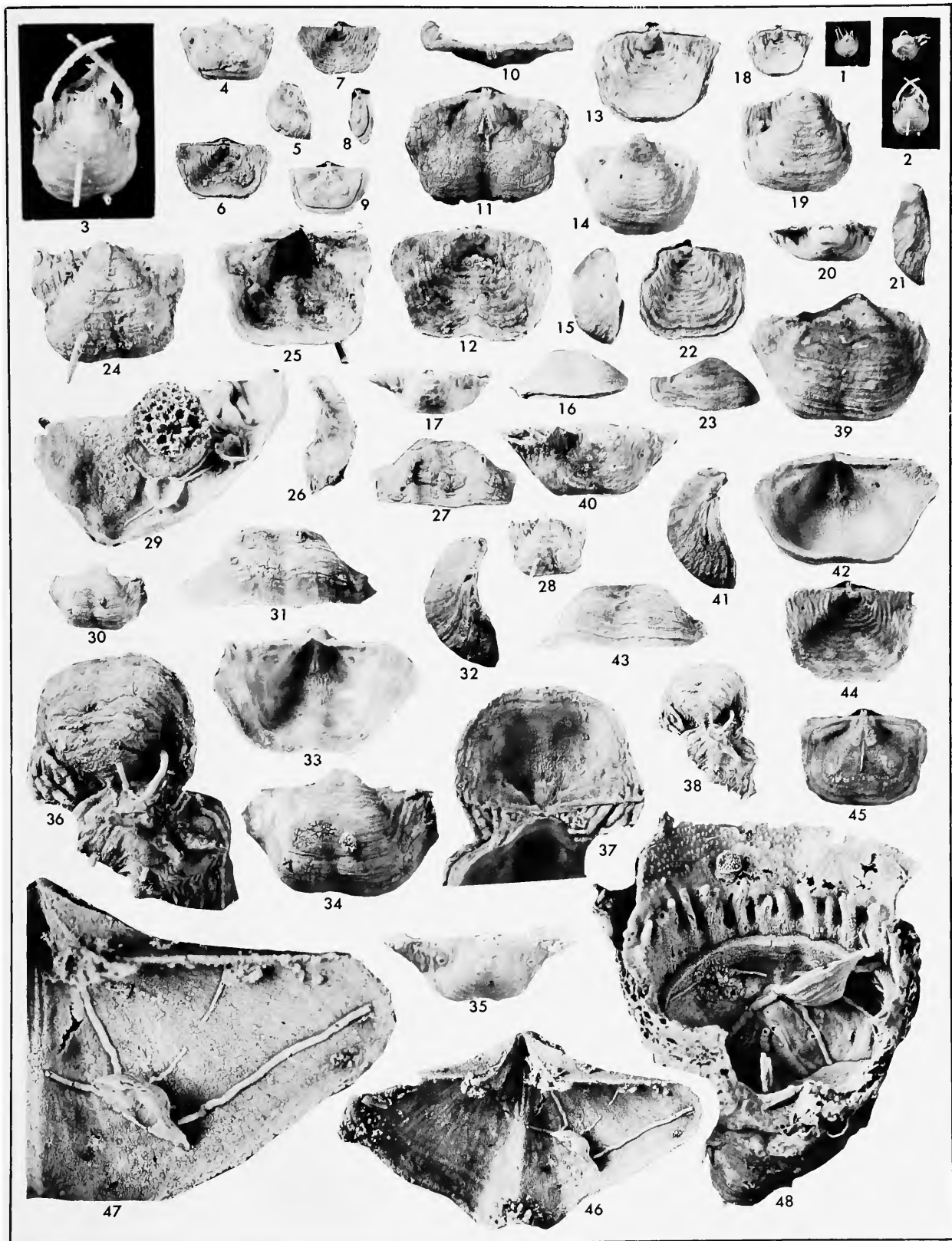


PLATE 233

Hystriculina and *Xenostege*s

Hystriculina sulcata, new species: 1, Ventral view of three immature pedicle valves, $\times 1$, paratypes USNM 154235b,c,a; 2, topmost specimen of preceding three, $\times 3$; 3, middle specimen, $\times 3$; 4, bottom specimen $\times 3$; 20–26, anterior, posterior, ventral dorsal, and side views, $\times 1$, and dorsal and ventral views, $\times 2$, of a complete specimen, paratype USNM 154235e; 27–31, dorsal, anterior, side, posterior, and ventral views, $\times 1$, of a complete specimen, paratype USNM 154235f. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701c.]

5–9, Ventral, anterior, dorsal, posterior, and side views, $\times 1$, of a complete specimen, paratype USNM 149718–1; 10–14, 32, 33. Ventral, posterior, side, dorsal, and anterior views, $\times 1$, and dorsal and ventral views, $\times 2$, of the holotype USNM 149718b; 15–19, posterior, ventral, anterior, side, and dorsal views, $\times 1$, of another complete specimen, paratype USNM 149718n; 34–36, interior, and exterior, $\times 2$, and posterior, $\times 3$, showing the cardinal process, endospines, and ear baffles, paratype USNM 149718o; 37–39, interior, exterior, $\times 2$, and posterior, $\times 3$, of another brachial valve, paratype USNM 149718p. [Neal Ranch Formation, USNM 701.]

Xenostege adherens Muir-Wood and Cooper: 40, Ventral view of an immature pedicle valve, $\times 6$, showing early rhizoid spines, hypotype USNM 154236 (for $\times 1$ view see plate 232: figure 1). [Cathedral Mountain Formation, USNM 703b.]

Xenostege umbonatus, new species: 41–46, Anterior, posterior, side, ventral, and dorsal views, $\times 2$, and dorsal view, $\times 1$, paratype USNM 149217h; 47–50, side, ventral, anterior, and interior views, $\times 2$, of a pedicle valve, paratype USNM 149217b; 51–53, interior, ventral, and side views of a pedicle valve, $\times 2$, showing muscle platform, paratype USNM 149217a; 54–58, dorsal, ventral, posterior, anterior, and side views, $\times 2$, of the holotype USNM 149217d, showing bases of the rhizoid spines; 59–62, ventral, interior, and side views of a laterally expanded pedicle valve, $\times 2$, paratype USNM 149217f. [Bell Canyon Formation (Hegler Member), USNM 731.]

PLATE 233.—*Hystriculina* and *Xenosteges*

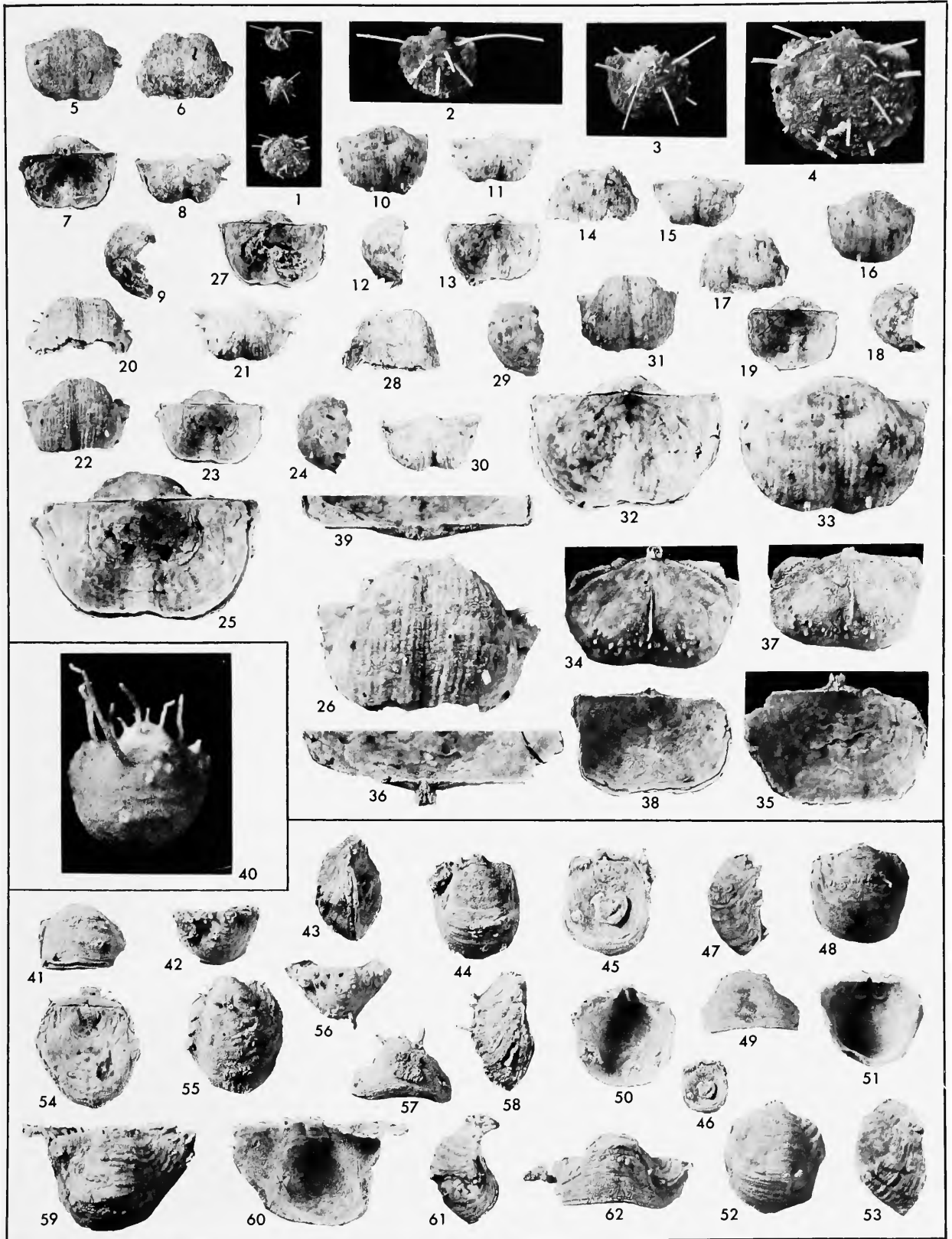


PLATE 234

Xenosteges

Xenosteges magnus, new species: 1, Specimen attached inside the pedicle valve of a lytoniid, $\times 1$, paratype USNM 154237. [Road Canyon Formation, USNM 721o.]

2, 3, Interior, $\times 2$, and exterior, $\times 1$, of a large pedicle valve, showing its rhizoid spines and muscle region, paratype USNM 154238. [Road Canyon Formation, USNM 719x.]

4–10, Anterior, posterior, dorsal, side, and ventral views, $\times 1$, and ventral and dorsal views, $\times 2$, of a large pedicle valve preserving part of its rhizoid spines, holotype USNM 152653a. [Road Canyon Formation, USNM 726d.]

11, 12, Ventral view, $\times 1$, $\times 2$, of an attached specimen, paratype USNM 152654. [Road Canyon Formation, USNM 721x.]

13–16, Side, interior, and exterior views, $\times 1$, and interior, $\times 2$, of a brachial valve, paratype USNM 154239a; 17–20, 27, posterior, side, ventral, and anterior views, $\times 1$, and interior, $\times 2$, of a pedicle valve, showing rims of spines in the interior, paratype USNM 154239b; 21–26, side, dorsal, anterior, posterior, and ventral views of a complete specimen, $\times 1$, and dorsal view, $\times 2$, paratype USNM 154239e. [Road Canyon Formation, USNM 721j.]

Xenosteges adherens Muir-Wood and Cooper: 28, Ventral view of a young pedicle valve showing one long rhizoid spine, $\times 1$, hypotype USNM 149170; 29, dorsal view of a complete specimen with laterally directed rhizoid spines, $\times 2$, paratype USNM 124128b. [Cathedral Mountain Formation, USNM 702.]

30, Ventral view, $\times 2$, of a young specimen, paratype USNM 124129a. [Cathedral Mountain Formation, USNM 702un.]

31, Dorsal view of a complete specimen, $\times 2$, paratype USNM 124130a; 32, ventral view of a pedicle valve, $\times 1$, showing laterally extended rhizoid spines, paratype USNM 124130b. [Cathedral Mountain Formation, USNM 702a.]

Xenosteges anomalus, new species: 33–35, Interior, exterior, $\times 2$, and interior, $\times 1$, showing a stout rhizoid spine, paratype USNM 154240a; 36–38, exterior, and interior, $\times 2$, and interior, $\times 1$, of another pedicle valve, paratype USNM 154240b; 39–41, dorsal, ventral, and side views of a complete specimen, $\times 1$, holotype USNM 154241a (for $\times 2$ views, see Plate 244: figures 38–42); 42–44, ventral, posterior, and anterior views, $\times 1$, of another paratype USNM 154241d; 45–47, dorsal view, $\times 1$, and dorsal and ventral views, $\times 2$, showing both valves, paratype USNM 154241b; 48, 49, exterior and interior, $\times 2$, of a brachial valve, paratype USNM 154240c; 50, interior of another brachial valve, $\times 2$, showing submarginal rim, paratype USNM 154240d; 51, interior of an obese brachial valve, $\times 4$, showing submarginal rim, brachial ridges, adductor callosities and cardinal process, paratype USNM 154240e. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 234.—*Xenosteges*

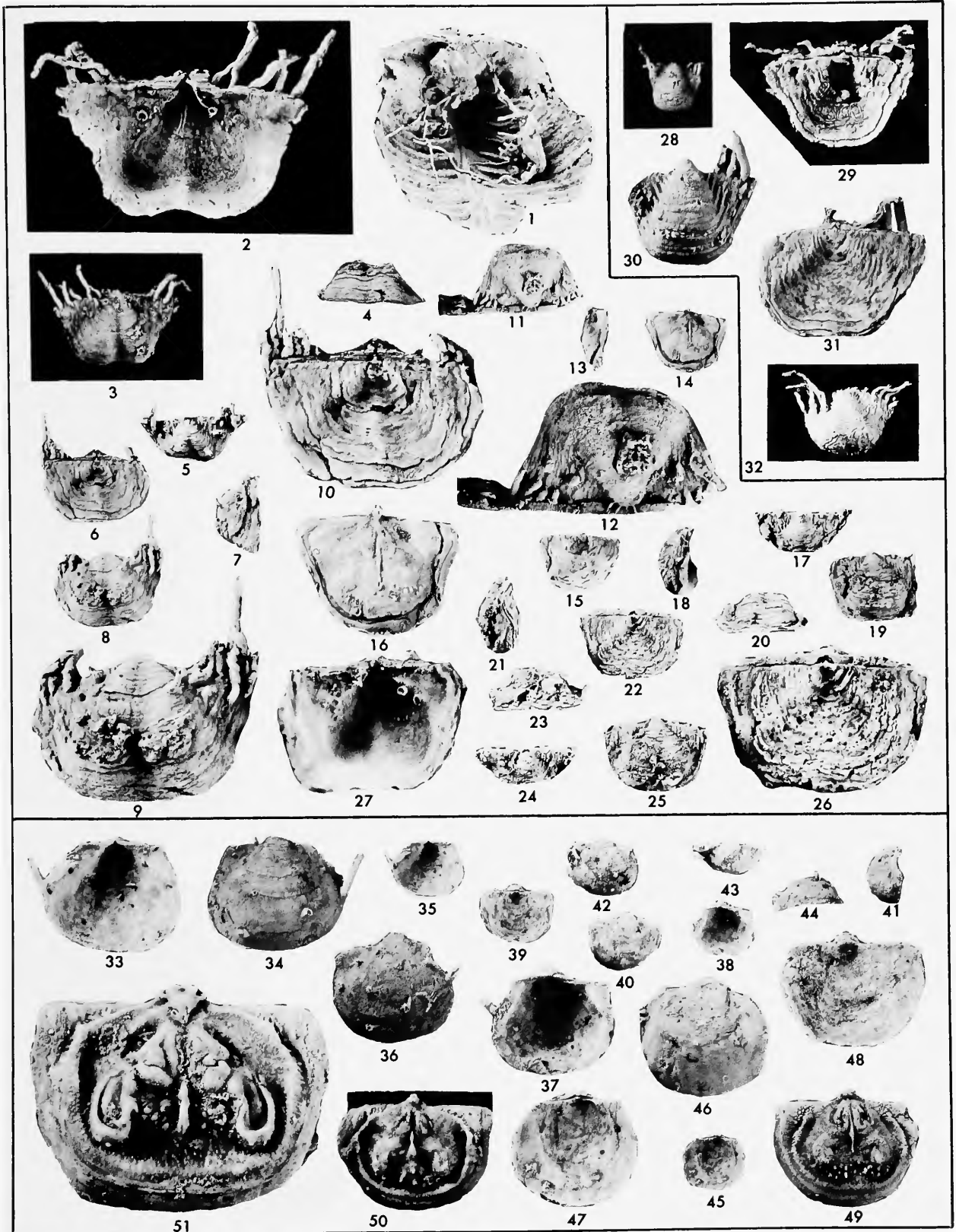


PLATE 235

Xenostege

Xenostege quadratus, new species: 1-5, Interior, ventral, anterior, and side views, $\times 2$, and ventral view, $\times 1$, of a large pedicle valve, showing muscle platform, paratype USNM 149200a; 11-14, dorsal, side, ventral, and anterior views of a complete specimen, $\times 2$, paratype USNM 149200c; 55-59, dorsal view, $\times 1$, and anterior, side, ventral, and dorsal views, $\times 2$, holotype USNM 154246a. [Word Formation (Willis Ranch Member), USNM 706e.]

6-10, Exterior, anterior, interior, and side views, $\times 2$, and posterior view, $\times 3$, of a brachial valve, showing elevated brachial ridges, paratype USNM 154242a; 20-25, ventral view, $\times 1$, and side, interior, ventral, oblique, and anterior views, $\times 2$, of a pedicle valve, paratype USNM 154242b. [Cherry Canyon Formation (Getaway Member), USNM 728.]

15-18, Ventral view, $\times 1$, and ventral, side, and dorsal views, $\times 2$, of an attached specimen, paratype USNM 154244a. [Word Formation (Willis Ranch Member), USNM 724u.]

19, Ventral view of a specimen attached to a bryozoan, $\times 2$, paratype USNM 154243c; 26-30, ventral, anterior, side, and interior views, $\times 2$, and ventral view, $\times 1$, of a large pedicle valve, paratype USNM 154243d; 31, anterior view of a specimen attached to a small *Derbyia*, $\times 2$, paratype USNM 154243a; 52, specimen attached inside the pedicle valve of *Echinauris*, $\times 2$, paratype USNM 149193; 60, ventral view of a specimen attached to a bryozoan, $\times 2$, paratype USNM 154243b. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

32-36, Ventral view, $\times 1$, ventral, interior, and anterior views, $\times 2$, of a pedicle valve, paratype USNM 154245a; 37-41, anterior and interior views, $\times 2$, posterior view, $\times 3$, and interior view, $\times 4$, of a brachial valve, showing exaggerated brachial ridges, paratype USNM 154245b; 42-45, exterior and interior views, $\times 2$, posterior view, $\times 3$, and interior view, $\times 4$, of a brachial valve distorted by crowding and showing great development of the brachial ridges, paratype USNM 154245c. [Word Formation (Willis Ranch Member), USNM 706.]

46-51, Dorsal view, $\times 1$, and posterior, anterior, ventral, and dorsal views, $\times 2$, of a complete specimen, paratype USNM 149197; 53, 54, ventral and interior views of a pedicle valve, $\times 1$, attached to *Enteleles*, paratype USNM 149196. [Word Formation (China Tank Member), USNM 706c.]

PLATE 235.—*Xenosteges*

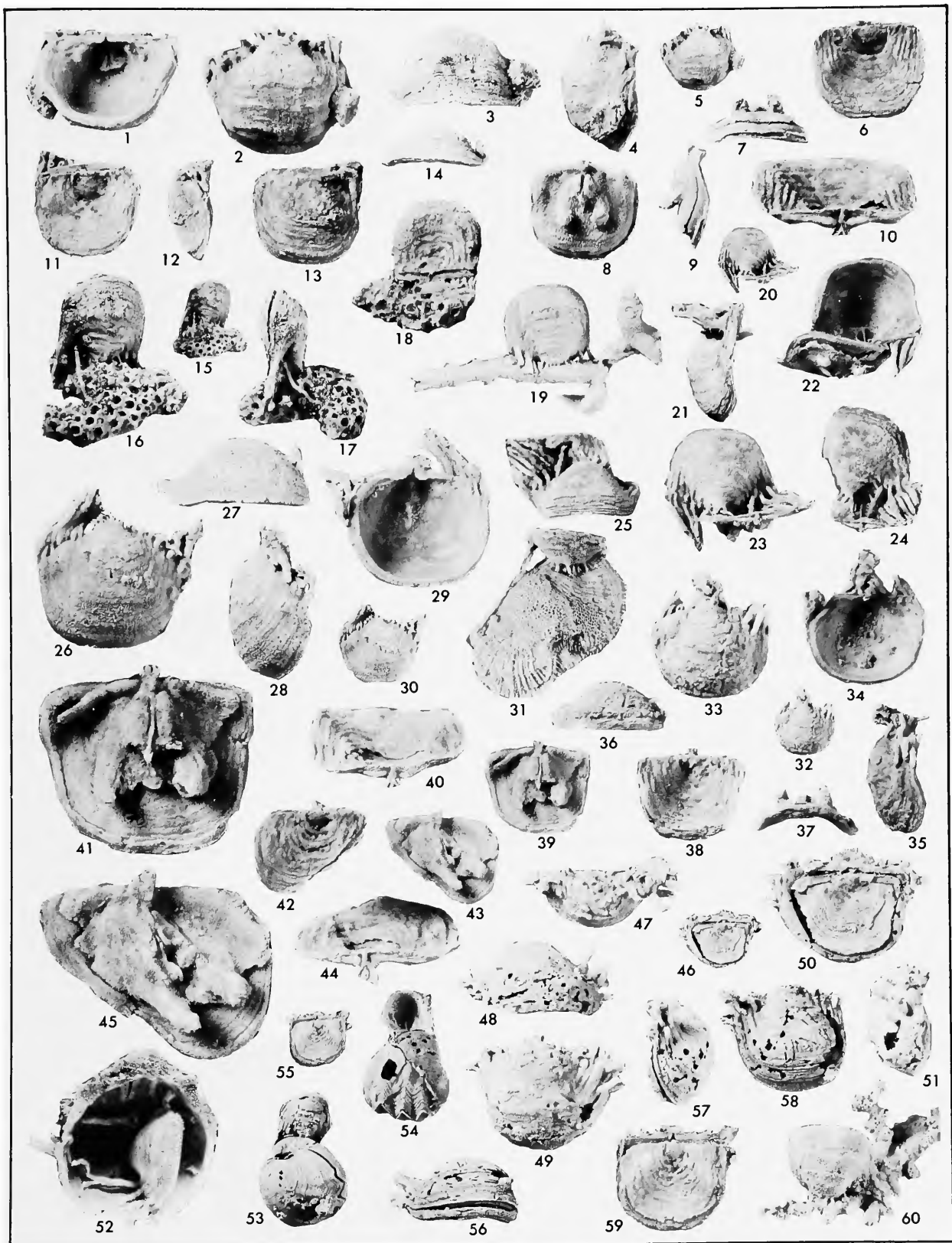


PLATE 236

Xenostege

Xenostege quadratus, new species: 1–5, Ventral, interior, anterior, and side views, $\times 2$, and ventral view, $\times 1$, of a pedicle valve, paratype USNM 154246b; 6–11, exterior view, $\times 1$, anterior, exterior, interior, and posterior views, $\times 2$, and posterodorsal view, $\times 3$, showing elevated brachial ridges, and cardinal process, paratype USNM 154246c; 12–18, exterior view, $\times 1$, anterior, interior, exterior, and side views, $\times 2$, posterior view, $\times 3$, and interior view, $\times 4$, showing brachial ridges, paratype USNM 154246d. [Word Formation (Willis Ranch Member), USNM 706e.]

Xenostege trivialis, new species: 19–23, Side, dorsal, ventral, anterior, and posterior views, $\times 2$, holotype USNM 152655c; 24–26, exterior, interior, $\times 2$, posterior view, $\times 3$, showing cardinal process, paratype USNM 152655d; 27–31, ventral, posterior, anterior, side, and interior views, $\times 2$, of a pedicle valve, paratype USNM 152655a. [Road Canyon Formation, USNM 721z.] 32–34, Ventral oblique view, $\times 1$, and oblique and interior views, $\times 2$, showing attached specimen with hold strengthened by a stout rhizoid spine, paratype USNM 152656c; 35, ventral view of another attached specimen, $\times 2$, paratype USNM 152656f; 36–41, interior, $\times 1$, and ventral, posterior, interior, anterior, and side views, $\times 2$, of a pedicle valve, paratype USNM 152656h; 42–46, side, exterior, anterior, and interior views, $\times 2$, and posterior view, $\times 3$, of a brachial valve showing cardinal process, paratype USNM 152656g; 47–51, posterior, side, ventral, anterior, and dorsal views of a complete specimen, $\times 2$, paratype USNM 152656e; 52–56, dorsal view, $\times 1$, and anterior, side, dorsal, and ventral views, $\times 2$, of another complete specimen, paratype USNM 152656d. [Road Canyon Formation, USNM 724c.]

Xenostege umbonatus, new species: 57–59, Exterior and interior views, $\times 2$, and exterior view, $\times 1$, of a brachial valve, paratype USNM 154247a; 60, 61, ventral views of a pedicle valve, $\times 1$, $\times 2$, paratype USNM 154247b; 62–64, exterior, $\times 1$, and interior and exterior, $\times 2$, of another brachial valve, paratype USNM 154247d; 65–67, exterior and interior, $\times 2$, and exterior, $\times 1$, of a brachial valve showing elevated brachial ridges, paratype USNM 154247e; 68–70, interior and exterior, $\times 2$, and exterior, $\times 1$, of another brachial valve with thickened adductor callosities, paratype USNM 154247c. [Bell Canyon Formation (Hegler Member), AMNH 635.]

PLATE 236.—*Xenosteges*

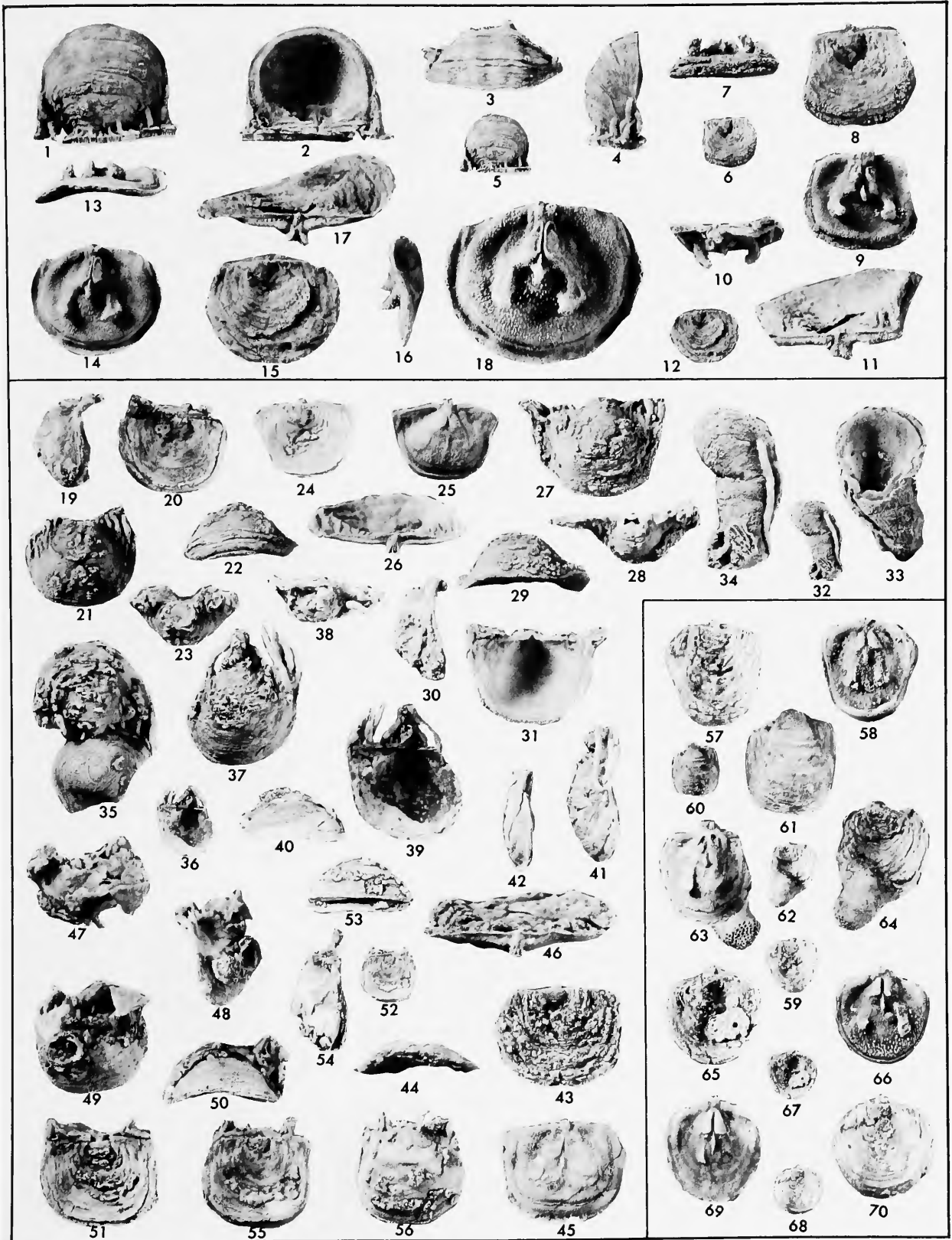


PLATE 237

Scapharina and *Kutorginella*

Scapharina levis, new species: 1-4, Interior, exterior, and posterior, $\times 3$, and exterior, $\times 1$, of a brachial valve showing ear baffles, cardinal process, and brachial ridges, paratype USNM 154224a; 5-8, dorsal, ventral, and posterior views, $\times 3$, and dorsal view, $\times 1$, of a complete specimen, paratype USNM 154224b. [Bell Canyon Formation (Pinery Member), AMNH locality 375.]

21-23, Ventral, $\times 1$, and interior and ventral, $\times 3$, views of a pedicle valve, showing fluted ear baffles, paratype USNM 149223d; 24, 25, interior and exterior views of a battered brachial valve, showing ear baffles, $\times 3$, paratype USNM 149223g; 26, 27, exterior and interior of another brachial valve, $\times 3$, showing ear baffles and marginal rim, paratype USNM 149223e; 28-31, exterior, posterior, interior, and side views of a brachial valve, $\times 3$, paratype USNM 152658f; 32-37, side, ventral, anterior, dorsal views, $\times 3$, and dorsal view, $\times 1$, of a complete specimen, paratype USNM 152658a; 38-43, ventral and dorsal views, $\times 1$, and side, ventral, anterior, and dorsal views, $\times 3$, paratype USNM 152658c; 44-49, ventral and dorsal views, $\times 1$, and anterior, ventral side, and dorsal views, $\times 3$, of a complete specimen preserving part of its large, scattered rhizoid spines, holotype USNM 152659; 50-55, ventral and dorsal views, $\times 1$, and ventral side and dorsal views, $\times 3$, of another complete specimen, paratype USNM 152658b. [Bell Canyon Formation (Lamar Member), USNM 738b.]

Kutorginella sullivanensis (R. E. King): 9-12, Side, dorsal, posterior, and ventral views of the holotype, $\times 1$, YPM 10767. [Road Canyon Formation, R. E. King locality 46.]

Scapharina quadrata, new species: 13-16, Interior, ventral, and posterior views, $\times 3$, and ventral view, $\times 1$, of a pedicle valve, paratype USNM 154225a; 17-20, posterior, interior, and exterior views, $\times 3$, and exterior, $\times 1$, of a brachial valve showing brevisseptum cardinal process, and brachial ridges, paratype USNM 154225b. [Bell Canyon Formation (Hegler Member), USNM 731.]

PLATE 237.—*Scapharina* and *Kutorginella*

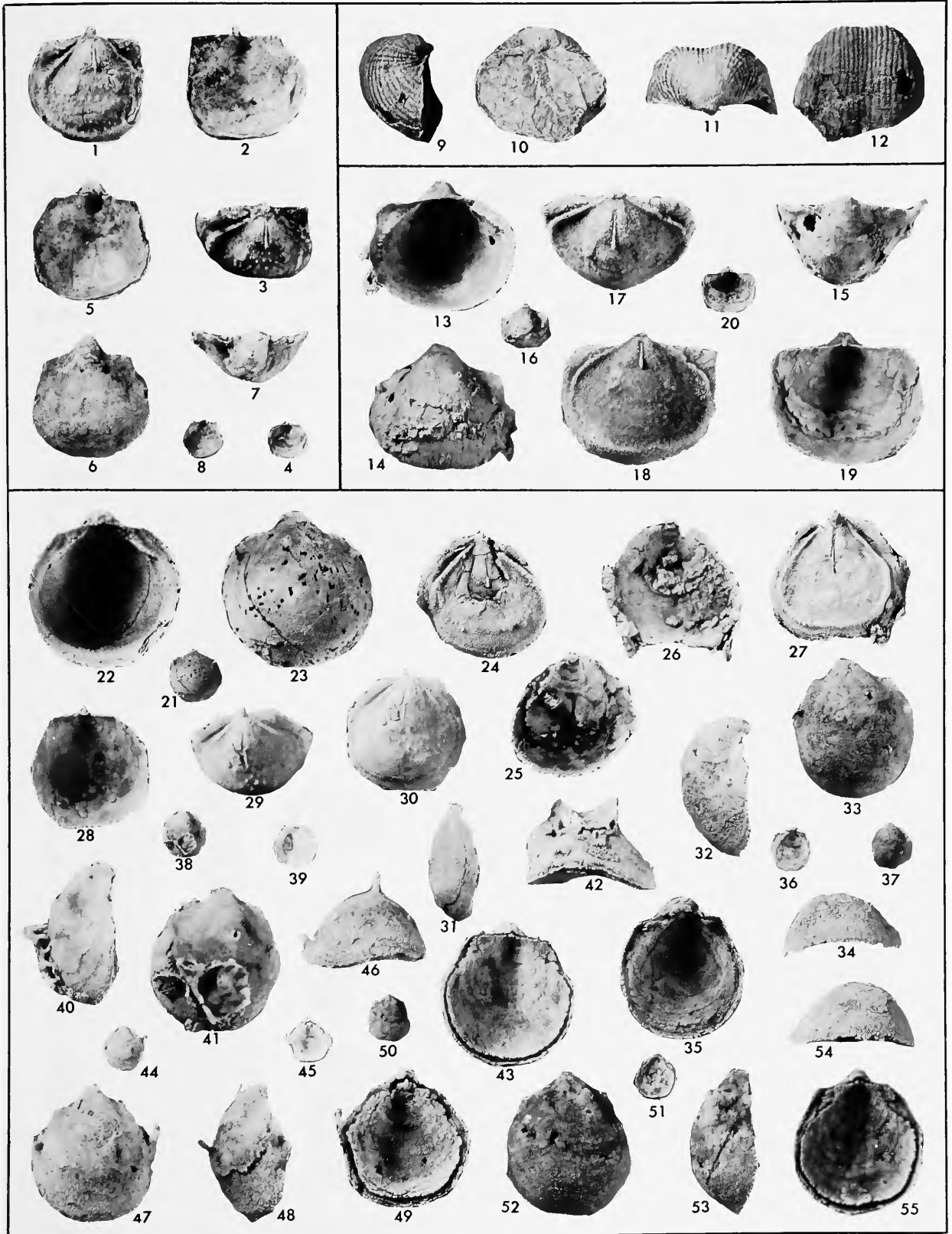


PLATE 238

Scapharina

Scapharina quadrata, new species: 1, 2, Ventral views of a pedicle valve, $\times 1$, $\times 2$, holotype USNM 152660a; 3–5, ventral and interior views, $\times 3$, and exterior, $\times 1$, of a pedicle valve, paratype USNM 152660b; 6, 7, interior and posterior of a damaged brachial valve interior, $\times 3$, showing brachial ridges and submarginal ridge, paratype USNM 152660d; 8–11, dorsal view, $\times 1$, and exterior, posterior, and interior views of another brachial valve, $\times 3$, paratype USNM 152660c; 12–14, interior, posterior, and exterior views of a brachial valve with well developed cardinal process, $\times 3$, paratype USNM 152660e; 15–17, interior, exterior, and posterior views of the preceding specimen, $\times 6$, showing brachial ridges, brevisseptum adductor scars; 18, exterior of the preceding specimen, $\times 1$. [Bell Canyon Formation (Hegler Member), USNM 731.]

Scapharina levis, new species: 19, Interior of the brachial valve, $\times 6$, showing cardinal process, paratype USNM 152658f. [Bell Canyon Formation (Lamar Member), USNM 738b.]

Scapharina rugosa, new species: 20–23, Ventral, side, anterior, and interior views of a pedicle valve, $\times 3$, paratype USNM 154227a; 24–28, dorsal view, $\times 1$, and dorsal, ventral, anterior and side views, $\times 3$, of a complete specimen, paratype USNM 154227d; 29, dorsal view of a complete specimen, $\times 3$, paratype USNM 154227c; 30–34, side, interior, and exterior, $\times 3$, and interior and exterior, $\times 6$, of a brachial valve showing submarginal rim, brachial ridges and cardinal process, paratype USNM 154227e; 35, 36, exterior and interior of another brachial valve, $\times 3$, paratype USNM 154227f; 37, dorsal view of a complete specimen, $\times 1$, paratype USNM 154227g; 38–42, anterior, interior, side, and exterior views, $\times 3$, and interior, $\times 6$, of a brachial valve showing a thickened cardinal process and strong submarginal rim, paratype USNM 154227h. [Bell Canyon Formation (Hegler Member), USNM 731.]

PLATE 238.—*Scapharina*

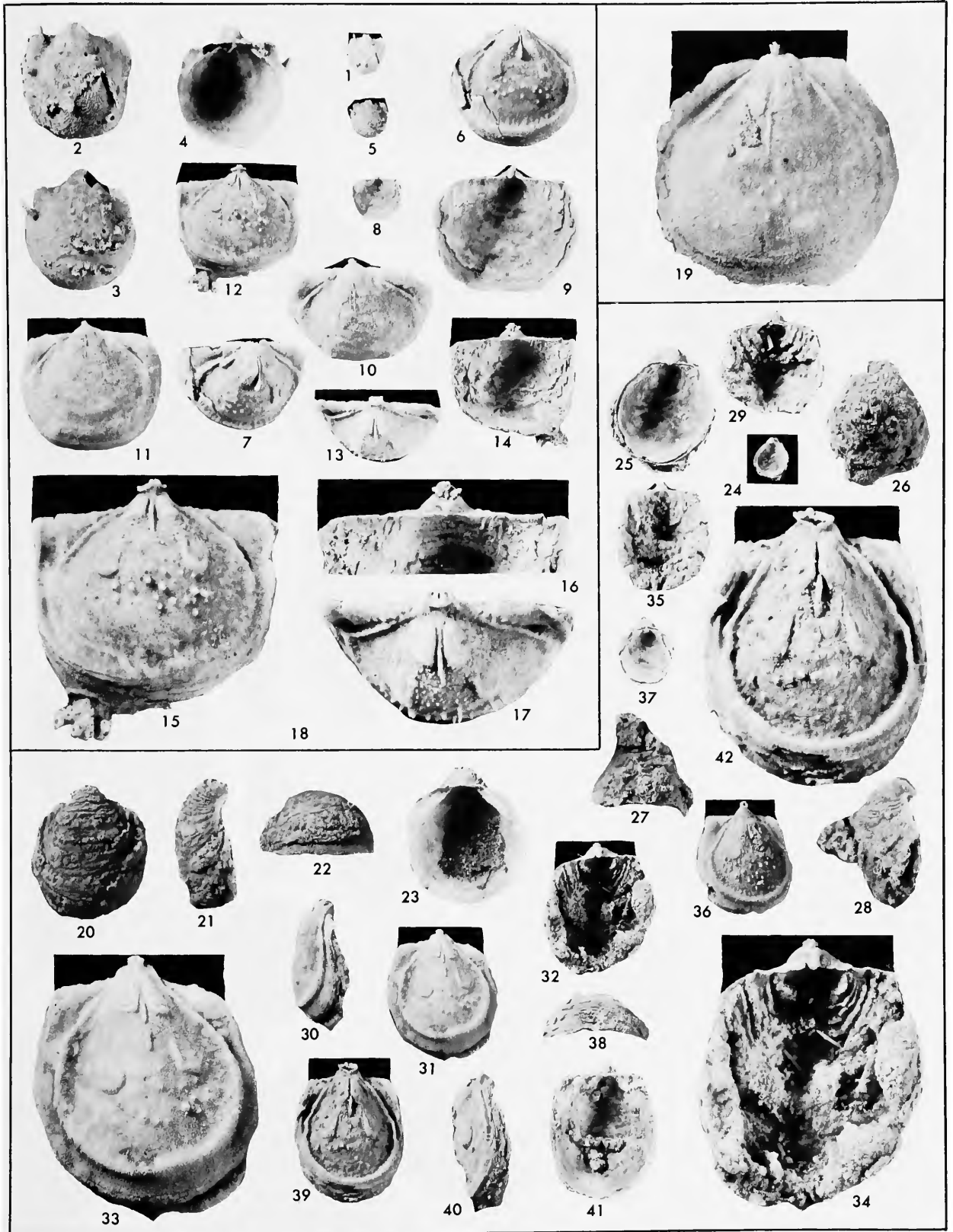


PLATE 239

Scapharina

Scapharina rugosa, new species: 1, 2, Exterior and interior of a pedicle valve, $\times 3$, showing rugose surface, paratype USNM 154228a; 3-6, exterior, $\times 1$, $\times 3$, and interior, $\times 3$, $\times 6$, showing cardinal process and adductor scars, of a rugose brachial valve, paratype USNM 154228b. [Bell Canyon Formation (Hegler Member), AMNH 635.]

7-10, Side, anterior, ventral, and dorsal views of a complete specimen, $\times 3$, paratype USNM 152657a; 11-14, ventral, side, dorsal, and anterior views of another complete specimen, $\times 3$, paratype USNM 152657c; 15, 16, interior and exterior views of a pedicle valve, $\times 3$, showing well developed ears, paratype USNM 152657b; 17-20, dorsal, ventral, side, and anterior views of a strongly rugose individual, $\times 3$, holotype USNM 152657d; 21-23, dorsal, anterior, and ventral views of a rugose specimen, $\times 3$, paratype USNM 152657e; 24-28, interior, posterior, and side views, $\times 3$, and interior and side views, $\times 6$, of a brachial valve, showing ear baffles merging into submarginal rim, brachial ridges and small cardinal process, paratype USNM 152657f; 54-56, anterior, side, and dorsal views of a rugose individual, $\times 3$, paratype USNM 154227b. [Bell Canyon Formation (Hegler Member), USNM 731.]

29-32, Dorsal, side, anterior, and ventral views of a specimen distorted by crowding, $\times 3$, paratype USNM 154226c; 33-37, dorsal, $\times 1$, and dorsal, side, anterior, and ventral views, $\times 3$, of a greatly thickened and rugose individual, $\times 3$, paratype USNM 154226d; 38-42, interior view, $\times 1$, and interior, anterior, ventral, and side views, $\times 3$, paratype USNM 154226e; 43-46, side, interior, exterior, and anterior views of a brachial valve, $\times 3$, showing the strong submarginal rim, paratype USNM 154226b; 47-50, side, interior, exterior and posterior views of another brachial valve, $\times 3$, paratype USNM 154226a; 51, 52, interior and side views of the preceding specimen, $\times 6$, showing brachial ridges, submarginal rim and cardinal process; 53, dorsal view of a brachial valve, $\times 3$, paratype 154226f. [Bell Canyon Formation (Rader Member), USNM 725f.]

PLATE 239.—*Scapharina*

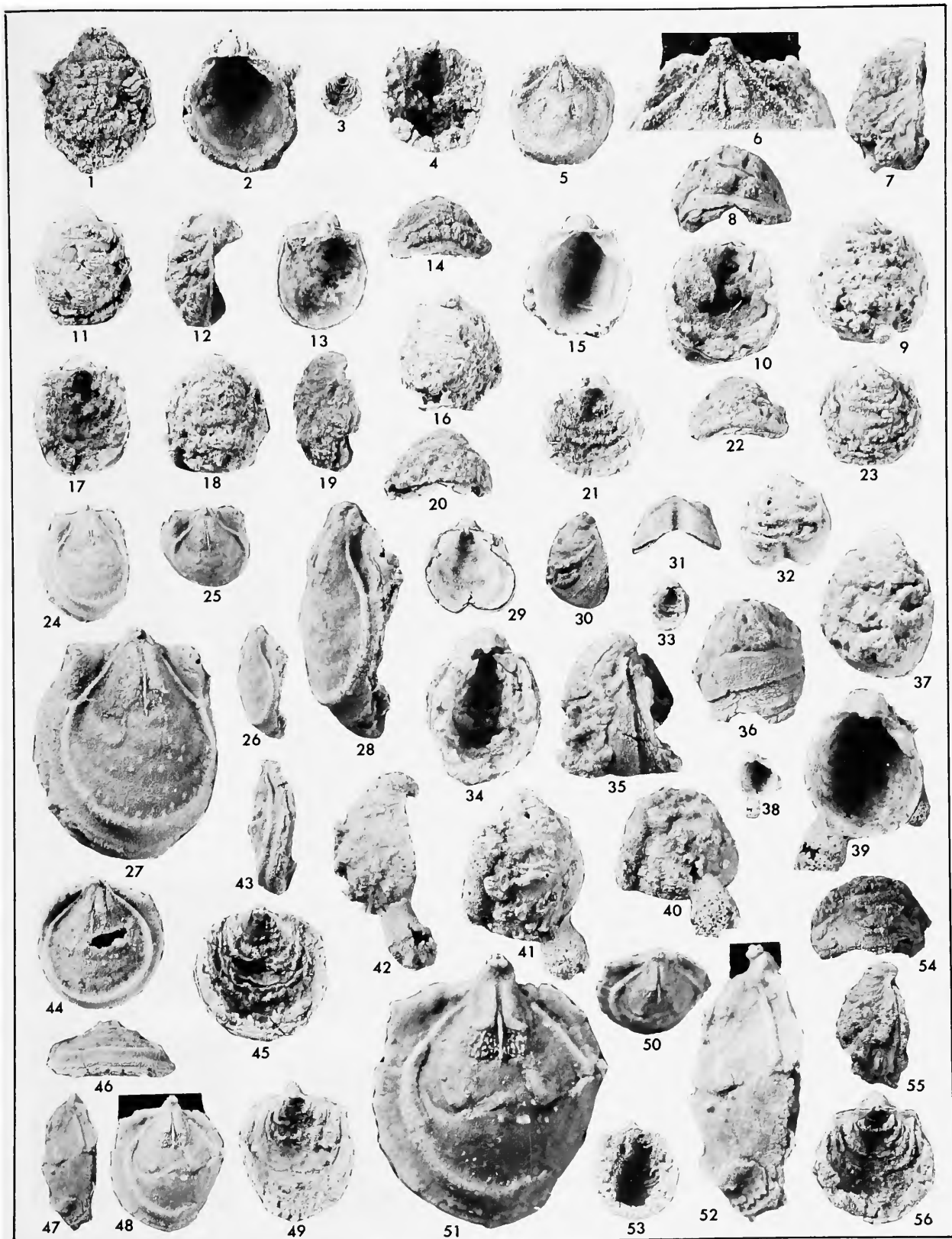


PLATE 240

Chonosteges

Chonosteges limbatus, new species: 1-6, Dorsal, ventral, side, and anterior views, $\times 2$, and dorsal and ventral views, $\times 1$, of a complete specimen, paratype USNM 154156a; 7, 8, anterior views, $\times 1$, $\times 2$, of an attached specimen, paratype USNM 154156b. [Hess Formation (Taylor Ranch Member), USNM 702e.]

9-14, Dorsal, side, anterior, and ventral views, $\times 2$, and ventral and dorsal views, $\times 1$, of a complete specimen with long, sleeve-like marginal flange on the brachial valve, holotype USNM 149285a. [Hess Formation (Taylor Ranch Member), USNM 702d.]

Chonosteges matutinus, new species: 15-20, Dorsal, ventral, and anterior views, $\times 1$, and dorsal, anterior, and ventral views, $\times 2$, of the holotype USNM 149288b; 21-24, ventral view, $\times 1$, and side, anterior, and ventral views, $\times 2$, of a pedicle valve, paratype USNM 149288a; 25-28, anterior, side and ventral views, $\times 2$, and side, $\times 1$, of another pedicle valve, paratype USNM 149307b; 29-33, anterior and ventral views, $\times 1$, and ventral, anterior, and side views, $\times 2$, of another paratype, USNM 149307a. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

Chonosteges multicosatus, new species: 34, Ventral view, $\times 2$, showing specimen before geniculation, paratype USNM 149301a; 35, exterior of the brachial valve, $\times 2$, paratype USNM 149301b; 36-41, side, dorsal, anterior, and ventral views, $\times 2$, and ventral and dorsal views, $\times 1$, of the holotype, USNM 149301c; 42-45, anterior, side, dorsal, and ventral views of another complete specimen, $\times 2$, paratype USNM 149301d; 46-49, anterodorsal, dorsal, and anterior views, $\times 2$, and dorsal view, $\times 1$, of a specimen with intake funnels crowded along the anterior margin of the brachial valve, paratype USNM 149301e; 50, 51, dorsal view of another specimen with crowded intake funnels, $\times 1$, $\times 2$, paratype USNM 149301f. [Cathedral Mountain Formation, USNM 703bs.]

PLATE 240.—*Chonosteges*

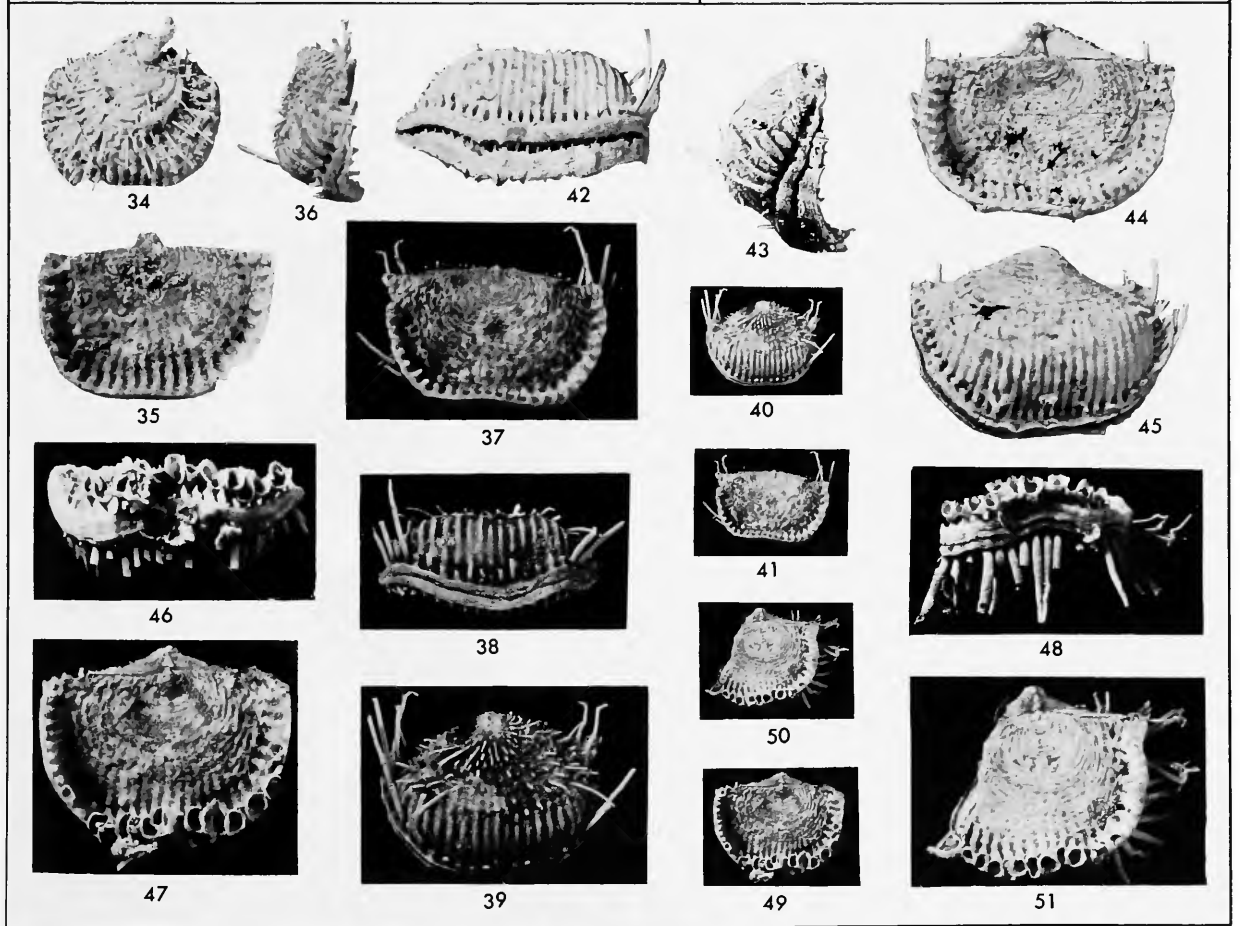
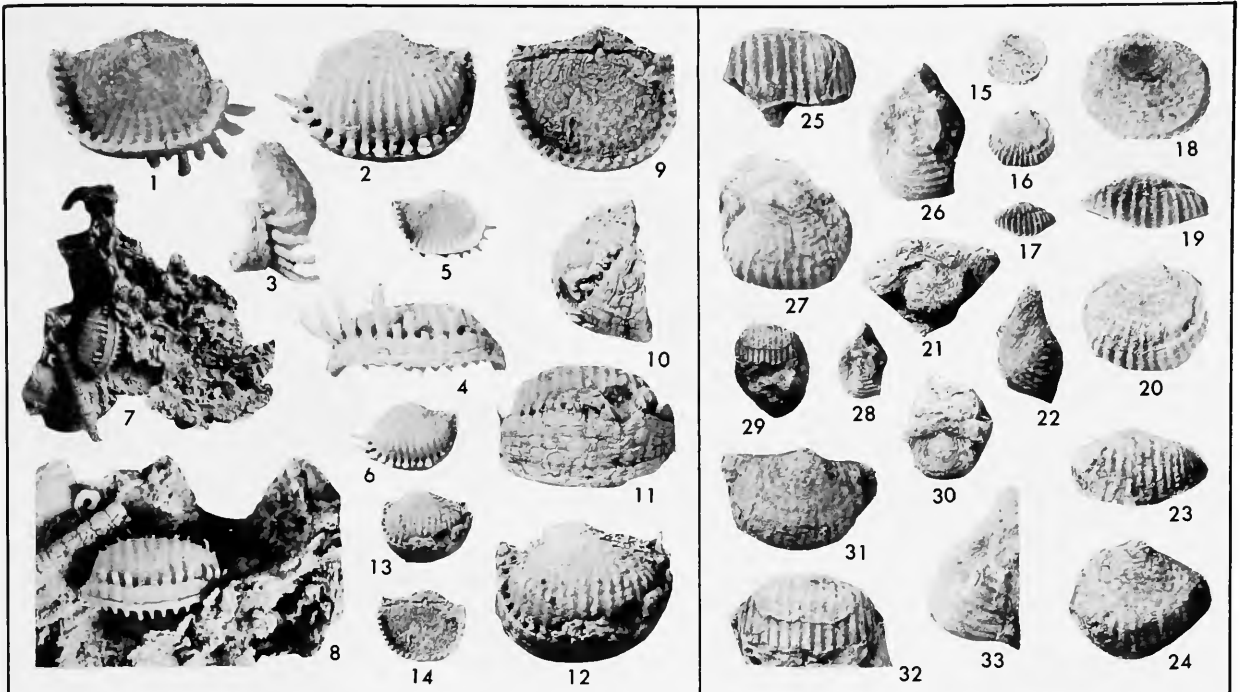


PLATE 241

Chonosteges

Chonosteges pulcher, new species: 1–6, Dorsal, ventral, anterior, and side views, $\times 2$, and dorsal and ventral views, $\times 1$, of the paratype USNM 149280b; 32–34, dorsal, ventral, and side views of another complete specimen, $\times 2$, paratype USNM 149280c. [Cathedral Mountain Formation (Wedin Member), USNM 717e.]

7, Anterior view of a specimen attached to a fenestellid frond, $\times 1$, paratype USNM 154163a; 12, anterior view of a specimen with valves agape, $\times 3$, showing the intake funnels, and strainer points, paratype USNM 154163b; 13, dorsal view of the preceding specimen, $\times 2$, showing the intake funnels; 23–25, exterior, anterior, and interior views of a brachial valve, $\times 2$, showing intake tubes, paratype USNM 154163c; 48, anterior of a gaping specimen, $\times 2$, showing the strainer needles on the brachial valve, paratype USNM 154163d. [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

8, Specimen attached to the brachial valve of *Institella*, $\times 1$, paratype USNM 154164a; 26, 27, anterior view of two attached specimens, $\times 1$, and anterior view of the lower specimen, $\times 2$, showing rhizoid spines and intake funnels, paratype USNM 154164c; 28–31, dorsal view, $\times 1$, and side, dorsal, and anterior views, $\times 2$, of a complete specimen showing strong marginal sleeve of the brachial valve, paratype USNM 154164b. [Cathedral Mountain Formation (Wedin Member), USNM 727p.]

9, Exterior of an immature pedicle valve, $\times 1$, showing hairlike ornament spines, paratype USNM 154165a; 14–16, exterior, partial anterior, and anterior views of a brachial valve, $\times 2$, showing intake tubes, paratype USNM 154165c; 21, 22, dorsal and anterior views of a complete specimen with intake tubes, $\times 2$, paratype USNM 154165d; 40–43, ventral, dorsal, side and anterior views of a complete specimen, $\times 2$, paratype USNM 154165b. [Cathedral Mountain Formation (Wedin Member), USNM 723u.]

10, 11, Interior and exterior of an immature specimen, $\times 2$, showing the open, V-shaped cardinal process, paratype USNM 154157b (for enlargement see plate 244: figure 8); 35, 36, exterior and interior of a distorted brachial valve, $\times 2$, paratype USNM 154157i; 44–47, ventral, dorsal, anterior, and side views of a complete individual, $\times 2$, paratype USNM 154157-l. [Cathedral Mountain Formation, USNM 721u.]

17, 18, Dorsal, and ventral views of a complete specimen, $\times 1$, paratype USNM 149294; 37–39, ventral, side, and dorsal views $\times 2$, of the preceding specimen. [Cathedral Mountain Formation, AMNH 504.]

19, 20, Ventral and interior views of a pedicle valve preserving some of its rhizoid spines, $\times 1$, paratype USNM 154166. [Cathedral Mountain Formation, USNM 702.]

49–52, Dorsal view, $\times 1$, and dorsal, side, and anterior views, $\times 2$, of a complete attached specimen, showing the flanges or sleeves of both valves, that of the brachial valve slipping over that of the pedicle valve, paratype USNM 154167a. [Cathedral Mountain Formation (Wedin Member), USNM 723v.]

PLATE 241.—*Chonosteges*

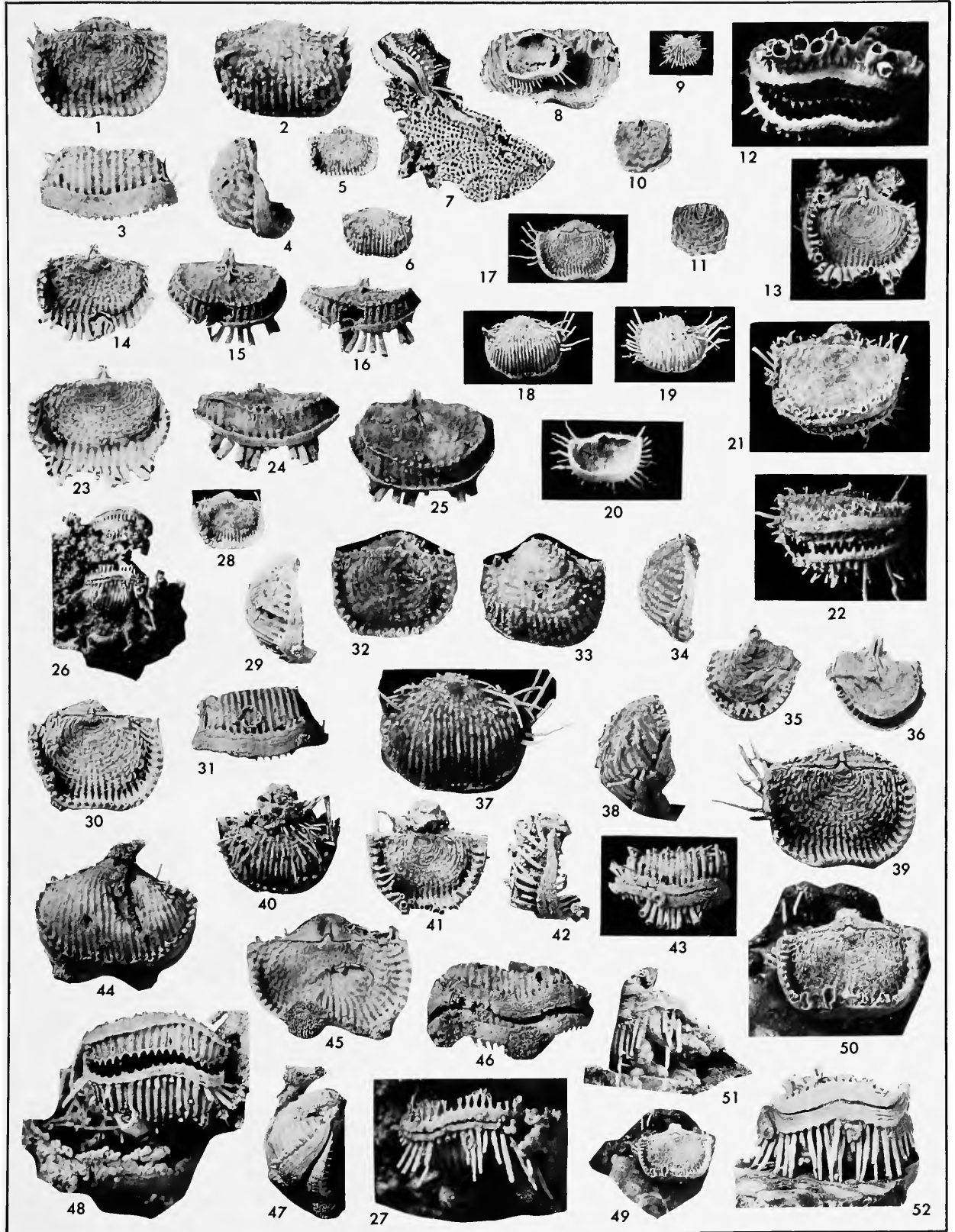


PLATE 242

Chonostege

Chonostege costellatus, new species: 1-5, Dorsal, ventral, anterior, and side views, $\times 2$, and dorsal view, $\times 1$, of a complete specimen, paratype USNM 149275e; 6-9, ventral, anterior, dorsal, and side views of another complete individual, $\times 2$, paratype USNM 149275f; 26, ventral view of a pedicle valve with rhizoid and ornament spines, $\times 2$, paratype USNM 154169a; 28, anterior of a gaping specimen showing the needle-like strainer spines, $\times 2$, paratype USNM 154169c; 29, 30, two specimens in attached position, $\times 1$, showing the mode of growth, paratypes USNM 154169g, h; 31, ventral view of an immature specimen, not yet geniculated, $\times 2$, paratype USNM 154169b; 37-40, posterodorsal, interior, and exterior views, $\times 2$, and posterior view, $\times 3$, showing cardinal process, paratype USNM 154169e; 41-44, posterodorsal, interior, and exterior views, $\times 2$, and posterior view, $\times 3$, showing moderately developed cardinal process, paratype USNM 154169d; 45-47, posterior, $\times 3$, interior, and exterior views, $\times 2$, of a young brachial valve, paratype USNM 154169f. [Cathedral Mountain Formation, USNM 703a¹.]

10-14, Ventral and dorsal views, $\times 1$, and anterior, side, and ventral views, $\times 2$, of a complete specimen, paratype USNM 154168a; 15-17, ventral and interior views, $\times 2$, and interior view, $\times 1$, of a pedicle valve showing the adductor callosity, paratype USNM 154168b; 18-20, interior view, $\times 1$, and interior and exterior views, $\times 2$, showing interarea, paratype USNM 154168d; 21, 22, exterior, and interior of a brachial valve, $\times 2$, showing the brachial ridges, paratype USNM 154168c; 23-25, exterior and interior, $\times 2$, and exterior, $\times 1$, of another brachial valve, paratype USNM 154168e. [Cathedral Mountain Formation, USNM 726u.]

27, Exterior of a young pedicle valve, $\times 2$, paratype USNM 154170a; 32-36, dorsal view, $\times 1$, and dorsal, ventral, side, and anterior views, $\times 2$, of the holotype USNM 152661a; 48, 49, dorsal views of another complete specimen, $\times 1$, $\times 2$, paratype USNM 154170b. [Cathedral Mountain Formation, USNM 726o.]

PLATE 242.—*Chonosteges*

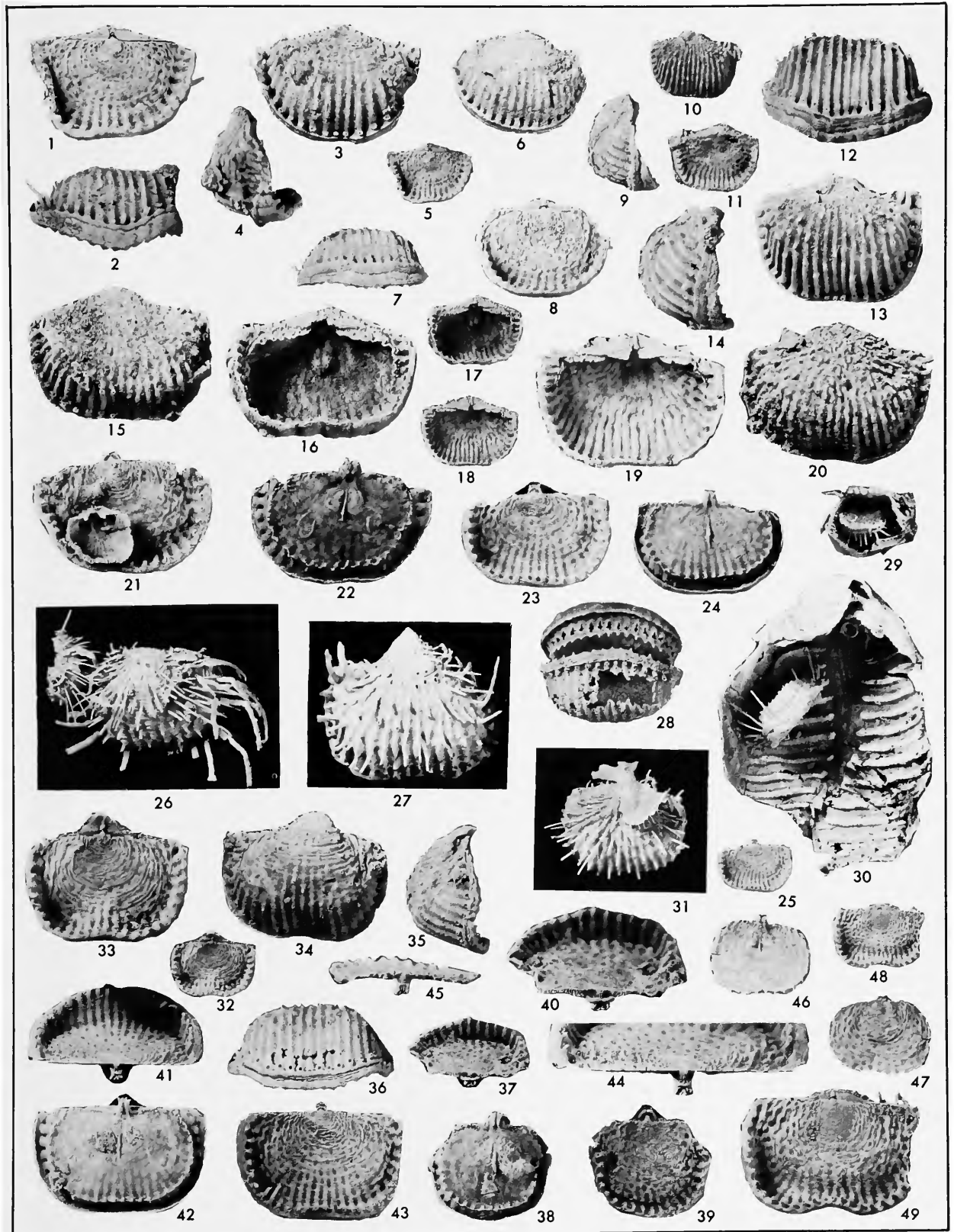


PLATE 243

Chonosteges

Chonosteges variabilis, new species: 1, Interior of brachial valve of *Neospirifer* occupied by two specimens of *Chonosteges variabilis*, $\times 2$, paratype USNM 123901; 2, dorsal view of the right hand individual of the preceding specimens, $\times 3$, showing anchor spines and intake tubes; 3, anterior view of the preceding specimen, $\times 3$, showing the intake funnels; 4, dorsal view of a complete specimen devoid of spines, $\times 1$, paratype USNM 124131a; 8, oblique view of the anterior of a specimen showing its numerous anchor spines, $\times 3$, paratype USNM 124132b; 12, ventral view of a specimen attached to *Rugatia*, $\times 1$, paratype 154153b; 15, ventral view of an immature specimen, $\times 1$, showing hairlike ornament spines and lack of marginal development, paratype USNM 154153c; 16, ventral view of a complete specimen, $\times 2$, showing geniculating margins, paratype USNM 149251; 19, anterior of another specimen, $\times 3$, showing rhizoid spines and the ventrally geniculated border of the brachial valve, paratype USNM 124132a. [Cathedral Mountain Formation, USNM 702.]

5, Ventral view of an immature specimen, $\times 1$, showing hairlike ornament spines and the beginning of anterior rhizoid spines, paratype USNM 154154c; 6, 7, dorsal views of two complete specimens, $\times 1$, paratypes USNM 154154a, b; 9, interior of an attached pedicle valve, $\times 1$, paratype USNM 154154g; 10, 11, anterior of a complete specimen, $\times 1$, $\times 2$, showing rhizoid spines and sleeve-like flange on rim of brachial valve, paratype USNM 149259a; 13, anterior view of a complete specimen, $\times 3$, showing needlelike spines that close off the intake tubes and the sleeve-like flange of the brachial valve, holotype USNM 124133b; 14, partial side view of an immature, attached specimen, $\times 1$, paratype USNM 154154i; 17, ventral valve of *Hercosia* with window, $\times 1$, showing attached *Chonosteges* within, paratype USNM 154154h; 18, dorsal view of the anterior of a complete specimen, showing a large funnel, $\times 3$, paratype USNM 123902; 21, anterior view of a complete specimen attached to a fenestellid funnel, $\times 2$, paratype USNM 149259b (note unusually long rhizoid spines). [Cathedral Mountain Formation, USNM 702un.]

20, Dorsal view of a brachial valve, showing long intake funnels, $\times 4$, paratype USNM 154155. [Cathedral Mountain Formation, USNM 726x.]

PLATE 243.—*Chonosteges*

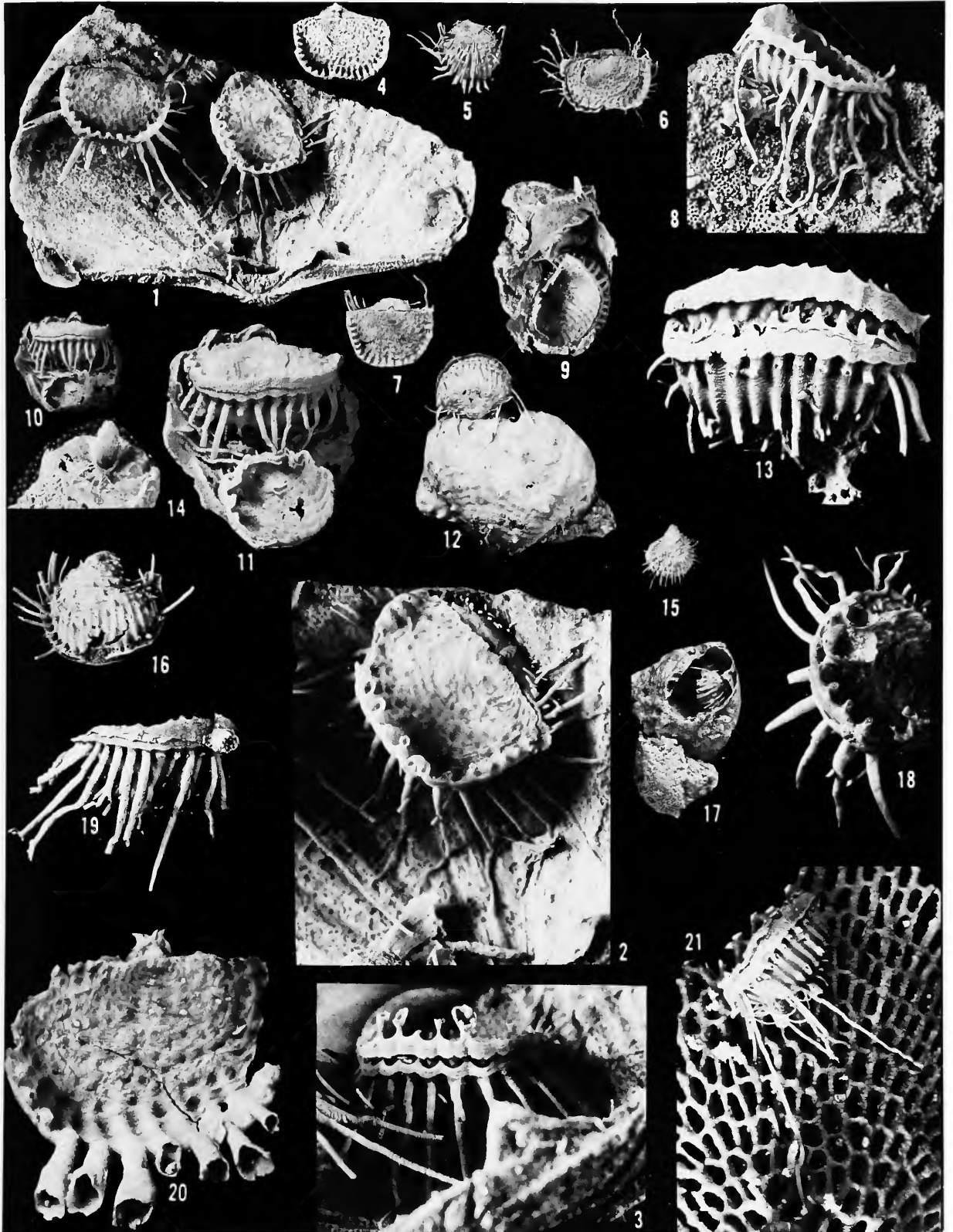


PLATE 244

Chonosteges, *Yakovlevia*, *Echinosteges*, *Paucispinifera*, *Oncosarina*, and *Xenosteges*

Chonosteges magnicostatus (Girty): 1, 2, Dorsal view, $\times 1$, $\times 3$, of the holotype USNM 118548. [Leonardian?, USGS 3880 (green).]

Chonosteges pulcher, new species: 3–7, Ventral, side, dorsal, and anterior views, $\times 2$, and dorsal view, $\times 1$, of a paratype USNM 154157a; 8, interior, of an immature brachial valve, $\times 4$, showing the open V-shaped cardinal process, paratype USNM 154157b; 9, 10, exterior and interior of a small brachial valve with advanced cardinal process, $\times 2$, paratype USNM 154157c; 11–13, posterodorsal and exterior views, $\times 2$, and dorsal view of the cardinal process, $\times 4$, of a brachial valve, paratype USNM 154157d; 14, interior of a brachial valve, $\times 2$, showing small brachial ridges, paratype USNM 154157g; 15–18, posterodorsal, dorsal and interior views, $\times 2$, and posterior view, $\times 4$, of another brachial valve, showing the complicated cardinal process and brachial ridges, paratype USNM 154157e; 19–22, interior and dorsal views of a brachial valve, $\times 2$, and interior and dorsal views, $\times 2$, showing thickened cardinal process, brachial ridges, intake funnels and their apertures, paratype USNM 154157f. [Cathedral Mountain Formation, USNM 721u.]

Yakovlevia anterospinosa, new species: 23–26, Dorsal, anterior, ventral, and side views of a complete specimen, $\times 1$, holotype USNM 154519a; 27, interior of the brachial valve, $\times 2$, paratype USNM 154519b. [Road Canyon Formation, 732j.]

Echinosteges guadalupensis (Shumard): 28, 29, Interior and exterior of a perfect brachial valve, showing an adult cardinal process, $\times 1$, hypotype USNM 154521. [Bell Canyon Formation (Rader Member), USNM 740j.]

Paucispinifera parasulcata, new species: 30, 31, Ventral and dorsal views of a complete specimen, $\times 1$, paratype USNM 154522. [Road Canyon Formation, USNM 732j.]

Oncosarina whitei (R. E. King): 32–36, Ventral, posterior, dorsal, anterior, and side views of the holotype, $\times 1$, YPM 11685; 37, dorsal view of the holotype, $\times 2$. [Hess Formation (Taylor Ranch Member), R. E. King 107.]

Xenosteges anomalus, new species: 38–42, Anterior, side, posterior, dorsal, and ventral views of the holotype, $\times 2$, USNM 154241a (for natural size views, see plate 234c: figures 39–41); 43, 44, posterior views of two brachial valves, $\times 3$, showing cardinal process, paratypes USNM 154240d, e. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 244.—*Chonosteges*, *Yakovlevia*, *Echinosteges*, *Paucispinifera*,
Oncosarina, and *Xenosteges*

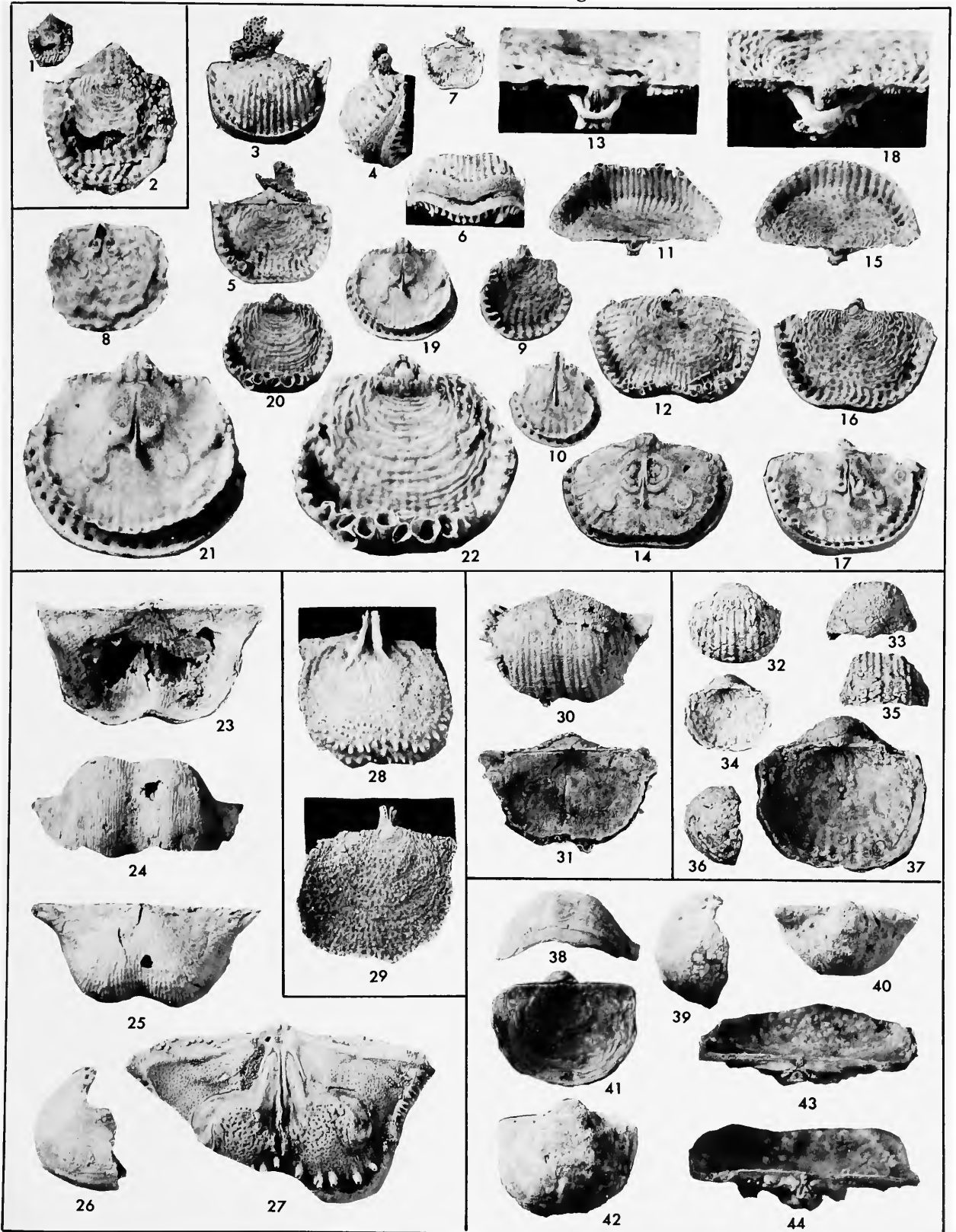


PLATE 245

Chonosteges

Chonosteges aff. *C. variabilis*, new species: 1-3, Side, ventral, and anterior views of a complete specimen, $\times 2$, figured specimen USNM 154159a; 4, 5, exterior of the brachial valve, $\times 1$, $\times 2$, figured specimen USNM 154159b; 6, posterior of the same brachial valve, $\times 3$, showing cardinal process; 7, cardinal process of the preceding specimen, $\times 6$, showing cardinal process and zygidium. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

Chonosteges aff. *C. variabilis*, new species: 8, 9, Anterior and ventral views of pedicle valve, $\times 2$, showing anterior border, figured specimen, USNM 154161. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

Chonosteges cf. *C. variabilis*, new species: 10, 11, Ventral and anterior views of an attached specimen, $\times 2$, figured specimen USNM 154160. [Bone Spring Formation (lower), AMNH 591.]

Chonosteges cf. *C. variabilis*, new species: 12-16, Dorsal, ventral, anterior, and side views, $\times 2$, and dorsal view, $\times 1$, of a complete specimen, figured specimen USNM 149264. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707b.]

Chonosteges variabilis, new species: 17-20, Anterior, dorsal, and interior views, $\times 2$, and dorsal view, $\times 1$, of a brachial valve, showing funnel-shaped spines, paratype USNM 154158a; 21-24, dorsal view, $\times 1$, and interior, dorsal, and anterior views, $\times 2$, of another brachial valve having narrow anterior spines, paratype USNM 154158b; 25-28, side, anterior, ventral, and dorsal views of a complete specimen with narrow spines, $\times 2$, paratype USNM 154384. [Cathedral Mountain Formation, 702b.]

29, Interior of a brachial valve, $\times 2$, showing a small cardinal process, paratype USNM 154385. [Cathedral Mountain Formation, USNM 703b.]

30-33, Anterior, dorsal, side, and posterior views of a complete specimen stripped of its spines, $\times 2$, paratype USNM 124131a. [Cathedral Mountain Formation, USNM 702.]

34-38, Side, posterior, anterior (gaping and showing inner marginal spines), ventral, and dorsal views of a complete specimen, $\times 2$, holotype USNM 124133b. [Cathedral Mountain Formation, USNM 702un.]

PLATE 245.—*Chonosteges*

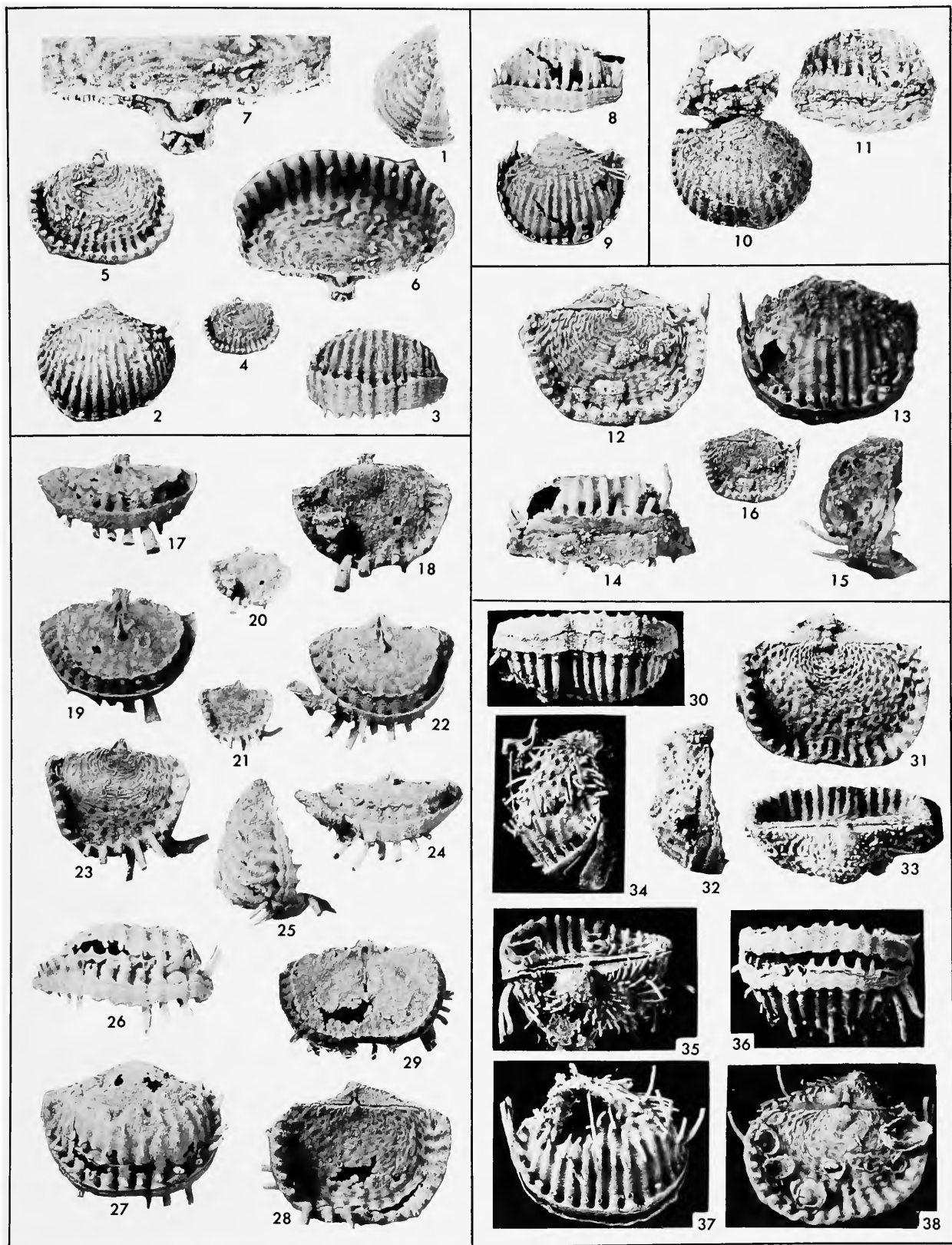


PLATE 246

Institella and *Peniculauris*

Institella salomonensis (Gemmellaro): 1, 2, Ventral and dorsal views of a large specimen, \times 1, hypotype USNM 149167a; 3, 4, exterior and side views of a brachial valve showing strong marginal geniculation, \times 1, hypotype USNM 149167b. [Sosio Formation, USNM 755.]

Institella species: 5, Ventral view of a pedicle valve, \times 1, figured specimen USNM 149166. Same as above.

Institella leonardensis (R. E. King): 6, 7, Anterior and dorsal views, \times 1, of a large sharply folded individual, hypotype USNM 123908b; 8, 9, brachial and pedicle interiors of the same specimen, \times 1, hypotypes USNM 124137e, f; 10, exterior of an immature specimen, \times 2, hypotype USNM 124137c; 14, exterior of a pedicle valve, showing the doubly geniculated border, \times 2, hypotype USNM 124137d. [Cathedral Mountain Formation, USNM 702.]

11, Posterior of a cardinal process, \times 2, showing the myophore, hypotype USNM 123912b; 12, interior of a fragmentary brachial valve, \times 2, showing dendritic adductor scars and cardinal process, hypotype USNM 123912c; 13, interior of a brachial valve, \times 1, showing thickened cardinal process, median ridge and brachial ridges, hypotype USNM 123912a. [Cathedral Mountain Formation, USNM 702un.]

Peniculauris subcostata (R. E. King): 15–19, Anterior, posterior, dorsal, side, and ventral views of a complete, young specimen, \times 1, hypotype USNM 148807. [Cathedral Mountain Formation, USNM 703bs.]

PLATE 246.—*Institella* and *Peniculauris*

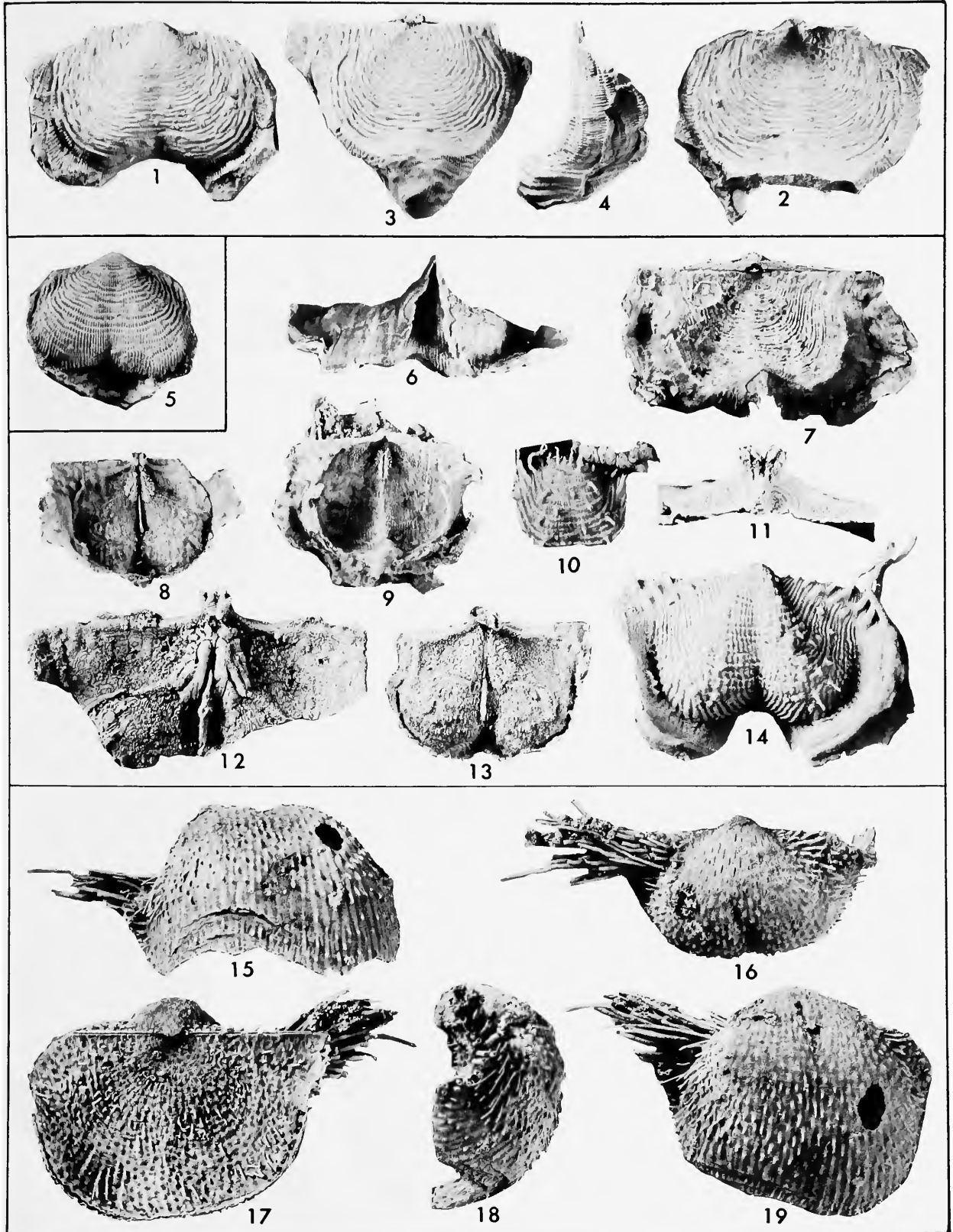


PLATE 247

Institella

Institella leonardensis (R. E. King): 1, Ventral view of an attached young specimen, $\times 1$, hypotype USNM 149147a; 2, ventral view of a large adult attached to another individual, $\times 1$, hypotype USNM 149147b; 3, 4, oblique and ventral views of a young individual attached to a bryozoan colony, $\times 1$, hypotype USNM 149147c; 28, 29, oblique and ventral views of another attached specimen, $\times 1$, hypotype USNM 149147d. [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

5, Ventral view of an immature attached specimen, $\times 1$, hypotype USNM 149157a; 9, another immature attached specimen, $\times 1$, hypotype USNM 149157b. [Cathedral Mountain Formation, USNM 702un.]

6, Interior of a brachial valve distorted by crowding, $\times 1$, hypotype USNM 154195a; 7, 8, ventral views of two immature pedicle valves, $\times 1$, hypotypes USNM 149153a, b; 13, 31, interior and exterior of a full-grown pedicle valve, preserving its flange and some of the rhizoid spines, $\times 1$, hypotype USNM 154195b; 14–16, dorsal, ventral, and side views of a complete specimen, preserving some of the rhizoid spines, $\times 1$, hypotype USNM 124137c; 20, ventral view of an immature pedicle valve attached to a fragment of bryozoan, $\times 1$, hypotype USNM 149153c; 21, interior of a large pedicle valve, $\times 1$, showing adductor callosities and geniculated flange, hypotype USNM 149153g; 22, another young pedicle valve attached to a bryozoan, $\times 1$, hypotype USNM 149153d; 24, interior of a pedicle valve, $\times 1$, hypotype USNM 154195c; 25, ventral view of a young, ungeniculated pedicle valve, $\times 1$, hypotype USNM 149153h; 26, a young pedicle valve attached to a coral, $\times 1$, hypotype USNM 149153e. [Cathedral Mountain Formation, USNM 702b.]

10–12, Ventral, anterior, and side views of a pedicle valve just beginning to geniculate, $\times 1$, hypotype USNM 154196a; 17, ventral view of a pedicle valve, greatly distorted by crowding, $\times 1$, hypotype USNM 154196b; 18, exterior of a pedicle valve with rhizoid spines, $\times 1$, hypotype USNM 154196i; 19, ventral view of another pedicle valve distorted by crowding, $\times 1$, hypotype USNM 154196c; 27, dorsal view of a complete specimen distorted by crowding, $\times 1$, hypotype USNM 152663c; 30, another pedicle valve distorted by crowding, $\times 1$, hypotype USNM 154196d. [Cathedral Mountain Formation, USNM 721u.]

23, Ventral view of an attached adult, $\times 1$, showing the tangled web of rhizoid spines, hypotype USNM 154197. [Cathedral Mountain Formation (Wedin Member), USNM 700x.]

PLATE 247.—*Institella*

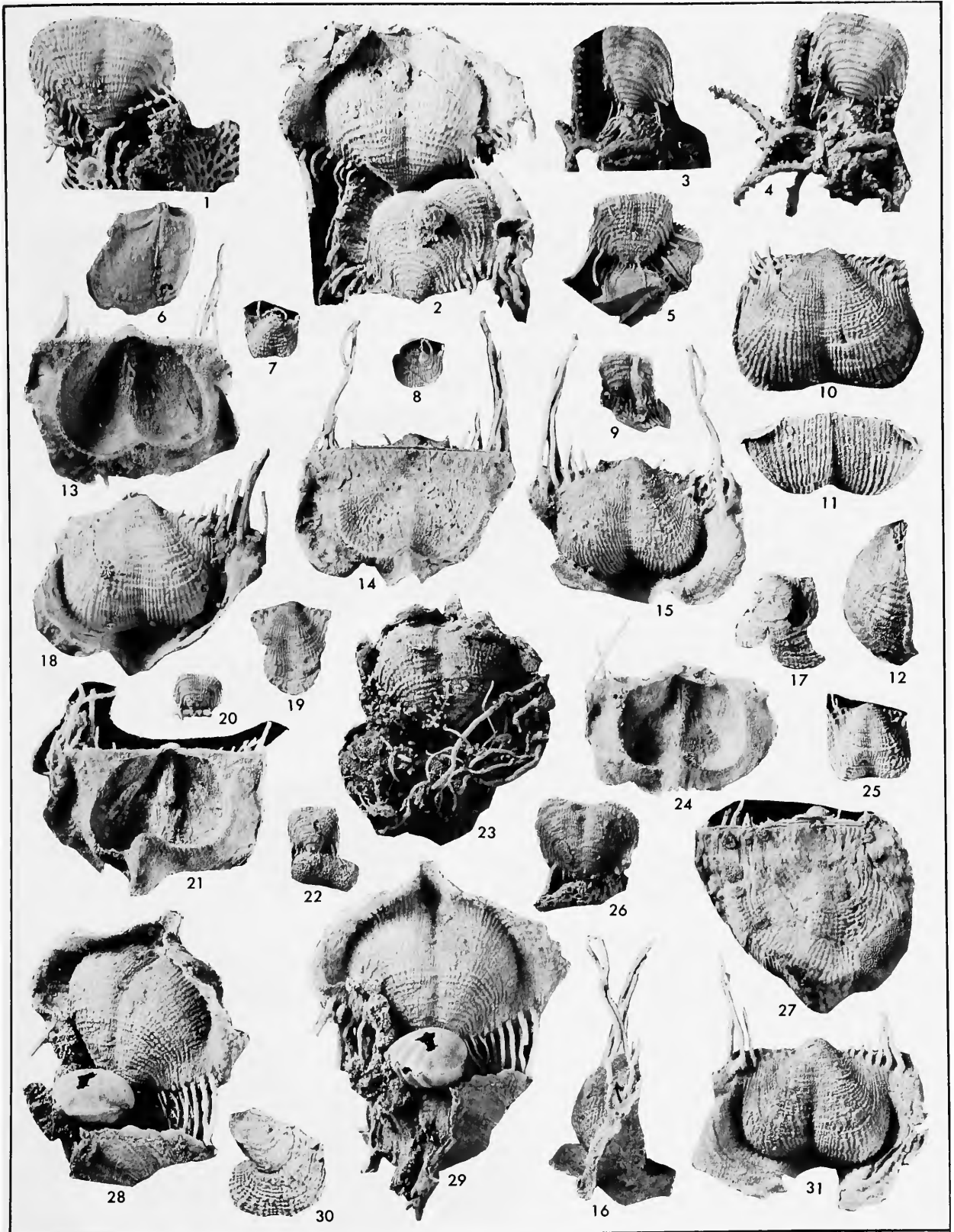


PLATE 248

Institella

Institella leonardensis (R. E. King): 1, 2, Interior of a pedicle and dorsal valve, $\times 1.5$, showing internal pathology of the shell, hypotype USNM 154196g, h; 7, ventral exterior of a young specimen not yet geniculated, $\times 1$, hypotype USNM 154196e; 10, side of a specimen, showing flange, $\times 1$, hypotype USNM 154196u; 18, 19, posterior, $\times 1.5$, and interior, $\times 1$, of a brachial valve, showing expanded cardinal process, hypotype USNM 154196j; 20–22, interior, $\times 1$, posterior, $\times 2$, and exterior, $\times 1$, views of an immature brachial valve, hypotype USNM 154196k; 23–25, exterior, interior, $\times 1$, and posterior, $\times 1.5$, views of a brachial valve, showing cardinal process and lateral ridges, hypotype USNM 154196-l; 26, 27, exterior and interior of another brachial valve, $\times 1$, showing lateral and brachial ridges, hypotype USNM 154196m; 28, posterior view of a brachial valve, $\times 1.5$, showing a narrow cardinal process, hypotype USNM 154196n; 29, ventral view of a young pedicle valve, $\times 1$, hypotype USNM 154196o; 30, 31, posterior view of two brachial valves, showing the variable cardinal process, $\times 1.5$, hypotypes USNM 154196p, q; 32, 33, anterior and ventral views of a large individual, $\times 1$, showing deep flange, hypotype USNM 154196r; 34, anterior of another individual showing a broad fold, $\times 1$, hypotype USNM 154196s; 35, 36, side and ventral views of a large specimen, $\times 1$, showing flange, hypotype USNM 154196t. [Cathedral Mountain Formation, USNM 721u.]

3, 37, Side and anterior views of a complete specimen with angular fold, $\times 1$, hypotype USNM 154195j; 4–6, 11, posterior, side, anterior, and ventral views, $\times 1$, of a complete specimen, hypotype USNM 154195d; 8, ventral view of a young pedicle valve just beginning to geniculate, $\times 1$, hypotype USNM 154195e; 9, ventral view, $\times 1$, of a young pedicle valve partly geniculated, hypotype USNM 154195g; 12, ventral view of a young pedicle valve in the process of geniculating, $\times 1$, hypotype USNM 154195f; 13, 14, exterior and interior of a brachial valve, $\times 1$, hypotype USNM 154195h, showing lobed cardinal process; 15, 16, interior and exterior of another brachial valve equal in size to the preceding but having an immature cardinal process, $\times 1$, hypotype USNM 154195i; 38, sharply folded specimen seen in anterior view, $\times 1$, hypotype USNM 149163a. [Cathedral Mountain Formation, USNM 702b.]

17, Side view of a gaping individual, $\times 1$, showing the sleeve-like arrangement of the flanges, hypotype USNM 154198. [Cathedral Mountain Formation, AMNH 500h.]

PLATE 248.—*Institella*

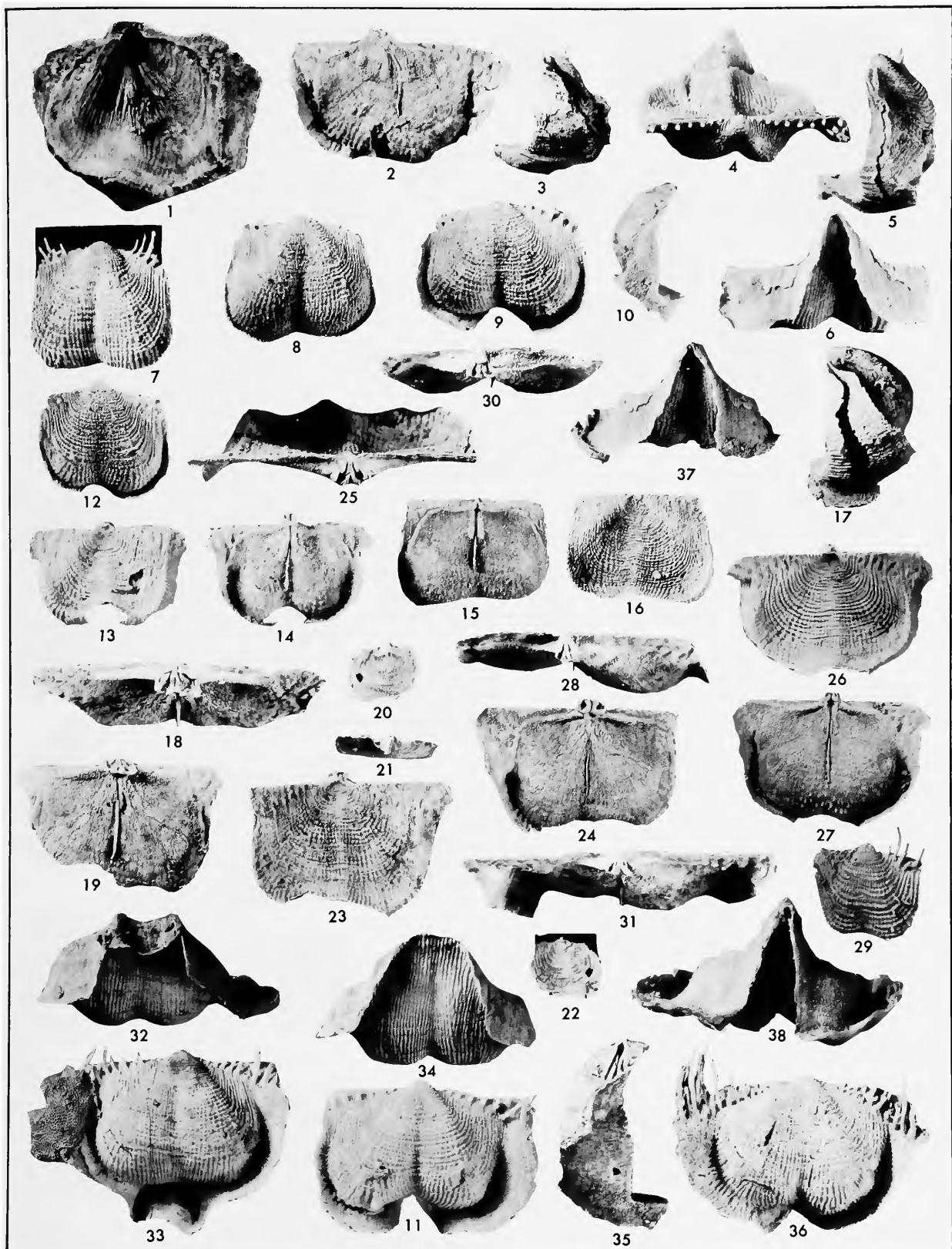


PLATE 249

Glyptosteges

Glyptosteges insculptus, new species: 1–6, Dorsal, ventral, posterior, side, and anterior views, $\times 1$, and dorsal view, $\times 2$, paratype USNM 152671f; 7–12, dorsal, posterior, ventral, side, and anterior views, $\times 1$, and dorsal view, $\times 2$, of another complete specimen, paratype USNM 152671b; 13–18, ventral, dorsal, anterior, posterior, and side views, $\times 1$, and dorsal view, $\times 2$, of the holotype USNM 152671c; 19–21, ventral and side views, $\times 1$, and side view, $\times 2$, of a specimen attached to a *Composita* shell, paratype USNM 154190a; 22, 23, partial side and ventral views of another attached specimen, $\times 1$, paratype USNM 154190b; 24 dorsal view of a complete specimen, $\times 1$, paratype USNM 154190c. [Bone Spring Formation, AMNH 591.]

Glyptosteges intricatus, new species: 25–28, Ventral, posterior, side, and anterior views, of a pedicle valve, $\times 1$, paratype USNM 154191f; 29–32, ventral, side, anterior, and posterior views of a pedicle valve, $\times 1$, paratype USNM 154191c; 57, interior of the preceding specimen, $\times 1.5$; 42, 43, ventral and anterior views of a pedicle valve, $\times 1$, paratype USNM 154191e; 44–48, ventral, dorsal, posterior, side, and anterior views of a complete specimen, $\times 1$, holotype USNM 154191b (for enlarged views and interiors see plate 250: figures 29–31); 49–52, exterior, $\times 1$, $\times 1.5$, and posterior and interior of a brachial valve, $\times 1.5$, showing the brachial ridges and cardinal process, paratype USNM 154191a; 53–56, posterior, interior, and exterior views, $\times 1.5$, and exterior, $\times 1$, of another brachial valve showing the brachial ridges, adductor scars, and ear baffles, paratype USNM 154191d; 59–61, dorsal, side, and ventral views, $\times 1$, of an attached specimen, paratype USNM 154191g; 62, ventral view of the preceding specimen, $\times 2$, showing rhizoid spines. [Skinner Ranch Formation (Dugout Mountain Member), USNM 732e.]

33–37, Ventral, anterior, side, and posterior views, $\times 1$, and posterointerior view of a large pedicle valve, $\times 1.5$, showing the rhizoid spines, paratype USNM 152669; 58, interior of the preceding specimen, $\times 1.5$, showing adductor callosity. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707g.]

38–41, Anterior side and ventral views, $\times 1$, and ventral view of pedicle valve, $\times 1.5$, paratype USNM 152672a. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707b.]

PLATE 249.—*Glyptosteges*

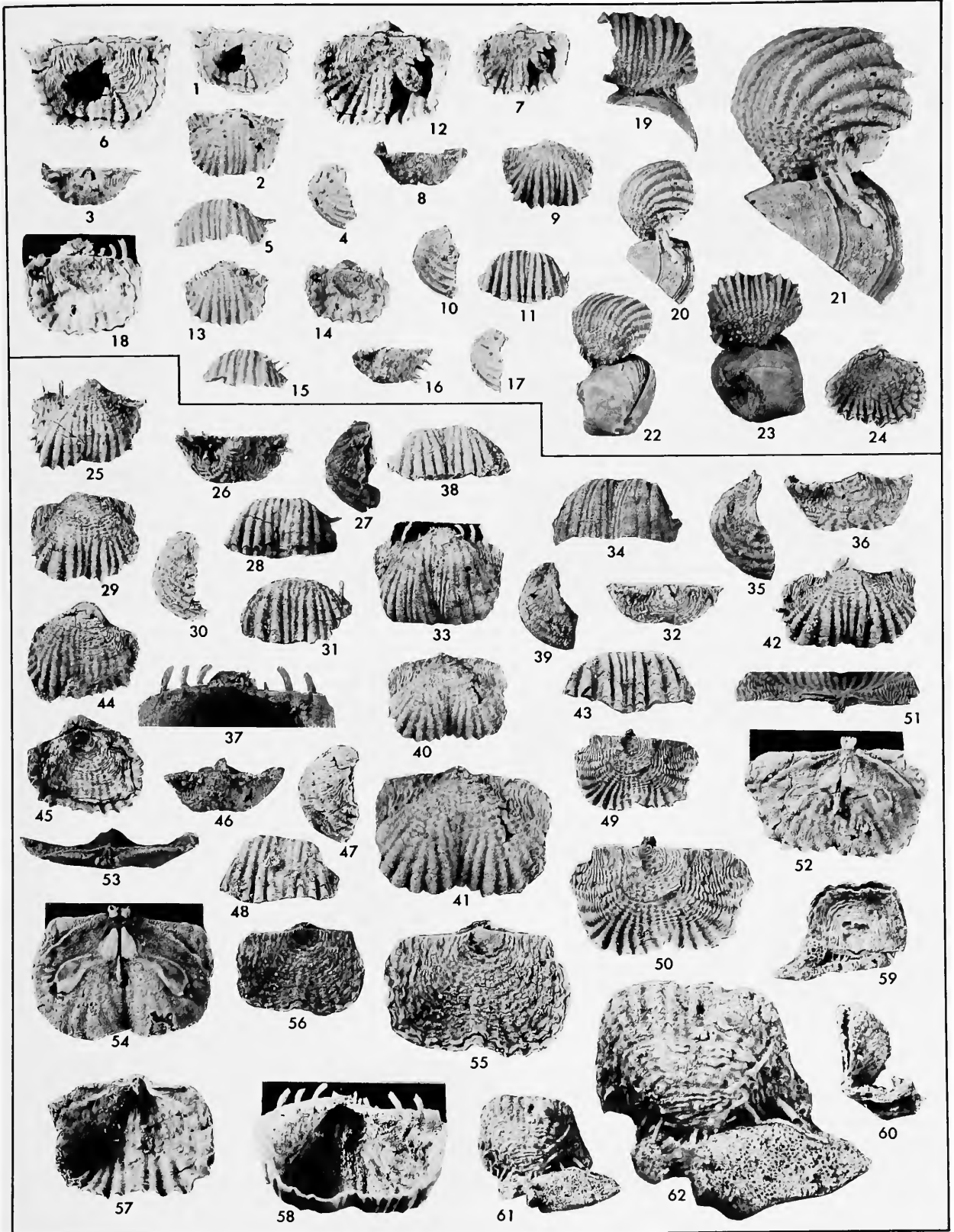


PLATE 250

Glyptosteges

Glyptosteges angustus (R. E. King): 1–5, Ventral, side, posterior, $\times 1$, and interior, $\times 1.5$, of a pedicle valve, hypotype USNM 154192. [Skinner Ranch Formation (Sullivan Peak member), USNM 707b.]

6–10, Ventral, side, posterior, anterior, $\times 1$, and interior, $\times 1.5$, views of another pedicle valve, hypotype USNM 152667e; 11–15, side, posterior, anterior, and ventral views of a pedicle valve, $\times 1$, hypotype USNM 152667g; 23, 24, posterior and interior of a brachial valve, $\times 1.5$, showing brachial ridges, hypotype USNM 152667h. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707d.]

16, Ventral view of a pedicle valve with strong anterior ribbing, $\times 1.5$, hypotype USNM 154193a; 17, ventral view of another pedicle valve, $\times 1.5$, hypotype USNM 154193b; 18, 19, exterior, $\times 1$, and interior, $\times 1.5$, of a pedicle valve retaining some of its rhizoid spines, hypotype USNM 154193c; 20, ventral view of a pedicle valve, $\times 1.5$, retaining one of the curved spines of the initial attachment ring, hypotype USNM 154193d; 25, 26, exterior and interior of a brachial valve, $\times 1.5$, showing the ear baffles, hypotype USNM 154193f; 27, 28, exterior and interior, $\times 1.5$, of another brachial valve showing ear baffles and endospines, hypotype USNM 154193e. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722–1.]

21, 22, Interior of a brachial valve, $\times 1$, $\times 2$, showing brachial ridges and endospines, hypotype USNM 154194a. [Skinner Ranch Formation (Sullivan Peak Member), USNM 727a.]

Glyptosteges intricatus, new species: 29–31, Interior of pedicle valve, interior of brachial valve, and dorsal view of holotype, $\times 2$, USNM 154191b (for additional views at $\times 1$, see plate 249: figures 44–48). [Skinner Ranch Formation (Dugout Mountain Member), USNM 732e.]

Glyptosteges sulcatus, new species: 32, 33, Interior and exterior of a brachial valve, $\times 2$, holotype USNM 152674a; 34–37, ventral, side, and dorsal views, $\times 1$, and dorsal view, $\times 2$, of a complete specimen, paratype USNM 152674e; 38–40, interior, $\times 1$, and interior and exterior, $\times 2$, of a brachial valve showing strong ear baffles, paratype USNM 152674f; 41, exterior of a pedicle valve distorted by crowding, $\times 1$, paratype USNM 152674g; 42–44, anterior and ventral views, $\times 1$, and dorsal view $\times 2$, of a complete specimen, paratype USNM 152674c; 45, 46, exterior and interior of a brachial valve, $\times 2$, paratype USNM 152674b. [Cathedral Mountain Formation, USNM 721u.]

PLATE 250.—*Glyptosteges*

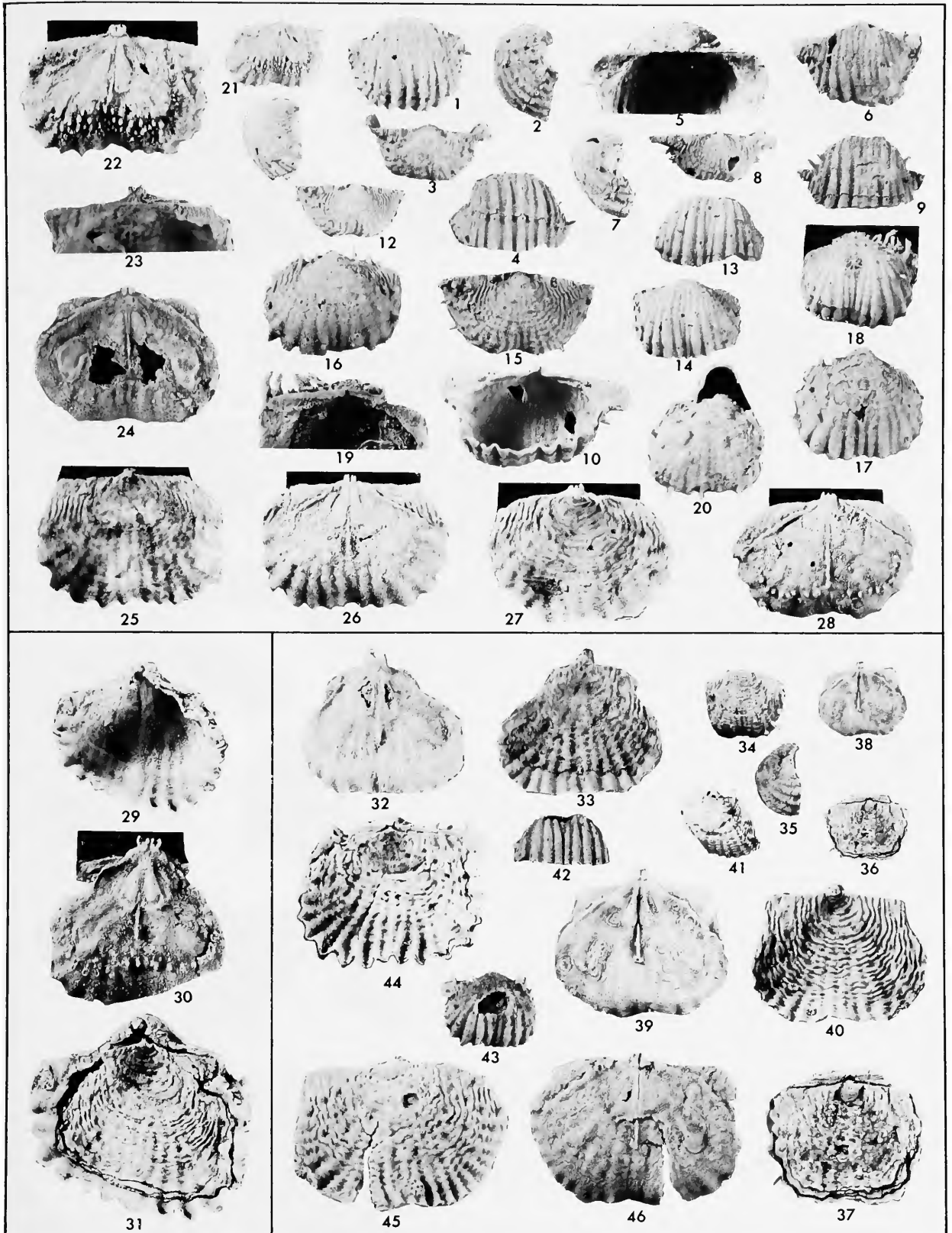


PLATE 251

Spyridiophora

Spyridiophora compacta, new species: 1-3, Anterior, side and ventral views of a pedicle valve, $\times 1$, paratype USNM 149312c; 4-6, anterior, posterior and side views, $\times 1$, of the paratype USNM 149312b; 7, 8, exterior of two brachial valves, $\times 1$, paratypes USNM 149312d, e; 9, 10, dorsal and ventral views of a complete specimen, $\times 1$, holotype USNM 149312a. [Lenox Hills Formation, USNM 715b.]

Spyridiophora reticulata (R. E. King): 11, Ventral view of a pedicle valve, $\times 1$, hypotype USNM 154230. [Skinner Ranch Formation (Sullivan Peak Member), USNM 735f.]

Spyridiophora distincta Cooper and Stehli: 12-14, Interior, side, and anterior views of an imperfect brachial valve, $\times 2$, showing the spyridium, paratype USNM 124116e; 15, posterior view of the preceding specimen, $\times 3$, showing the spyridium; 16-18, interior, posterior, and side views of another brachial valve, $\times 2$, showing lateral baffles and spyridium, holotype USNM 124117; 19, 20, posterior and interior, of the preceding specimen, $\times 3$, showing baffles and spyridium; 21, 22, dorsal view of the holotype, $\times 1$, and interior of the pedicle valve of the holotype, $\times 2$; 23-26, dorsal, $\times 1$, and side, posterior and dorsal, $\times 2$, views, of a complete specimen, paratype USNM 124116a; 27-31, anterior, ventral, posterior, and dorsal views, $\times 1$, and dorsal view, $\times 2$, of another complete specimen, paratype USNM 124116b. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701k.]

PLATE 251.—*Spyridiophora*

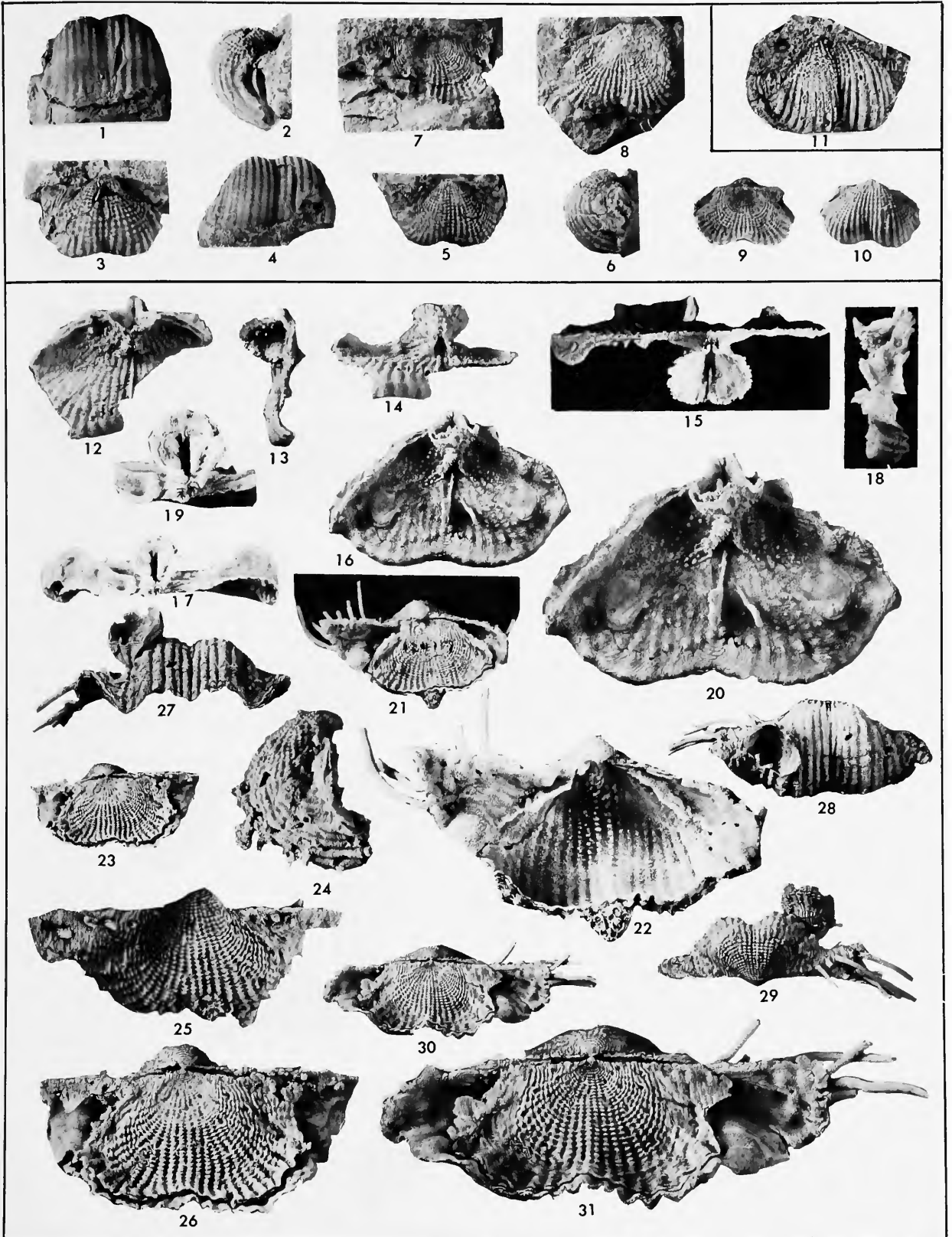


PLATE 252

Spyridiophora

Spyridiophora reticulata (R. E. King): 1, 2, Ventral view of a young pedicle valve preserving the initial attachment ring, $\times 1$, $\times 2$, hypotype USNM 152665c; 3, dorsal view of an immature complete specimen, $\times 1$, hypotype USNM 154231j; 4-6, ventral and dorsal views, $\times 1$, and dorsal view, $\times 2$, showing reticulate ornament of the young stage, hypotype USNM 154231k; 7-10, dorsal, posterior, ventral, and anterior views, $\times 1$, of a complete young specimen preserving one of its stout rhizoid spines, hypotype USNM 154231-l; 11-14, ventral, dorsal, anterior, and posterior views, $\times 1$, of a young adult, hypotype USNM 154231m; 26-29, interior and exterior, $\times 1$, and interior and posterior, $\times 2$, views of a brachial valve, showing spyridium with muscle scars, hypotype USNM 154231n; 30-33, anterior, side, ventral, and posterior views of a complete specimen, $\times 1$, hypotype USNM 154231o; 34-37, side, anterior, posterior and ventral views of another complete specimen, $\times 1$, hypotype USNM 152665a; 38-41, anterior, side, ventral, and posterior views of a narrow specimen, $\times 1$, hypotype USNM 152665b. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

15, Dorsal view of a brachial valve, $\times 1$, hypotype USNM 149327. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

16-21, Side, dorsal, ventral, anterior, and posterior views, $\times 1$, and dorsal view, $\times 2$, of an imperfect specimen, hypotype USNM 149325. [Skinner Ranch Formation (top = Taylor Ranch), USNM 705r.]

22, 23, Dorsal and ventral views of a complete specimen, $\times 1$, hypotype USNM 154233a; 24, 25, interior and exterior of a brachial valve, $\times 1$, hypotype USNM 154233b. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

42-47, Dorsal, ventral, posterior, side, and anterior views, $\times 1$, and dorsal view, $\times 1.5$, of a complete specimen, exhibiting some of its stout rhizoid spines, hypotype USNM 149321a; 48, 49, dorsal and side views of a complete specimen preserving some of its rhizoid spines, $\times 1$, hypotype USNM 149321b. [Hess Formation (Taylor Ranch Member), USNM 702d.]

50-54, Side, interior, posterior, and anterior views, $\times 2$, and posterior, $\times 3$, of a brachial valve, showing spyridium and cardinal process, hypotype USNM 124118b. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707d.]

55, Ventral view of a broken specimen, $\times 1$, showing the spyridium, hypotype USNM 154229a; 56, 57, side and dorsal views of a complete specimen, $\times 1$, hypotype USNM 154229b. [Bone Spring Formation, AMNH 591.]

PLATE 252.—*Spyridiophora*

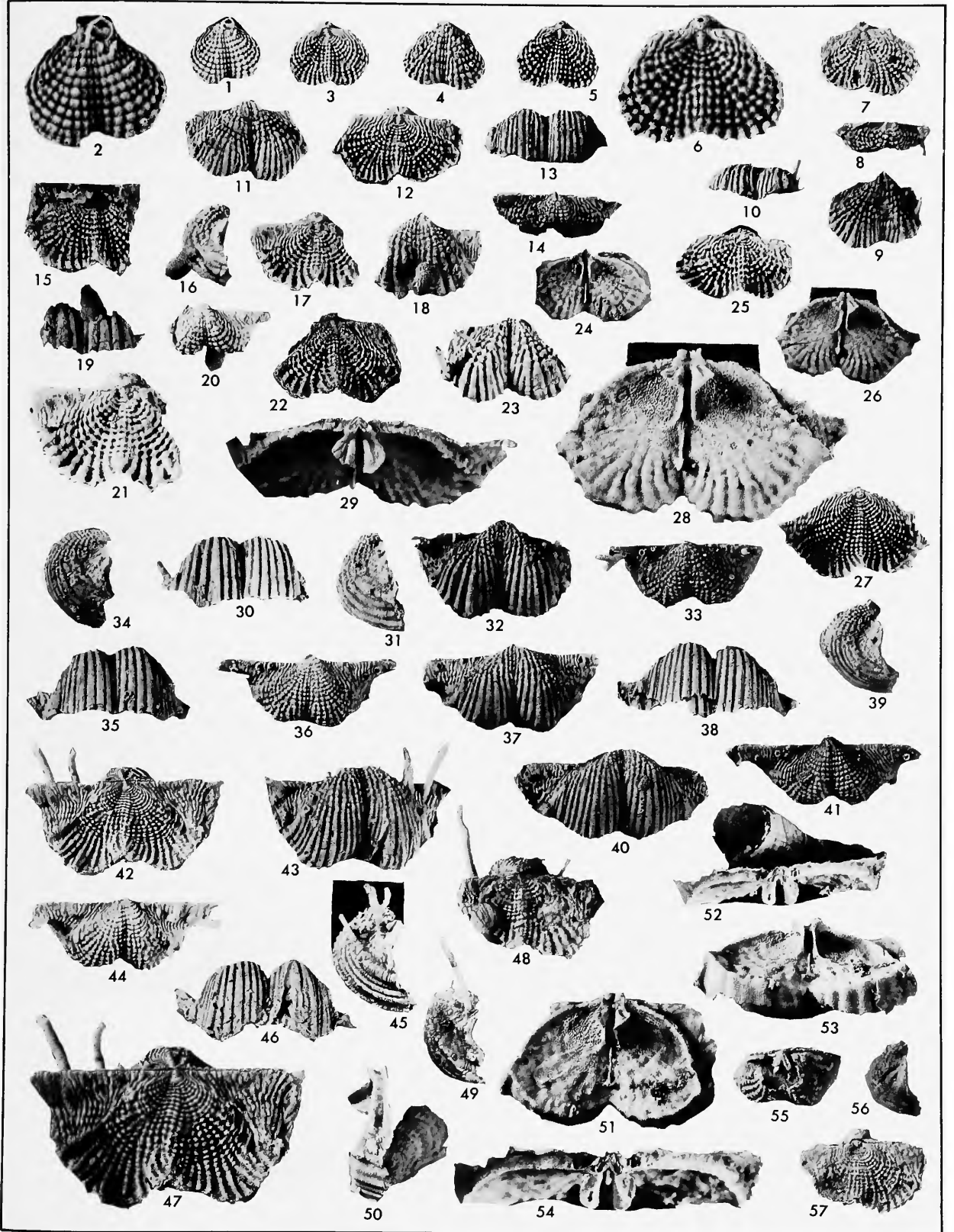


PLATE 253

Spyridiophora and *Glyptosteges*

Spyridiophora reticulata (R. E. King): 1, 2, Exterior of a brachial valve, $\times 2$, $\times 1$, holotype YPM 11724. [Skinner Ranch Formation (Sullivan Peak Member), R. E. King locality 4.]

3, Ventral view of an imperfect pedicle valve, $\times 1$, paratype YPM 11727. [Skinner Ranch Formation (Sullivan Peak Member), R. E. King locality 226.]

4-6, Posterior, anterior and ventral views of a pedicle valve, $\times 1$, paratype T10056a; 7-9, anterior, posterior and side views of another paratype, $\times 1$, T10056b. [Skinner Ranch Formation (upper), R. E. King locality Tb.]

11-13, Exterior and interior, $\times 1$, and interior view, $\times 4$, of an immature brachial valve showing spyridium, hypotype USNM 154231a; 14-16, Exterior, and interior, $\times 1$, and interior, $\times 2$, of another immature brachial valve, hypotype USNM 154231b; 17-19, exterior and interior, $\times 1$, and interior, $\times 2$, showing spyridium fusing with cardinal process, hypotype USNM 154231c; 21, interior of a brachial valve with spyridium fusing with cardinal process, $\times 2$, hypotype USNM 154231f; 22-24, exterior and interior, $\times 1$, and interior, $\times 2$, view of a young brachial valve, showing cardinal process and growing spyridium, hypotype USNM 154231d; 25-27, interior, $\times 2$, and posterior and interior, $\times 4$, views showing fluted baffles, spyridium and cardinal process, hypotype USNM 154231g; 28-30, exterior and interior, $\times 1$, and interior, $\times 2$, views of an adult brachial valve, hypotype USNM 154231e; 31-34, interior and exterior, $\times 1$, and interior, $\times 2$, views of an adult brachial valve, showing strong ear baffles and muscle scars on the spyridium, hypotype USNM 154231h; 35, 36, dorsal views of an immature complete specimen, $\times 1$, $\times 2$, hypotype USNM 154231i. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

20, Posterior view of a brachial valve, $\times 2$, showing ear baffles and spyridium, hypotype USNM 154232a. [Skinner Ranch Formation (Sullivan Peak Member), USNM 727a.]

Spyridiophora species 1: 37-41, Ventral, side, posterior, oblique, and anterior views of a complete specimen, $\times 1$, YPM 12664; 42-44, posterior, oblique, and anterior views of the preceding specimen, $\times 2$, showing elevated fold on slope above the ear. [Said to come from Gaptank Formation (bed 3 of the Gaptank section), but the specimen contains Wolfcampian fusulinids, R. E. King locality, Sd.]

Glyptosteges angustus (R. E. King): 10, Ventral view of a fragmentary pedicle valve probably referable to *Glyptosteges* rather than to *Spyridiophora*, $\times 1$, paratype YPM 11729. [Skinner Ranch Formation (Sullivan Peak Member), R. E. King, locality 228.]

PLATE 253.—*Spyridiophora* and *Glyptosteges*

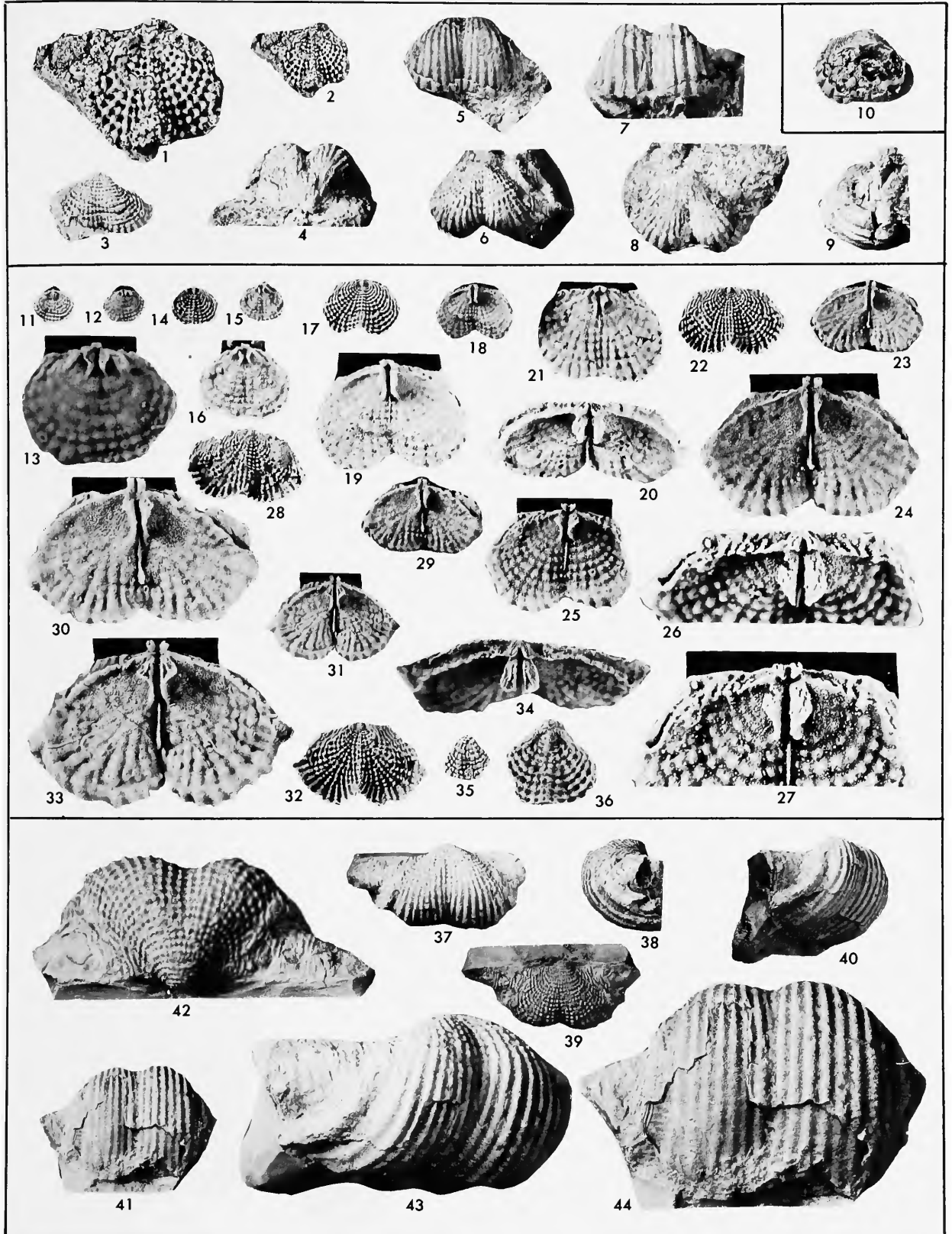


PLATE 254

Craspedona

Craspedona newelli, new species: 1-3, Dorsal view, $\times 2$, and ventral and dorsal views, $\times 1$, of the holotype USNM 154172a; 4, 5, interior of a brachial valve, $\times 2$, $\times 3$, showing the cardinal process, zygidium, and endospines, paratype USNM 149443c; 14, interior of a brachial valve, $\times 1$, paratype USNM 154172d; 15, exterior of a brachial valve, showing the narrow, tubelike projection at the anterior, $\times 1.5$, paratype USNM 154172c; 16, exterior of a pedicle valve, $\times 2$, paratype USNM 154172b; 27, interior of the pedicle valve, $\times 2$, showing the muscle scars and elevated adductor scars, paratype USNM 154172e. [Bell Canyon Formation (Hegler Member), USNM 731.]

6, 7, Interior of a brachial valve, $\times 3$, $\times 1$, showing brachial ridges and zygidium, paratype USNM 152664f; 8, 9, exterior and side of a siphonate brachial valve, $\times 2$, paratype USNM 154171b; 10, side, $\times 1.5$, of a pedicle valve; 11, anterior view of a brachial valve, $\times 1.5$, showing the strong anterior fold, paratype USNM 154171c; 12, 13, interior, $\times 2$, and exterior, $\times 1.5$, of a brachial valve, showing large flange, paratype USNM 154171d; 17, exterior of a pedicle valve, $\times 1.5$, paratype USNM 154171f; 18-21, interior and side, $\times 1$, exterior, $\times 1.5$, and interior $\times 2$, of a pedicle valve showing the rhizoid spines on the posterior margin, paratype USNM 154171e; 22, interior of a pedicle valve, $\times 2$, showing initial attachment ring and later rhizoid spines, paratype USNM 154171g; 24, 25, exterior of an attached specimen, $\times 2$, $\times 1$, paratype USNM 154171a. [Bell Canyon Formation (Rader Member), USNM 725f.]

23, Anterior of a complete specimen, $\times 2$, showing siphonate projection, paratype USNM 154173. [Bell Canyon Formation (Pinery Member), AMNH 398.]

26, Exterior of a pedicle valve, $\times 1.5$, paratype USNM 149442. [Bell Canyon Formation (Hegler Member), AMNH 625.]

PLATE 254.—*Craspedona*

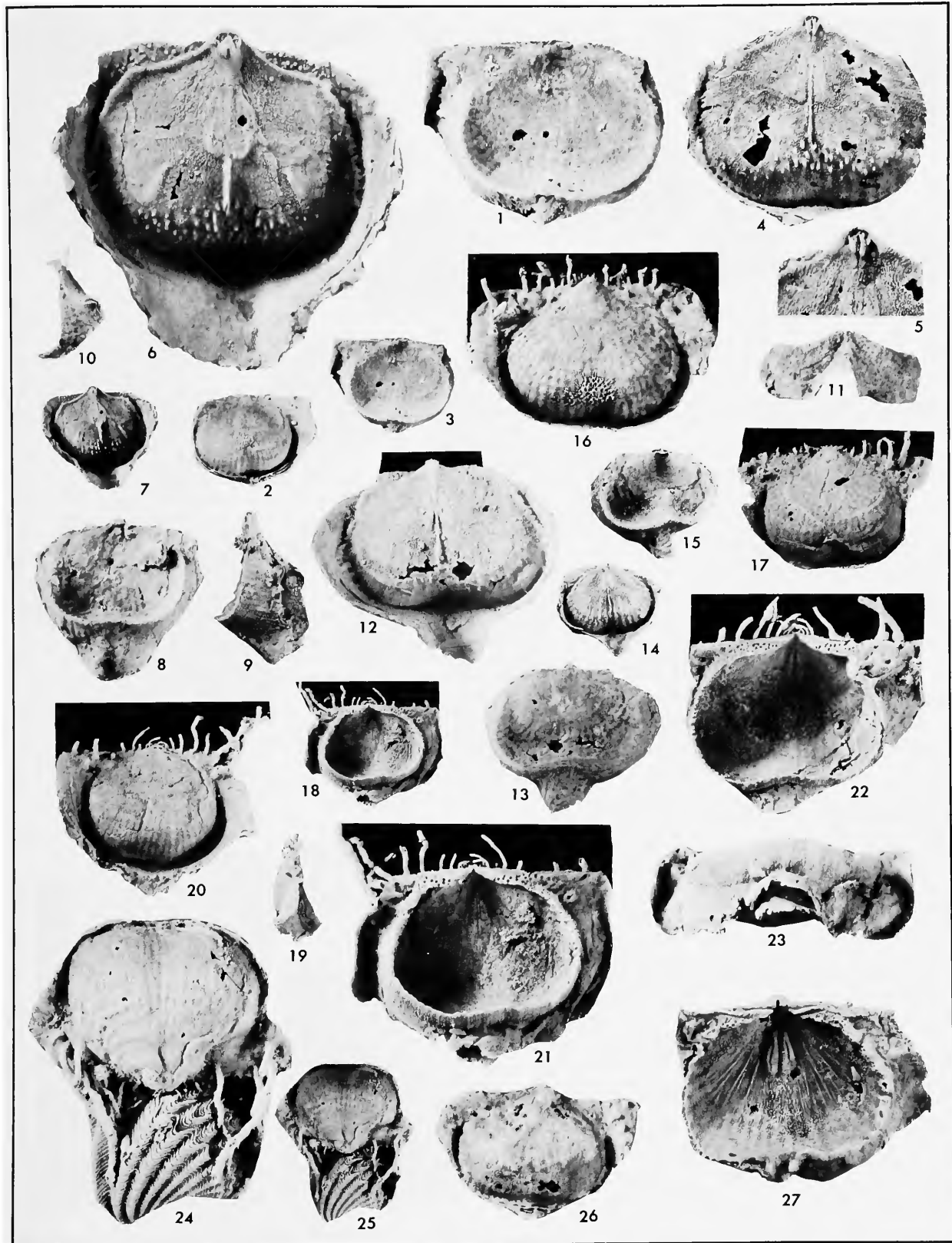


PLATE 255

Agelesia

Agelesia triangularis (R. E. King): 1–3, Posterior, interior, and side views of a brachial valve, $\times 2$, showing widely bilobed cardinal process and adductor platforms, hypotype USNM 154144a; 4–6, posterior, interior, and side views of another brachial valve, $\times 2$, showing high median septum, hypotype USNM 154144c; 7–9, posterior, interior, and side views of a brachial valve with unusually well developed median septum, $\times 2$, hypotype USNM 154144b; 17, dorsal view of a complete specimen, $\times 1$, showing anchor spines, hypotype USNM 154144d; 22, ventral view of an attached specimen, $\times 1$, hypotype USNM 154144g; 27, 28, ventral view of another attached specimen, $\times 1$, $\times 2$, showing long rhizoid spines, hypotype USNM 154144j; 34, specimen in ventral view attached to a branch of a bryozoan, $\times 1$, hypotype USNM 154144i. [Cathedral Mountain Formation (Wedin Member), USNM 723u.]

10–12, Side, dorsal, and ventral views of a specimen stripped of its spines, $\times 1$, hypotype USNM 154145a; 13, 14, interior of a brachial valve, $\times 1$, $\times 2$, hypotype USNM 154145b; 15, 16, interior of another brachial valve, $\times 1$, $\times 2$; hypotype USNM 154145c. [Cathedral Mountain Formation, USNM, 721u.]

18, 19, Two dorsal views of a small cluster of specimens attached to *Enteleles*, $\times 1$, hypotype USNM 154146a; 30, 31, side and ventral views of another specimen attached to *Enteleles*, $\times 1$, hypotype USNM 154146b; 32, small individual attached to *Institella*, $\times 1$, hypotype USNM 154146c; 40–43, dorsal view, $\times 1$, and ventral, side and dorsal views, $\times 2$, showing the long rhizoid spines, hypotype USNM 154146d. [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

20, Posteroventral view of a specimen with umbonal region removed to show the adductor platforms within, $\times 1$, hypotype USNM 153834a; 25, 26, dorsal and ventral views of an attached specimen, $\times 1$, hypotype USNM 153834b; 29, interior of a pedicle valve; $\times 1$, hypotype USNM 153834c; 35–39, side, anterior, posterior, dorsal, and ventral views of a complete specimen, $\times 1$, hypotype USNM 153834d; 44, ventral view of specimen, $\times 1$, showing the long rhizoid spines, hypotype USNM 153834g. [Cathedral Mountain Formation, USNM 703bs.]

21, Dorsal view of a specimen attached to *Institella*, $\times 1$, hypotype USNM 154147a; 33, small individual attached to *Institella*, $\times 1$, hypotype USNM 154147b. [Cathedral Mountain Formation (Wedin Member), USNM 727p.]

23, 24, Dorsal and side views of a specimen attached to a fenestellid frond, $\times 1$, hypotype USNM 154148. [Cathedral Mountain Formation (Wedin Member), USNM 700–1.]

PLATE 255.—*Agelesia*

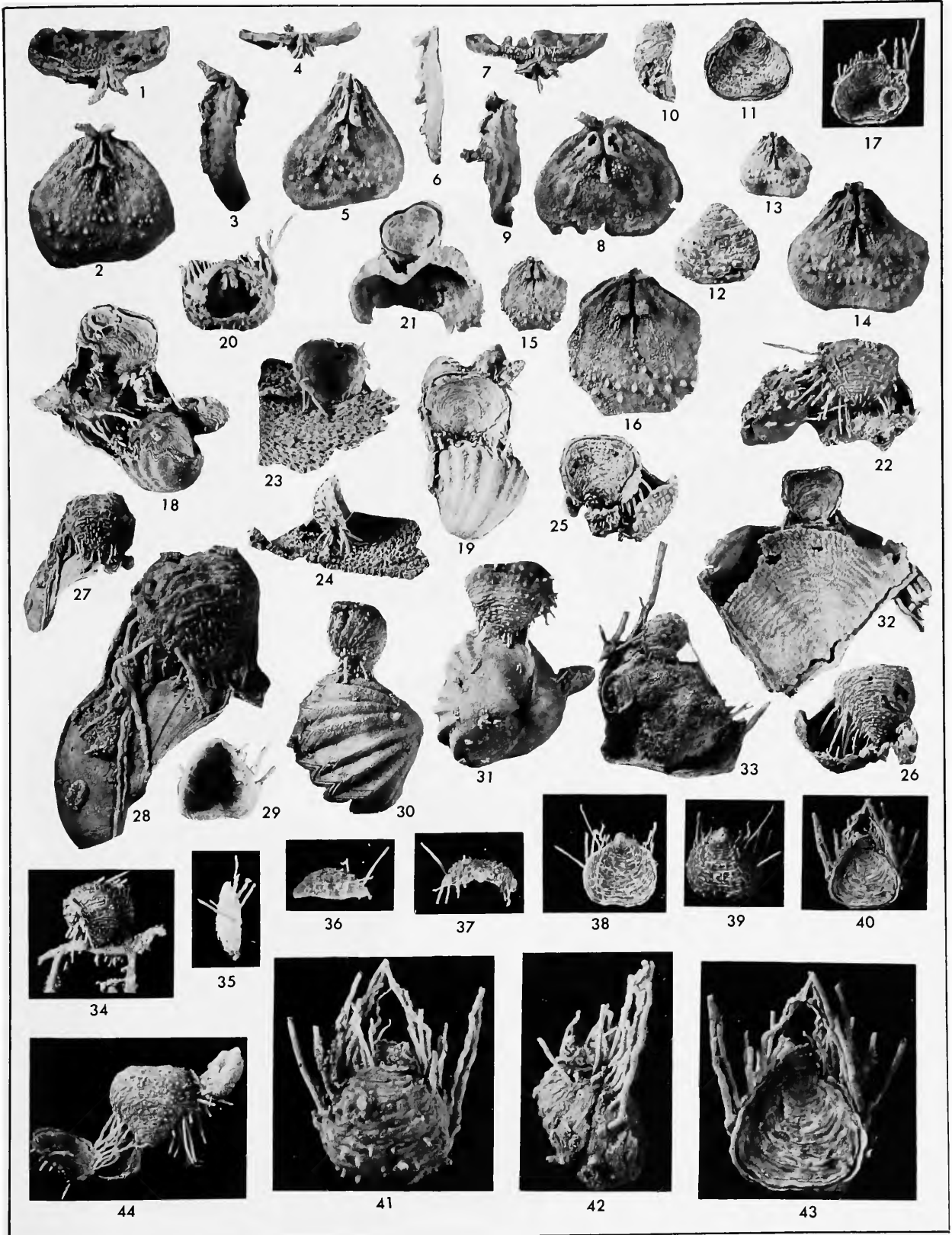


PLATE 256*Ametoria* and *Ramavectus*

Ametoria residua, new species: 1-3, Exterior and interior, $\times 1$, and posterior, $\times 2$, views of a brachial valve, showing the cardinal process and median ridge, paratype USNM 149364a; 7-10, ventral, anterior, side, and posterior views of the holotype, $\times 1$, USNM 153476; 11-13, Interior, side, and exterior views of a brachial valve, $\times 1$, paratype USNM 149364b; 14, interior of another brachial valve, $\times 2$, paratype USNM 149364c. [Road Canyon Formation, USNM 703d.]

4-6, Side, posterior, and ventral views of a large pedicle valve, $\times 1$, paratype USNM 154029. [Road Canyon Formation, AMNH 503.]

Ramavectus diabloensis Stehli: 15, 16, Side and ventral views of a pedicle valve, $\times 1$, hypotype USNM 154210b; 17-19, ventral, interior, and posterior views of another pedicle valve, $\times 1$, hypotype USNM 154210a; 20-22, fragments of three brachial valves, $\times 1$, showing the divergent struts anterior to the cardinal process, hypotypes USNM 154210j, h, f; 23, 24, exterior and interior of the brachial valve, $\times 1$, hypotype USNM 154210k. [Bone Spring Formation, USNM 728e.]

PLATE 256.—*Ametoria* and *Ramavectus*

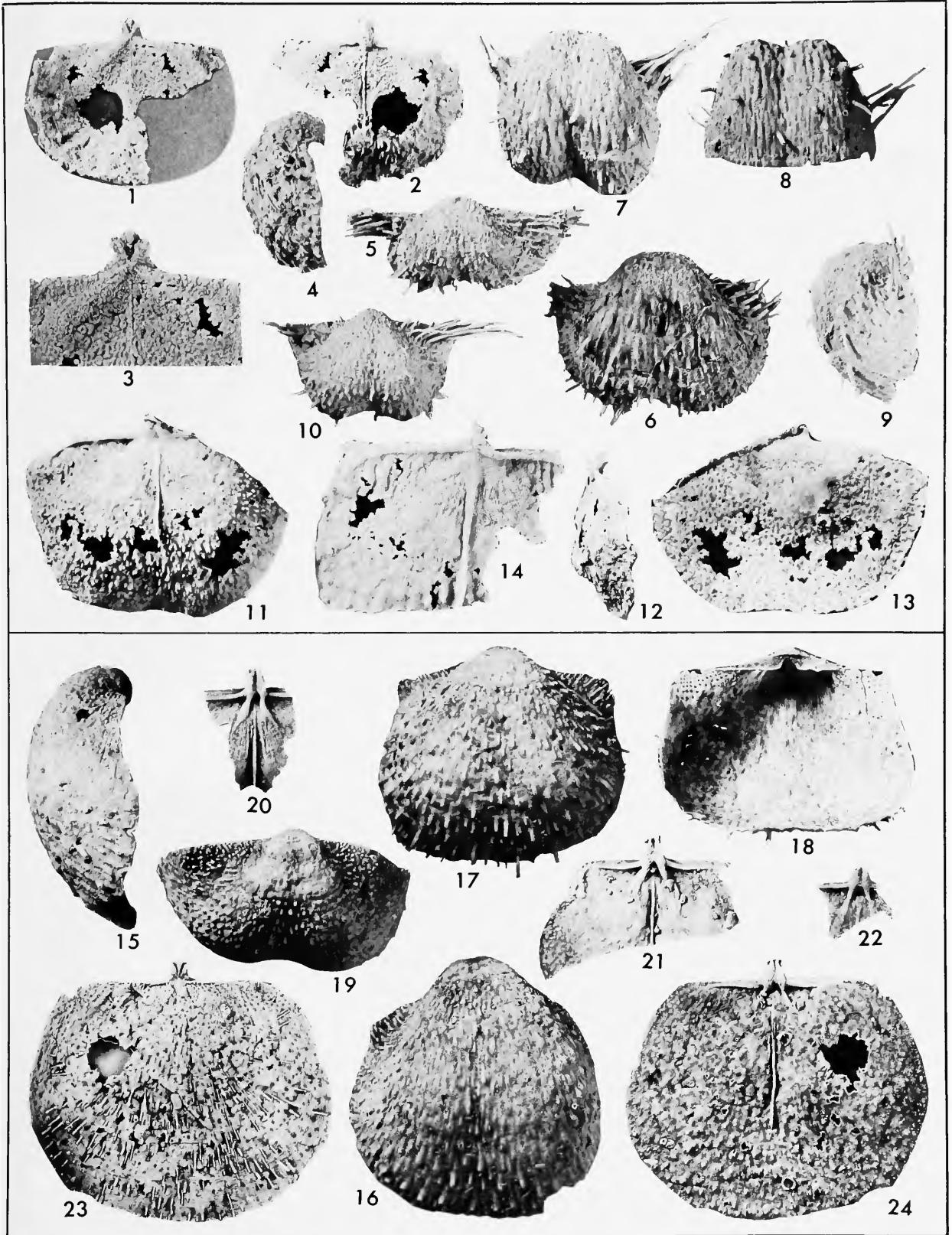


PLATE 257*Limbella and Ramavectus*

Limbella limbata, new species: 1, 2, Ventral view, $\times 1$, $\times 2$, of a young specimen retaining its initial attachment rings, paratype USNM 154211, [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

Ramavectus diabloensis Stehli: 3, 4, Ventral and interior views, $\times 1$, of a small pedicle valve, hypotype USNM 149450b; 5, 6, exterior and interior of a young brachial valve, $\times 1$, hypotype USNM 149450a; 17-19, posterior, side, and ventral views of a large pedicle valve, $\times 1$, hypotype USNM 148959a; 20, 21, interior and ventral views of another pedicle valve, $\times 1$, showing the short interarea, hypotype USNM 148959b. [Bone Spring Formation, AMNH 625.]

7-10, Interior, side, ventral, and anterior views of a young pedicle valve, $\times 1$, showing an interarea, hypotype USNM 148957b; 11-14, exterior, side, and interior views, $\times 1$, and posterior of the cardinal process, $\times 2$, of a large brachial valve, hypotype USNM 148957a; 15, ventral view of a large pedicle valve, $\times 1$, hypotype USNM 154210c; 16, interior of a brachial valve, showing the struts anterior to the cardinal process, $\times 1$, hypotype USNM 154210d. [Bone Spring Formation, USNM 728e.]

PLATE 257.—*Limbella* and *Ramavectus*

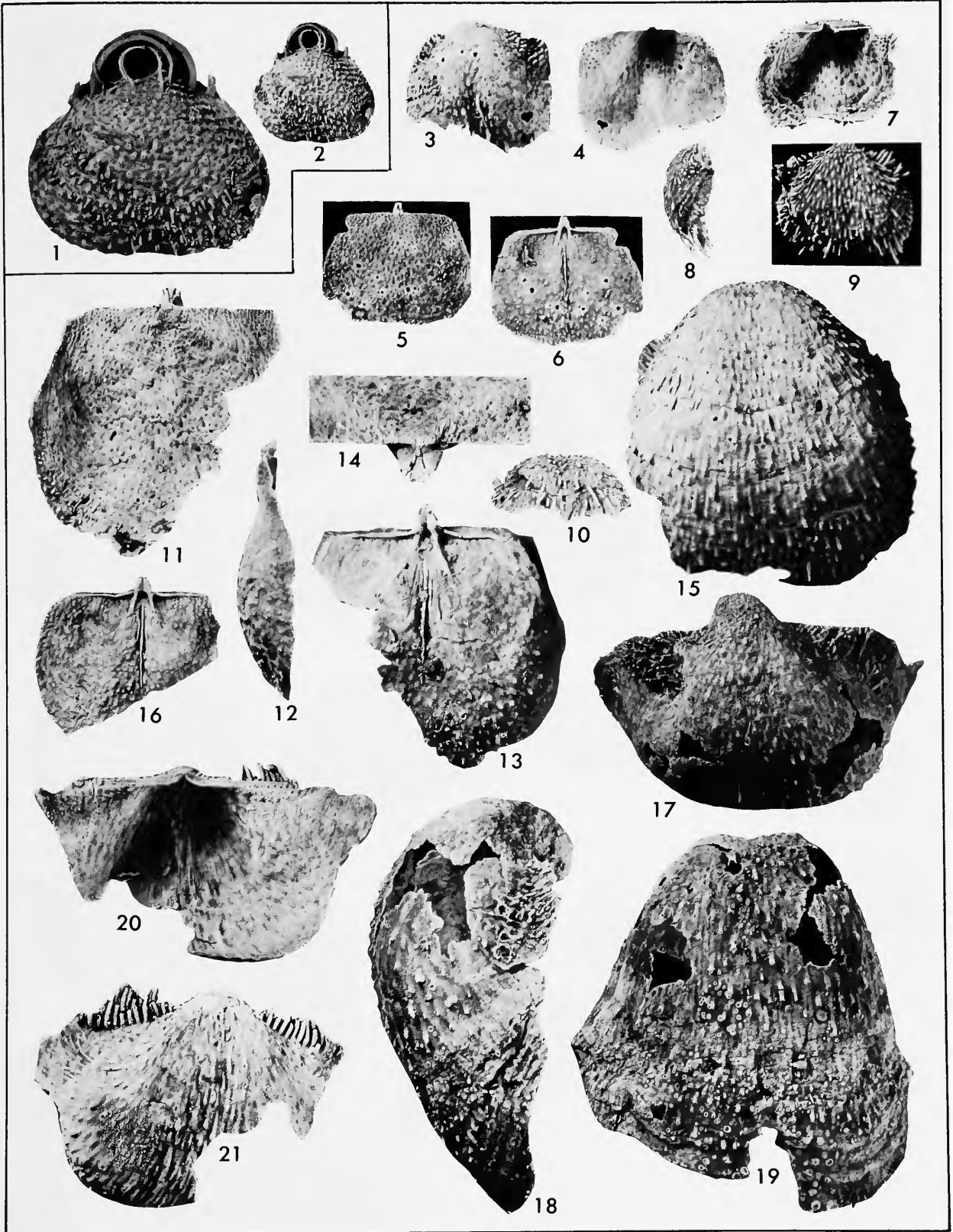


PLATE 258

Rhamnaria, Ramavectus, and Echinosteges

Rhamnaria eximia, new species: 1–4, Posterior, ventral, side, and interior views of the pedicle valve, × 1, paratype USNM 149451c; 5, 6, interior and exterior of a young brachial valve, × 1, paratype USNM 149451g; 7–10, interior, posterolateral, exterior, and side views of a full-grown brachial valve, × 1, paratype USNM 149451e; 11–14, side, posterior, anterior, and ventral views of a large pedicle valve, × 1, paratype USNM 149451b; 15–18, side, interior, posterodorsal, and exterior views of a brachial valve, × 1, paratype USNM 149451d; 19–22, ventral, anterior, posterior, and dorsal views of another large pedicle valve, × 1, holotype USNM 149451a; 23, 24, exterior and interior of a young brachial valve, × 1, paratype USNM 149451h; 25, 26, exterior and interior of another brachial valve, × 1, paratype USNM 149451f. [Bone Spring Formation, USNM 728f.]

Ramavectus diabloensis Stehli: 27–29, Posterior, side, and ventral views of an imperfect pedicle valve, × 1, hypotype USNM 154210–1. [Bone Spring Formation, USNM 728e.]

Echinosteges guadalupensis (Shumard): 30, Posterior view of a hypotype, showing the interarea and elytridium, × 2, USNM 152652a (for additional views see plate 229: figures 10–12). [Bell Canyon Formation (Rader Member), USNM 725f.]

Echinosteges, species: 31, 32, Posterior and ventral views, showing numerous slender ornament spines, × 1, figured specimen USNM 149045. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

PLATE 258.—*Rhamnaria*, *Ramavectus*, and *Echinosteges*

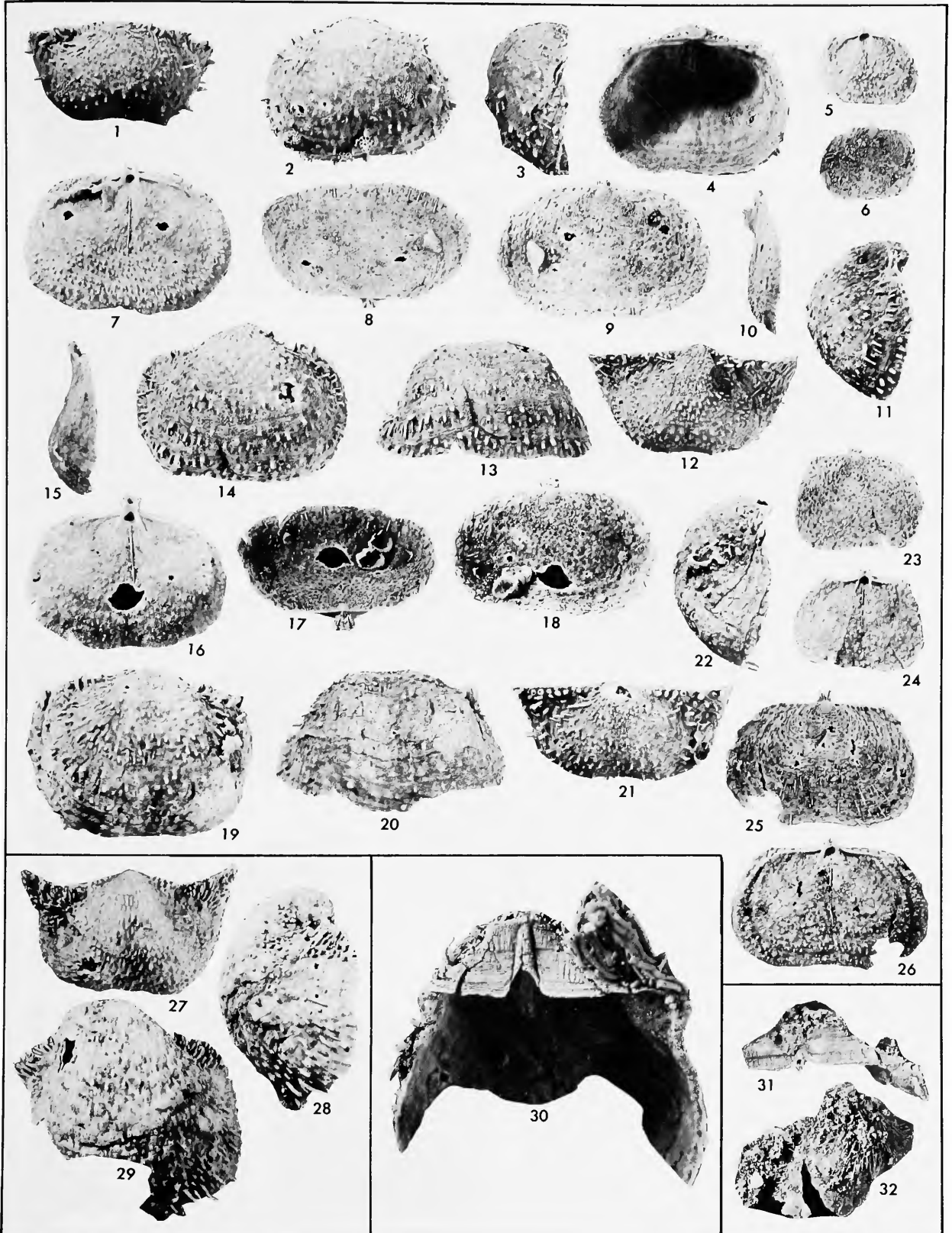


PLATE 259

Rhamnaria

Rhamnaria tenuispinosa, new species: 1, 2, Ventral and dorsal views of a specimen preserving most of its spines, $\times 1$, paratype USNM 154215f; 6, dorsal view of a young spiny specimen, $\times 1$, paratype USNM 154215j; 7-9, dorsal, interior, and side views of a brachial valve, $\times 1$, paratype USNM 154215d (for exterior views of the whole specimen, see plate 260: figures 24-26); 10-12, dorsal, interior, and side views of another brachial valve, $\times 1$, paratype USNM 154215h; 25, exterior of a pedicle valve with long ornament spines, $\times 1$, paratype USNM 154215i. [Road Canyon Formation (base), USNM 702c.]

3, 33, Interior and exterior of a pedicle valve, $\times 1$, paratype USNM 154219b. [Cathedral Mountain Formation, USNM 721u.]

4, 5, Ventral and dorsal views of a young specimen attached to a bryozoan, $\times 1$, paratype USNM 154217d; 17-19, dorsal, ventral, and anterior views of a complete but young adult, $\times 1$, paratype USNM 149360g; 23, 24, exterior, $\times 1$, and interior, $\times 2$, of a pedicle valve, showing initial attachment, ring, paratype USNM 154217e; 29, 30, dorsal and ventral views of a complete young specimen, showing the initial ring of attachment, $\times 1$, paratype USNM 149360h. [Cathedral Mountain Formation, USNM 702un.]

13-16, Ventral, anterior, posterior, and side views of a large pedicle valve, $\times 1$, paratype USNM 149373c; 20, interior of a large brachial valve, $\times 1$, paratype USNM 149373d; 26, ventral view of a pedicle valve, $\times 1$, paratype USNM 149373g; 27, 28, exteriors of two ventral valves, $\times 1$, showing delicate ornament spines, paratypes USNM 149373e, f. [Cathedral Mountain Formation, USNM 703a¹.]

21, 22, Exterior and interior of a brachial valve, $\times 1$, paratype USNM 154216h; 31, 32, interior and exterior of another brachial valve, $\times 1$, showing a deformed cardinal process, paratype USNM 154216i. [Cathedral Mountain Formation, USNM 702.]

PLATE 259.—*Rhamnaria*

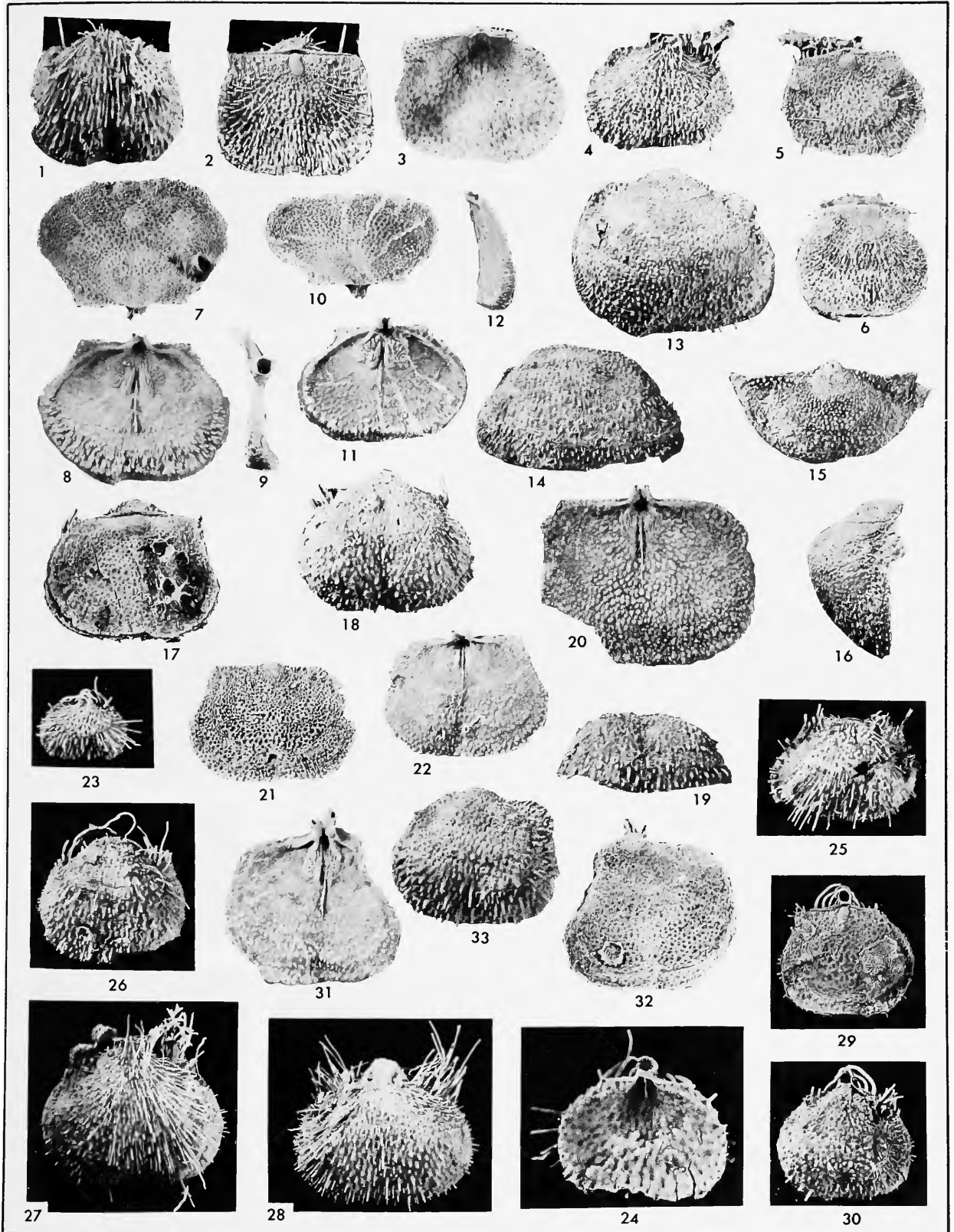


PLATE 260

Rhamnaria

Rhamnaria tenuispinosa, new species: 1, 2, Dorsal and posterior views of a complete specimen, $\times 1$, paratype USNM 149357a; 10–13, side, anterior, posterior, and interior views of a large pedicle valve, $\times 1$, showing adductor track, paratype USNM 149357b; 16, 17, interior and posterior of a brachial valve, $\times 1$, showing the cardinal process, paratype USNM 154216g. [Cathedral Mountain Formation, USNM 702.]

3–6, Anterior, side, dorsal, and ventral views of a small adult, $\times 1$, paratype USNM 154215b; 9, interior of a brachial valve, $\times 1$, paratype USNM 154215c; 20–23, side, dorsal, anterior, and ventral views, $\times 1$, of the holotype USNM 149359a; 24–26, posterior, dorsal, and ventral views of a complete specimen preserving some of its rhizoid spines, $\times 1$, paratype USNM 154215d (for dorsal interior of this specimen see plate 259: figures 7–9); 27, 28, side and ventral views of another specimen preserving many of its spines, $\times 1$, paratype USNM 154215e. [Road Canyon Formation (base), USNM 702c.]

7, 8, Interior and dorsal views of a brachial valve, $\times 1$, paratype USNM 154218a; 14, 15, side and interior of another large brachial valve, $\times 1$, paratype USNM 154218b. [Cathedral Mountain Formation, USNM 702b.]

18, 19, Exterior and interior of a large brachial valve, $\times 1$, showing thickened cardinal process and brevisseptum, paratype USNM 149373b. [Cathedral Mountain Formation, USNM 703a¹.]

PLATE 260.—*Rhamnaria*

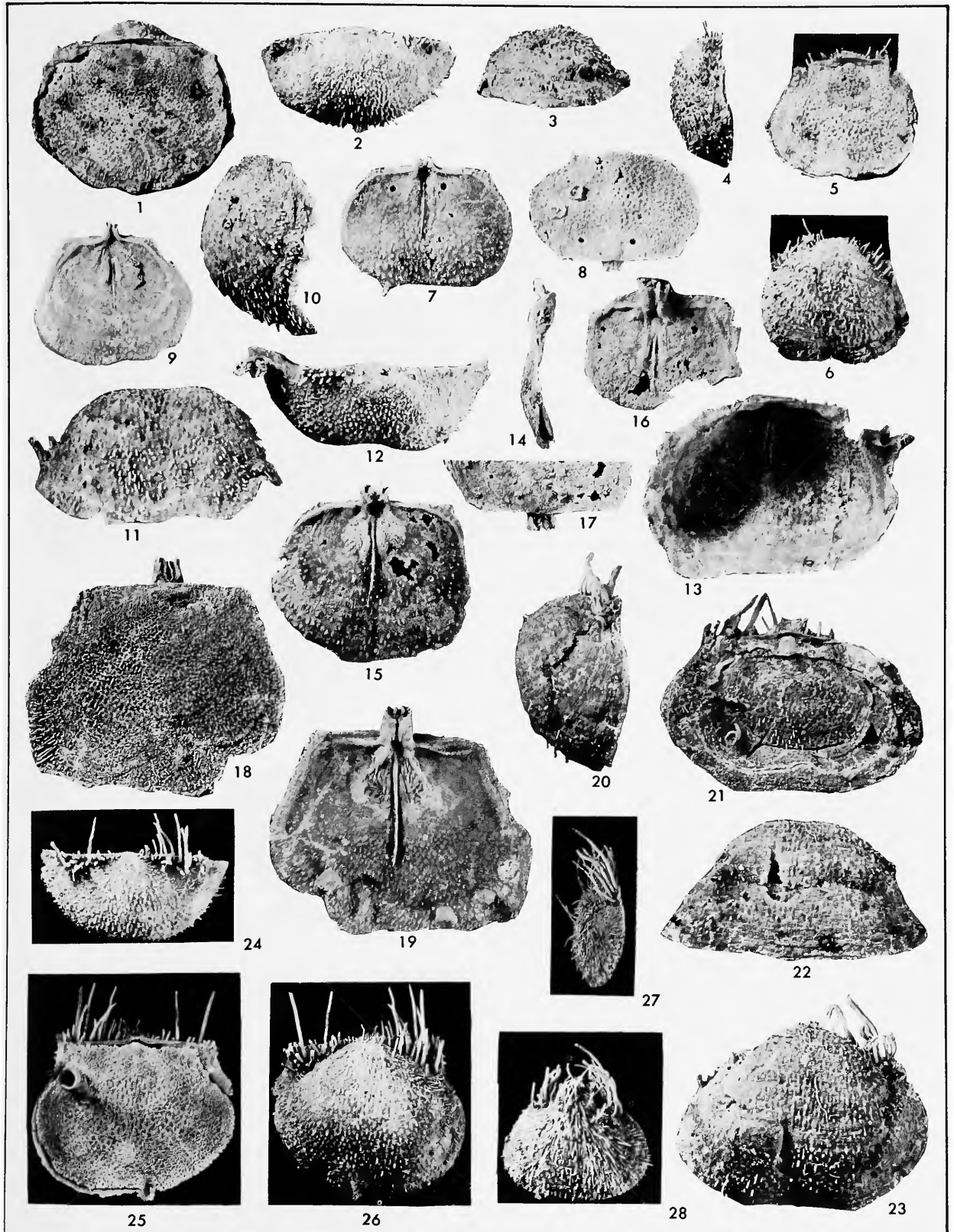


PLATE 261

Rhamnaria

Rhamnaria rectangulata, new species: 1–8, Dorsal, interior, and side views of the brachial valve, $\times 1$, and posterior, ventral, anterior, dorsal, and side views of the ventral valve of the same specimen, $\times 1$, holotype USNM 149409a; 9–15, side, dorsal, and interior views, $\times 1$, of the brachial valve and dorsal, interior, anterior, and ventral views, $\times 1$, of the complete specimen, paratype USNM 149409b. [Road Canyon Formation, USNM 703d.]

Rhamnaria tenuispinosa, new species: 16–19, Ventral, dorsal, anterior, and side views of a small adult, $\times 1$, paratype USNM 154215a. [Road Canyon Formation (base), USNM 702c.]

20–22, Dorsal, anterior, and ventral views of a small individual, $\times 1$, paratype USNM 149360c; 29, dorsal view of a young attached specimen, $\times 1$, paratype USNM 154217a; 31, 32, dorsal and ventral views of a specimen attached to a bryozoan, $\times 1$, paratype USNM 154217b; 35–37, side, ventral, and dorsal views of an attached specimen, showing deformation due to crowding against the bryozoan branches, $\times 1$, paratype USNM 154217c. [Cathedral Mountain Formation, USNM 702un.]

23, 24, Ventral and dorsal views of an immature specimen, $\times 1$, paratype USNM 154216a; 25, 26, dorsal and ventral views of a small attached specimen, $\times 1$, paratype USNM 154216b; 30, dorsal view of another immature complete specimen, $\times 1$, paratype USNM 154216c; 38, 39, ventral and dorsal views of an immature specimen, $\times 1$, paratype USNM 154216f; 40, 41, ventral and side views of attached adult, $\times 1$, paratype USNM 149356. [Cathedral Mountain Formation, USNM 702.]

33, 34, Dorsal, $\times 1$, and side, $\times 2$, views of a specimen attached to a sponge fragment and showing the rhizoid spines coming off all parts of the pedicle valve, paratype USNM 149373a. [Cathedral Mountain Formation, USNM 703a¹.]

27, 28, Interior of an immature pedicle valve, $\times 1$, $\times 2$, showing the short median septum, paratype USNM 154531. [Cathedral Mountain Formation, USNM 702a.]

PLATE 261.—*Rhamnaria*

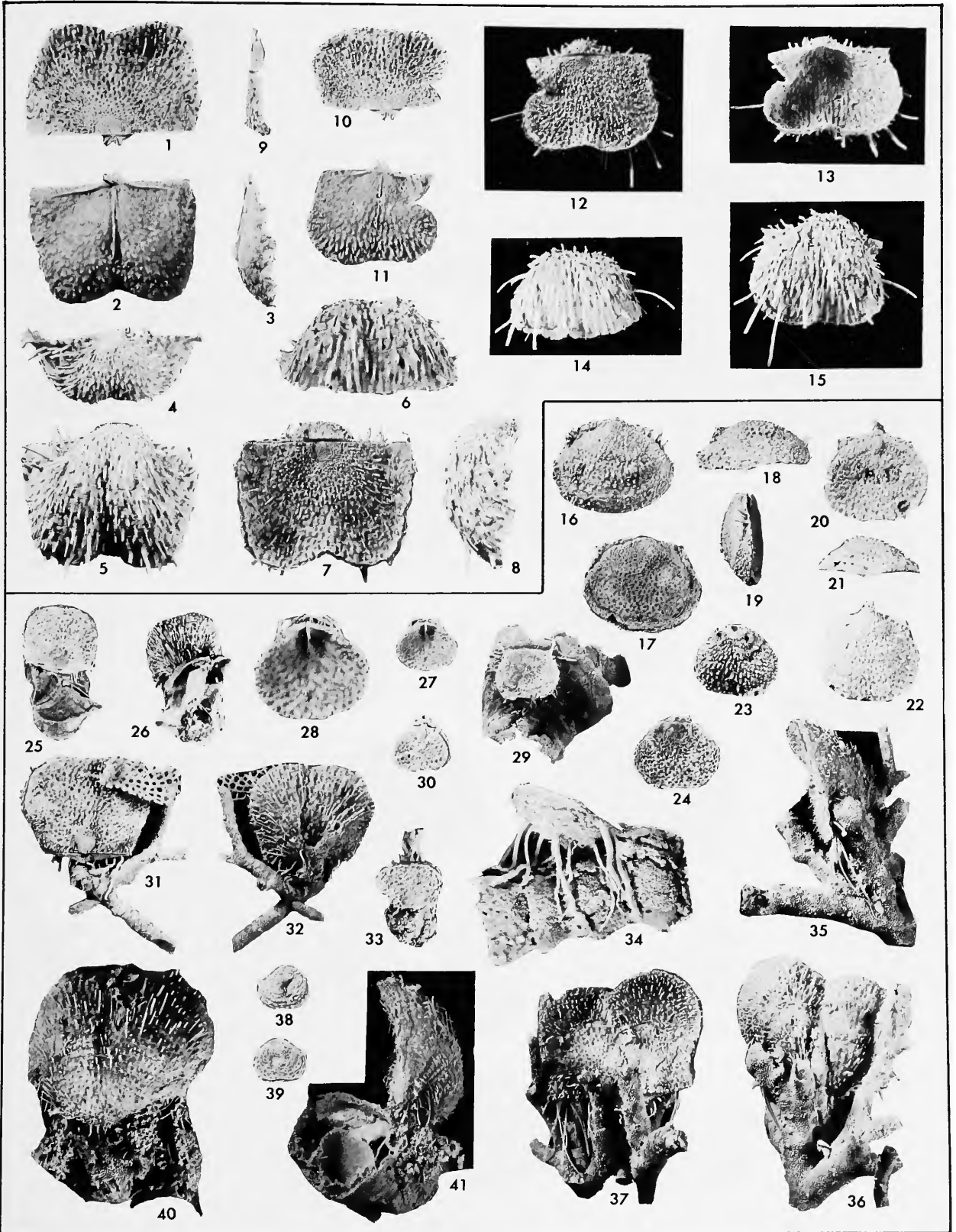


PLATE 262*Rhamnaria*

Rhamnaria tenuispinosa, new species: 1, Dorsal view of an exceptionally large specimen, × 1, paratype USNM 154220. [Cathedral Mountain Formation, USNM 726o.]

Rhamnaria sulcata, new species: 2, 3, Interior and exterior of an immature brachial valve, × 1, paratype USNM 149402x; 4–7, ventral, posterior, side, and anterior views of a young adult, × 1, paratype USNM 149402g; 8–11, ventral, side, posterior, and anterior views of a small adult, × 1, paratype USNM 149402e; 12, interior of an immature pedicle valve, × 1, paratype USNM 149402q; 13, 14, exterior and interior of a young brachial valve, × 1, paratype USNM 149402u; 15–18, ventral, posterior, anterior, and side views of a young pedicle valve, × 1, paratype USNM 149402h; 19–21, interior, exterior, and posterodorsal views of a small brachial valve with widely bilobed cardinal process, × 1, paratype USNM 149402v; 22–24, side, exterior, and interior of a brachial valve with normal cardinal process, × 1, paratype USNM 149402w; 25–27, interior, side, and exterior views of a large brachial valve with thickened cardinal process, × 1, paratype USNM 149402j; 28–30, exterior, side, and interior of another brachial valve, × 1, paratype USNM 149402s; 31–34, interior, exterior, side, and posterodorsal views of a brachial valve, showing a bilobed cardinal process, × 1, paratype USNM 149402t; 35–38, posterior, anterior, ventral, and side views of a young, complete adult, × 1, paratype USNM 149402c; 39–42, interior, side, posterodorsal, and exterior views of a large brachial valve having a cardinal process in a juvenile stage, × 1, paratype USNM 149402r; 43–46, posterior, anterior, side, and ventral views of a large pedicle valve, × 1, paratype 149402p; 47–50, ventral, side, anterior, and posterior views of a large pedicle valve, showing the strong median sulcus, × 1, holotype USNM 149402a. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 262.—*Rhamnaria*

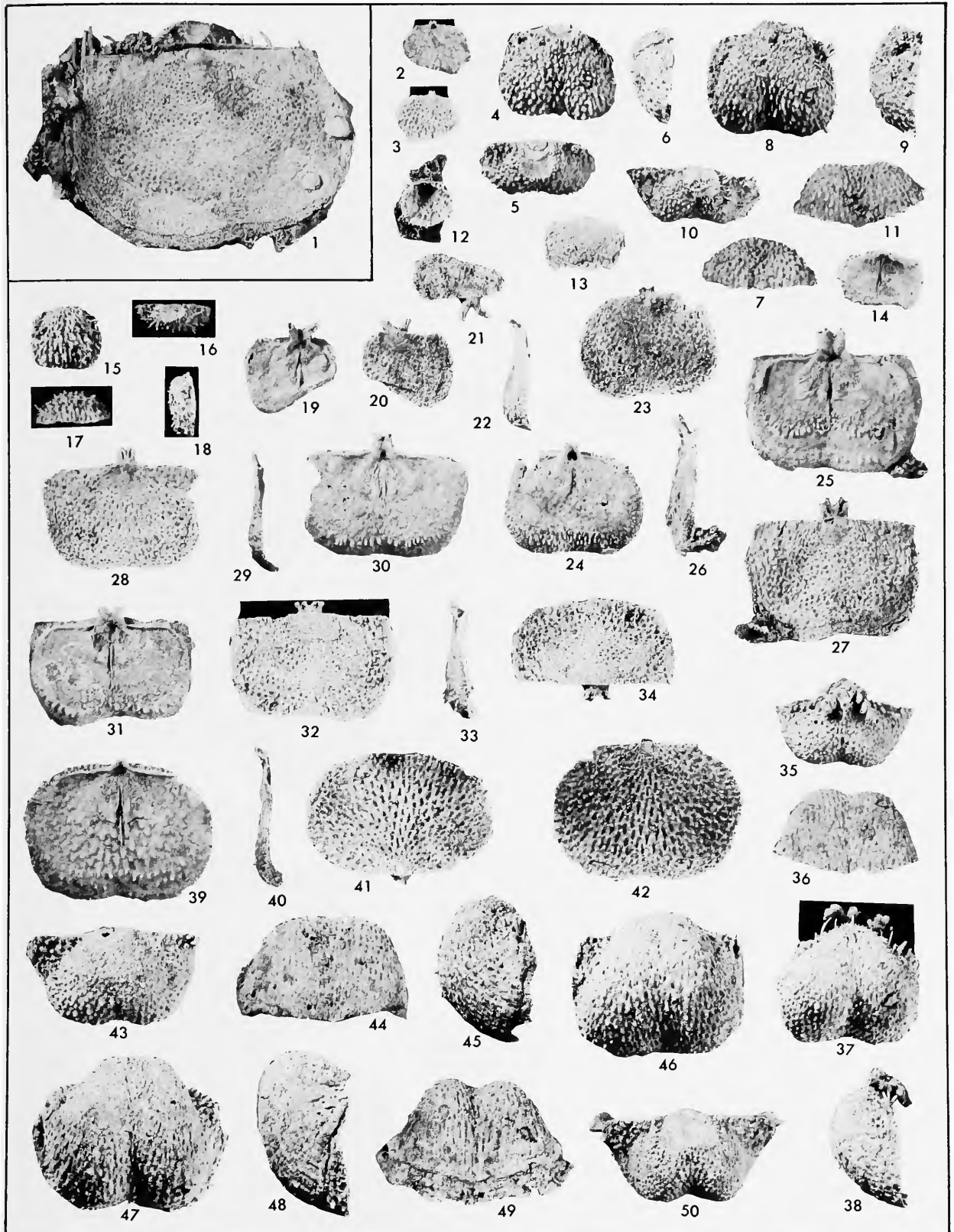


PLATE 263

Rhamnaria

Rhamnaria kingorum delicata, new subspecies: 1–4, ventral, anterior, dorsal, and side views of complete adult, × 1, paratype USNM 154221b; 5–8, ventral, posterior, side, and dorsal views of a large adult, × 1, holotype USNM 154221a; 9, 10, dorsal and ventral views of a rounded specimen, × 1, paratype USNM 149396c; 11–13, ventral, dorsal, and side views of an immature individual, × 1, paratype USNM 149396f; 14, interior of an immature pedicle valve, × 1, showing median septum, paratype USNM 154221h; 15, interior of an immature brachial valve distorted by crowding, × 1, paratype USNM 154221f; 16–18, ventral, dorsal, and side views of a young specimen, × 1, paratype USNM 149396i; 21–23, ventral, dorsal, and side views of a young adult, × 1, paratype USNM 149396h; 26–28, ventral, side, and dorsal views of a specimen elongated by crowding, × 1, paratype USNM 149396j; 29, ventral view of an adult preserving some of its rhizoid spines, × 1, paratype USNM 154221m; 30, 31, two brachial valve interiors, × 1, showing different development of the cardinal process, paratypes USNM 154221e, i; 32, interior of an immature pedicle valve, showing the median septum, × 1, paratype USNM 154221o; 33–35, interior of three brachial valves, × 1, showing variation of the interior, paratypes USNM 154221d, k, l; 36, ventral view of a pedicle valve preserving the initial attachment ring, × 1, paratype USNM 154221n; 37, ventral view of a young individual with rhizoid spines, × 1, paratype USNM 154221q; 40, 41, interior of two brachial valves, × 1, showing variation in cardinal process, paratypes USNM 154221j, c; 42–44, side and interior views, × 1, and interior view, showing the median septum, × 2, of an immature pedicle valve attached to *Paucispinifera*, paratype USNM 149396k; 45, 46, ventral and side views of a specimen attached to *Costispinifera*, × 1, showing the numerous fine rhizoid spines, paratype USNM 149396–l; 47, interior, × 1, of an immature brachial valve, paratype USNM 154221g; 48, 49, dorsal view of an immature pedicle valve, × 1, × 2, showing the median septum, paratype USNM 149396m. [Word Formation (China Tank Member), USNM 706c.]

19, 20, Exterior and interior of a young brachial valve, × 1, paratype USNM 154222b; 24, 25, interior and exterior of a young pedicle valve, × 1, paratype USNM 154222a. [Word Formation (China Tank Member), USNM 726r.]

38, 39, Oblique and ventral views, × 1, of a specimen attached to the pedicle valve of *Megousia*, paratype USNM 154223. [Word Formation (China Tank Member), USNM 733q.]

PLATE 263.—*Rhamnaria*



PLATE 264

Rhamnaria

Rhamnaria kingorum Muir-Wood and Cooper: 1, 2, Ventral and dorsal views of a young specimen attached to a bryozoan, $\times 1$, hypotype USNM 149389a; 3, dorsal view of a young specimen occupied by a number of other young brachiopods, $\times 1$, hypotype USNM 149389b; 4, ventral view of a young pedicle valve with ornament and rhizoid spines, $\times 1$, paratype USNM 124072p; 7, 8, interior of a pedicle valve, $\times 2$, $\times 1$, showing muscle scars and initial attachment ring clasping a crinoid stem, paratype USNM 124072a; 10, posterior of a pedicle valve showing the cicatrix of attachment, $\times 2$, paratype USNM 124072c; 11, ventral view of a pedicle valve, $\times 1$, showing some of its rhizoid spines, hypotype USNM 154213k; 12, exterior of a young ventral valve, $\times 1$, hypotype USNM 149389c; 13, exterior of another, younger pedicle valve, $\times 1$, paratype USNM 124072o; 14, 15, interior and exterior of a pedicle valve distorted by crowding, $\times 2$, paratype USNM 124072k; 16, exterior of a ventral valve, $\times 1$, showing its rhizoid spines, hypotype USNM 154213-1; 17, 18, ventral and side views of a pedicle valve attached to a pelecypod shell, $\times 1$, hypotype USNM 149389d; 19, 20, oblique view of a pedicle valve, $\times 1$, $\times 2$, showing the numerous ornament spines, paratype USNM 124072e; 21, ventral view of a complete specimen, $\times 1.5$, $\times 1$, showing mode of attachment, paratype USNM 124072m; 22, immature specimen deformed by growing against transverse spines over the dorsal exterior of a dorsal valve of *Echinauris*, $\times 2$, hypotype USNM 149697; 25, interior of an immature pedicle valve, $\times 1$, showing its median septum, hypotype USNM 154213u; 26, interior of another immature pedicle valve, $\times 1$, attached to the brachial valve of *Echinauris*, and showing the median septum, hypotype USNM 154213s; 27, interior of a young brachial valve, $\times 1$, hypotype 154214f; 28, ventral view of a small attached pedicle valve, $\times 1$, hypotype USNM 149389e; 29, ventral view of an adult pedicle valve, $\times 2$, attached to *Paucispinifera* and showing the role of the rhizoid spines, paratype USNM 124072f. [Word Formation (Willis Ranch Member), USNM 706c.]

5, 6, Exterior, $\times 1$, and interior, $\times 2$, of a pedicle valve preserving the initial attachment ring, hypotype USNM 149388a; 9, interior of an immature brachial valve, $\times 1$, hypotype USNM 154214e; 23, 24, interior, $\times 1$, $\times 2$, of a pedicle valve attached to a brachial valve and showing the median septum, hypotype USNM 149388b. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 264.—*Rhamnaria*

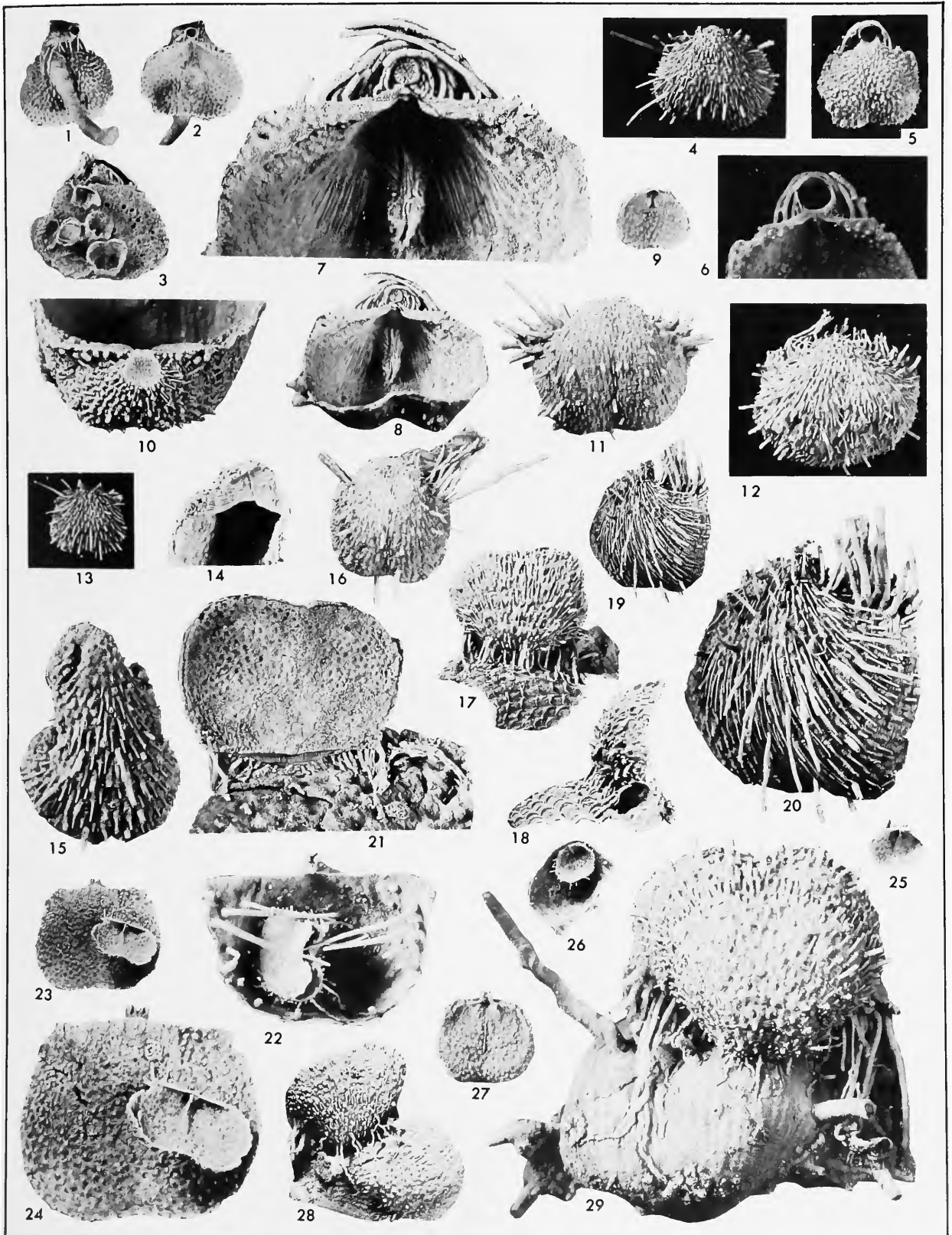


PLATE 265

Rhamnaria

Rhamnaria kingorum Muir-Wood and Cooper: 1-5, Dorsal, ventral, posterior, side, and anterior views of an immature individual, × 1, hypotype USNM 149383i; 6-10, ventral, anterior, posterior, side, and dorsal views of another immature specimen, older than the preceding, × 1, hypotype USNM 149383h; 11-15, ventral, side, dorsal, anterior, and posterior views of a still larger specimen than the preceding, × 1, hypotype USNM 149383g; 16, interior of an immature brachial valve, × 1, hypotype USNM 154214g; 17-21, dorsal, ventral, posterior, anterior, and side views of another complete, nearly adult specimen, × 1, hypotype USNM 149383f; 22, interior of another immature brachial valve, × 1, hypotype USNM 154214h; 23, 24, interior of two half-grown brachial valves, × 1, hypotypes USNM 154214i, j; 35-37, dorsal, side, and interior views of an adult brachial valve, × 1, hypotype USNM 154214k; 38, 39, dorsal and ventral views of a large adult, × 1, hypotype USNM 149383d; 40-42, interior, side, and dorsal views of a large brachial valve with strongly lobed cardinal process, × 1, hypotype USNM 154214-1; 43, 44, side and dorsal views of a large complete specimen, × 1, hypotype USNM 149383b; 45-49, side, posterior, interior, anterior and ventral views of a large pedicle valve, × 1, showing muscle scars, hypotype USNM 149383j. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

25, 26, Interior and side views of a young brachial valve, × 1, hypotype USNM 154213i; 27, 28, interior and side views of another brachial valve more highly developed cardinal process than the preceding specimen, × 1, hypotype USNM 154213j; 29-31, side, dorsal, and interior views of a large brachial valve, × 1, hypotype USNM 154213e; 32-34, dorsal, side, and interior views of another brachial valve, × 1, hypotype USNM 154213h. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 265.—*Rhamnaria*

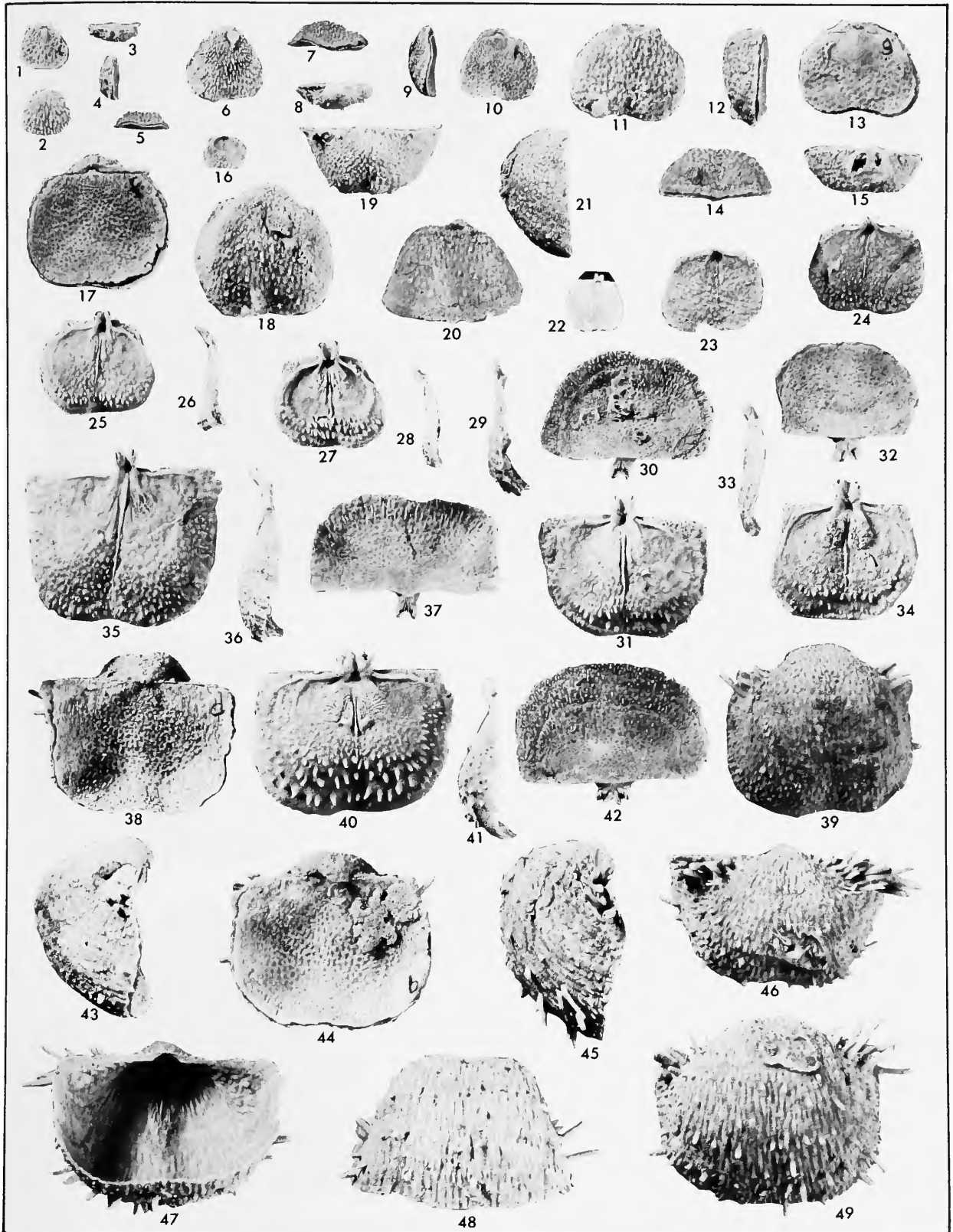


PLATE 266*Rhamnaria*

Rhamnaria kingorum Muir-Wood and Cooper: 1, Interior of a brachial valve, $\times 2$, showing endospines, brevisseptum and cardinal process, paratype USNM 124072j; 2-5, ventral, anterior, side, and posterior views of a pedicle valve, $\times 1$, holotype USNM 124072b; 6, 7, posterior and interior views of a brachial valve with widely bilobed cardinal process, $\times 1$, hypotype USNM 154213a; 11, 12, interior of a small but obese brachial valve, $\times 2$, $\times 1$, hypotype USNM 124072q; 15, interior of a brachial valve, $\times 2$, showing endospines, dendritic adductor scars, and cardinal process, paratype USNM 124072i; 18, ventral view of a pedicle valve $\times 2$, showing its mode of attachment, paratype USNM 124072d; 19, 20, interior and posterior of a young brachial valve, $\times 2$, showing the immature cardinal process, paratype USNM 124072-1; 21-23, exterior and interior, $\times 2$, and interior, $\times 1$, of an obese brachial valve with greatly expanded cardinal process, paratype USNM 124072h. [Word Formation (Willis Ranch Member), USNM 706e.]

8-10, Side and exterior, $\times 1$, and exterior, $\times 2$, showing numerous spines on the brachial valve, hypotype USNM 154214a; 13, 14, interior and exterior of a young brachial valve $\times 1$, showing excessive growth of the cardinal process, hypotype USNM 154214c; 16, 17, interior and side views of a brachial valve, $\times 1$, hypotype USNM 154214d. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 266.—*Rhamnaria*

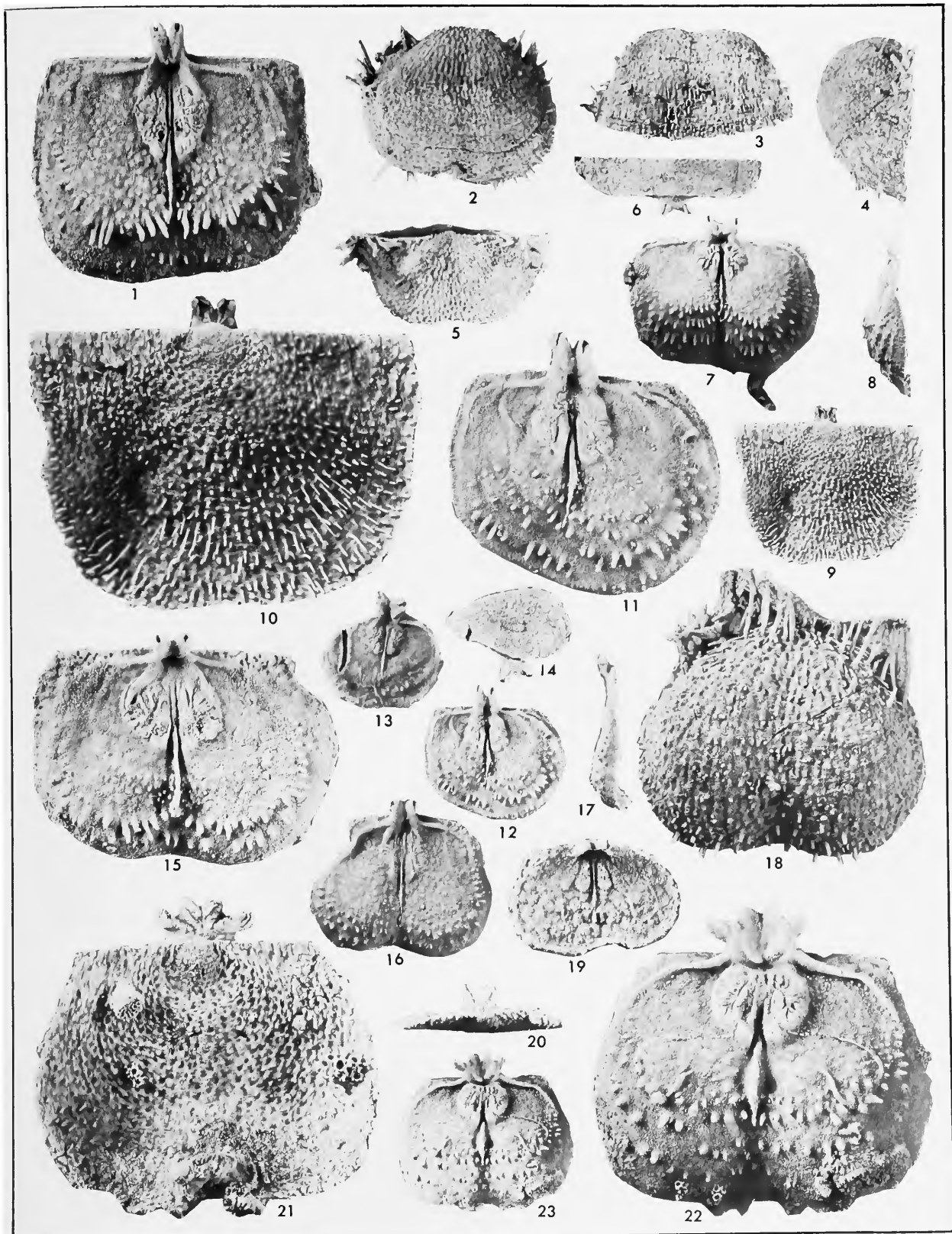


PLATE 267

Echinosteges and *Rhamnaria*

Echinosteges guadalupensis (Shumard): 1–4, Side, ventral, anterior, and dorsal views of a complete specimen, × 1, hypotype USNM 154523, [Capitan Formation, USNM 738a.]

Rhamnaria shumardi, new species: 5–8, Ventral, side, dorsal, and anterior views of a small specimen, × 1, paratype USNM 149408k; 9–12, ventral, dorsal, anterior, and side views of a complete specimen, × 1, holotype USNM 149408c; 13–16, posterior, ventral, anterior, and side views of a pedicle valve, × 1, paratype USNM 149408b. [Capitan Formation, USNM 738a.]

17, 18, Side and ventral views of a silicified pedicle valve, × 1, paratype USNM 149406. [Bell Canyon Formation (Pinery Member), USNM 733.]

19, 20, Interior of two immature brachial valves, × 1, paratypes USNM 154212a, b. [Bell Canyon Formation (post-Rader Limestone), AMNH 409.]

Rhamnaria grandis new species: 21–24, Side, ventral, anterior, and dorsal views of a large complete specimen, × 1, holotype USNM 149380a. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

PLATE 267.—*Echinosteges* and *Rhamnaria*

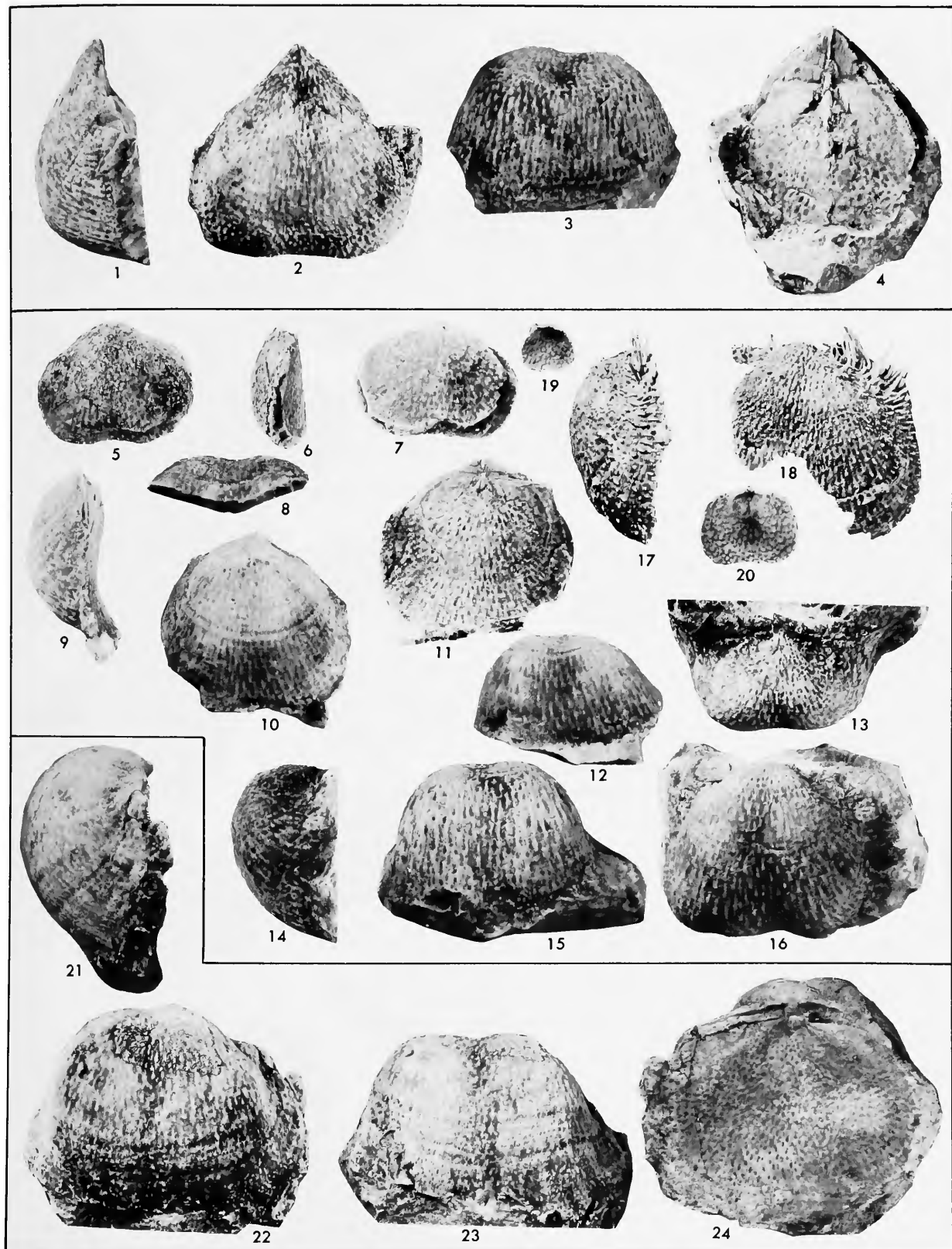


PLATE 268

Tschernyschewia

Tschernyschewia americana, new species: 1, 2, Interior and oblique views of a pedicle valve, $\times 2$, showing the strong, long median septum, holotype USNM 152683c; 3-5, posterior, exterior, and interior views of a brachial valve, $\times 2$, showing the bilobed cardinal process, paratype USNM 152683a; 6-8, posterior, interior, and exterior of another brachial valve larger than the preceding, $\times 2$, paratype USNM 152683b; 9-14, posterior, anterior, side, ventral, and dorsal views, $\times 1.5$, and dorsal view, $\times 1$, of a complete specimen, paratype USNM 149434c; 15-20, side, ventral, posterior, anterior, and dorsal views, $\times 1.5$, and dorsal view, $\times 1$, of another complete specimen, paratype USNM 149434b; 21, 22, dorsal view of a specimen attached to the substrate, $\times 1$, $\times 2$, paratype 149434d. [Bone Spring Formation, AMNH 591.]

Tschernyschewia inexpectans, new species: 23, Interior of a fragmentary brachial valve, showing the divergent prongs of the cardinal process, $\times 1$, paratype USNM 154234. [Hess Formation (Taylor Ranch Member), USNM 702d.]

24-27, Side, dorsal, posterior, and ventral views of a complete specimen, $\times 1$, paratype USNM 152682b; 28-31, posterior, side, dorsal, and ventral views of another complete specimen, $\times 1$, paratype USNM 152682a; 32, ventral view of a pedicle valve, $\times 1$, paratype USNM 152682d. [Hess Formation (Taylor Ranch Member), USNM 716n.]

33-36, Dorsal, posterior, and side views, $\times 1$, and dorsal view $\times 1.5$, of a complete specimen, holotype USNM 152681; 37, 38, oblique anterior and anterior views of the holotype, $\times 1$, showing the median septum of the pedicle valve; 39, oblique anterior view of the holotype, $\times 1.5$, showing the median septum of the pedicle valve. [Hess Formation (Taylor Ranch Member), USNM 716o.]

PLATE 268.—*Tschernyschewia*

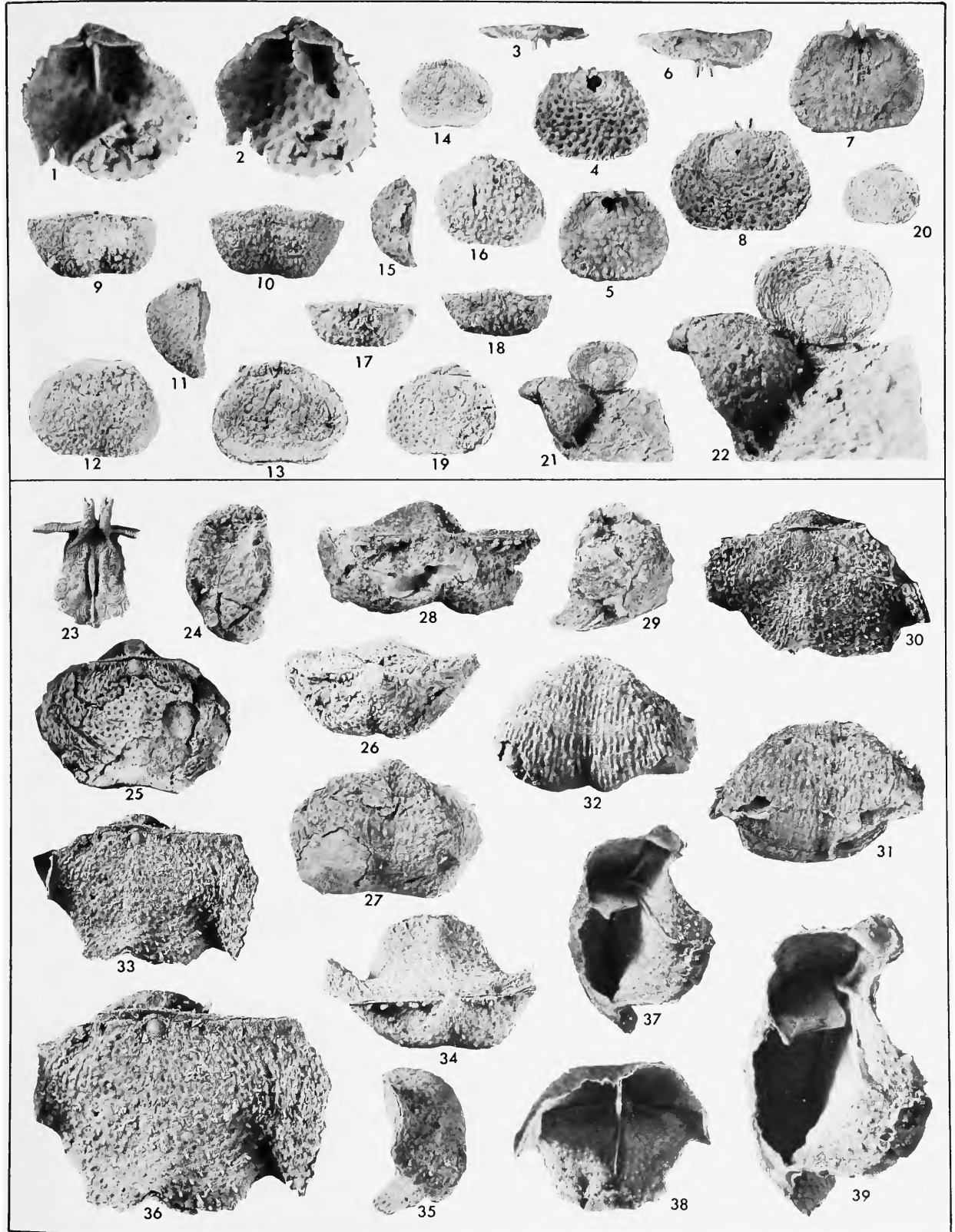


PLATE 269

Tschernyschewia and *Strophalosia*

Tschernyschewia species: 1–3, Ventral, side, and interior views of a pedicle valve, \times 1, showing the median septum and rhizoid spines on the body of the shell, figured specimen USNM 149359a; 4–6, exterior, side, and interior of a fragmentary brachial valve, \times 1, figured specimen USNM 149359b; 7, interior of a large brachial valve, \times 1, showing a trace of the pedicle valve median septum between the prongs of the cardinal process, figured specimen 149359c. [Road Canyon Formation (base), USNM 702c.]

8–10, Ventral, side, and interior views of a large pedicle valve, \times 1, figured specimen USNM 152684a; 11, 12, interior and exterior of a fragment of the brachial valve showing the cardinal process, \times 1, figured specimen USNM 152684b. [Road Canyon Formation, USNM 719x.]

Strophalosia inexpectans, new species: 13–16, Ventral, anterior, posterior, and side views of a pedicle valve, \times 1, paratype USNM 151229a; 17–21, anterior, posterior, ventral, side, and interior views of a pedicle valve, \times 1, holotype USNM 151229b; 22, interior of the holotype, \times 2, showing muscle scars; 23, interarea of the holotype, \times 3, showing teeth and flat pseudodeltidium; 24, interarea of another specimen, \times 2, showing the teeth and pseudodeltidium, paratype USNM 151229c; 25, 26, interior and exterior of a brachial valve, \times 1, paratype USNM 151229d; 27–30, posterior, posterodorsal, interior, and oblique views of the preceding brachial valve \times 3, showing the cardinal process, sockets and myophore. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 269.—*Tschernyschewia* and *Strophalosia*

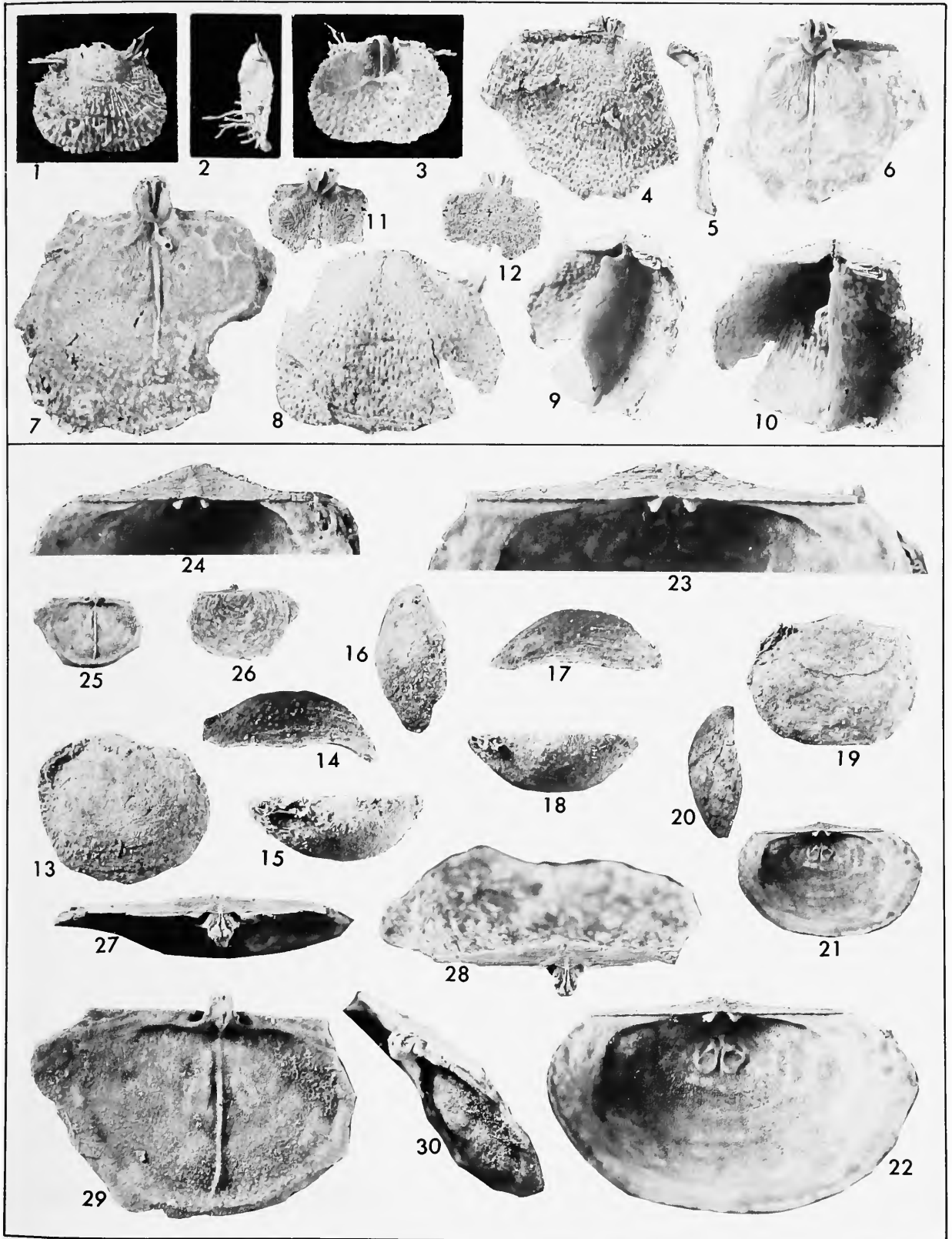


PLATE 270*Scacchinella*

Scacchinella primitiva, new species: 1-3, Posterior, ventral, and side views of a large pedicle valve, $\times 1$, paratype USNM 151701b; 4, interior of an imperfect pedicle valve, $\times 1$, showing "brachial ridges," paratype USNM 151701j; 5-7, posterior, side, and ventral views of a pedicle valve preserving the beak, $\times 1$, paratype USNM 151701c; 8, 9, apical and side views of a specimen shorn of the beak, $\times 1$, paratype USNM 151701g; 10, interior impression of the brachial valve, $\times 1$, showing the adductor ridges and "brachial ridges," holotype USNM 151701a; 11, partial side view of the holotype, showing the median septum and one prong of the cardinal process, $\times 1$. [Gaptank Formation, USNM 700g.]

Scacchinella titan, new species: 12, Polished section of a pedicle valve, showing the long median septum, and crisscross plates that strengthen the conical pedicle valve, $\times 1$, paratype USNM 147934. [Skinner Ranch Formation (Decie Ranch Member), USNM 707w.]

13, Tilted posterior view of a brachial valve, showing one prong of the cardinal process with its deep myophore at the distal end, $\times 2$, paratype USNM 153665d; 14, 15, apical and posterior views of a young, wide specimen, showing attachment cicatrix and rhizoid spines, $\times 1$, paratype USNM 153665e; 16, ventral view of the preceding specimen, $\times 2$, showing some of the rhizoid or attachment spines. [Skinner Ranch Formation (base), USNM 705a.]

PLATE 270.—*Scacchinella*

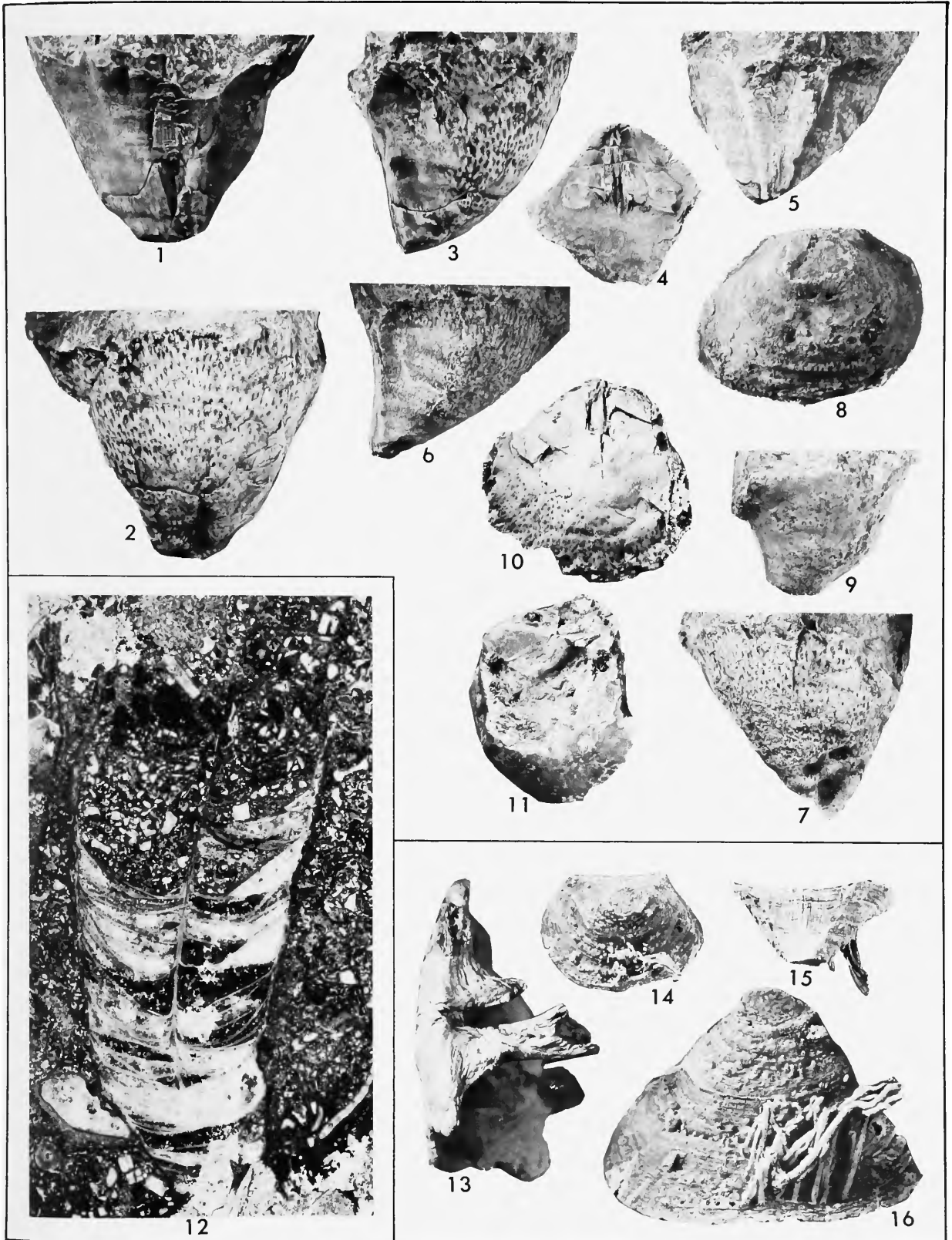


PLATE 271

Scacchinella

Scacchinella triangulata, new species: 1, Polished surface of a cross section of the pedicle valve, showing septum, $\times 1$, paratype USNM 153669a; 10, interior of a specimen from which the ventral side has been stripped, $\times 1$, showing the median septum and the forked cardinal process, paratype USNM 153669b. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 702n.]

2-5, Ventral, side, posterior, and dorsal views of a small adult, $\times 1$, paratype USNM 151694b; 6-9, ventral, dorsal, posterior, and side views of a large individual, $\times 1$, holotype USNM 151694a. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 702q.]

11, Exterior of a very large brachial valve, $\times 1$, paratype USNM 151697b; 12, posterior view of a complete specimen, $\times 1$, showing the median septum and the cardinal process, paratype USNM 151697a. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 702r.]

13, Interior of a brachial valve, $\times 1$, showing the forked cardinal process and large adductor impressions, paratype USNM 151691a. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 701q.]

Scacchinella exasperata, new species: 14-16, Dorsal, side, and posterior views of a young specimen, $\times 1$, paratype USNM 151686g; 17-19, dorsal, side, and posterior views of a larger specimen than the preceding, $\times 1$, paratype USNM 151686c; 20-22, ventral, side, and posterior views of a large individual, $\times 1$, holotype USNM 151686a; 23, posterior view of a specimen from which the shell has been stripped to show the median septum and cardinal process, $\times 1$, paratype USNM 151686j; 24, polished section of a pedicle valve, $\times 1$, showing the strong median septum, paratype USNM 151686k. [Lenox Hills Formation, USNM 705k.]

PLATE 271.—*Scacchinella*

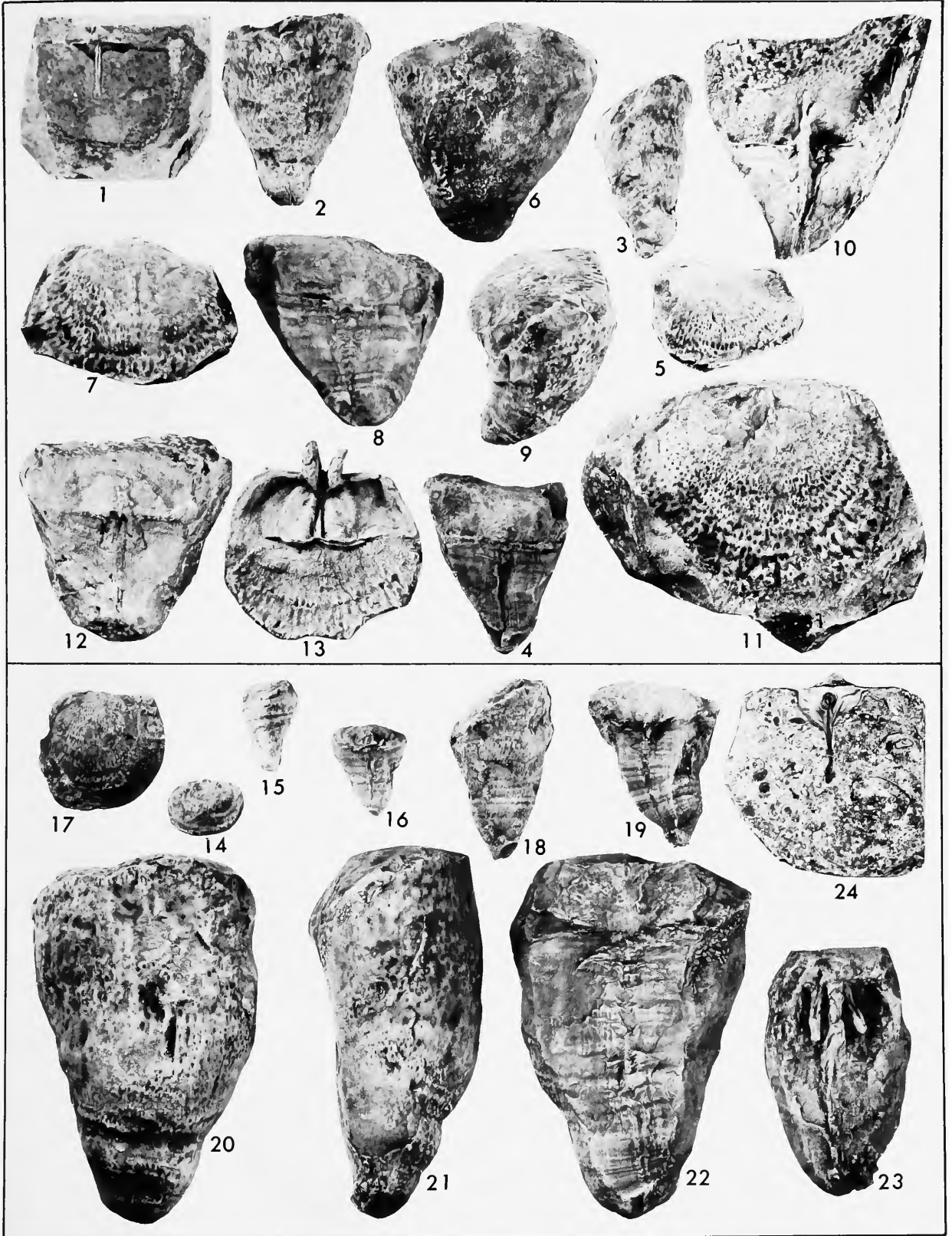


PLATE 272

Scacchinella

Scacchinella titan, new species: 1–4, Ventral, posterior, side, and dorsal views of a complete specimen, $\times 1$, paratype USNM 153670a; 5, 6, side and ventral views of an elongated specimen, $\times 1$, paratype USNM 153670b. [Skinner Ranch Formation, USNM 724p.]

Scacchinella americana Stehli: 7–9, Brachial valve tilted to show cardinal process, interior, and side views, also showing elevated adductor scar attachments, $\times 1$, hypotype USNM 153671. [Bone Spring Formation (lower), USNM 725c.]

10–13, Interior, interior tilted, side, and posterior views of another brachial valve, showing the cardinal process, $\times 1$, hypotype USNM 153672a; 14–16, ventral, interior, and side views of the pedicle valve, showing the median septum, $\times 1$, hypotype USNM 153672b. [Bone Spring Formation (lower), USNM 728e.]

17–20, Posterior, ventral, side, and dorsal views of a complete specimen, $\times 1$, hypotype USNM 148031a; 21–23, side, posterior, and dorsal views of a short specimen, $\times 1$, hypotype USNM 148031c. [Bone Spring Formation, AMNH 699.]

24–27, Side, dorsal, posterior, and ventral views of a stout specimen, $\times 1$, hypotype USNM 148034. [Bone Spring Formation, AMNH 655.]

PLATE 272.—*Scacchinella*

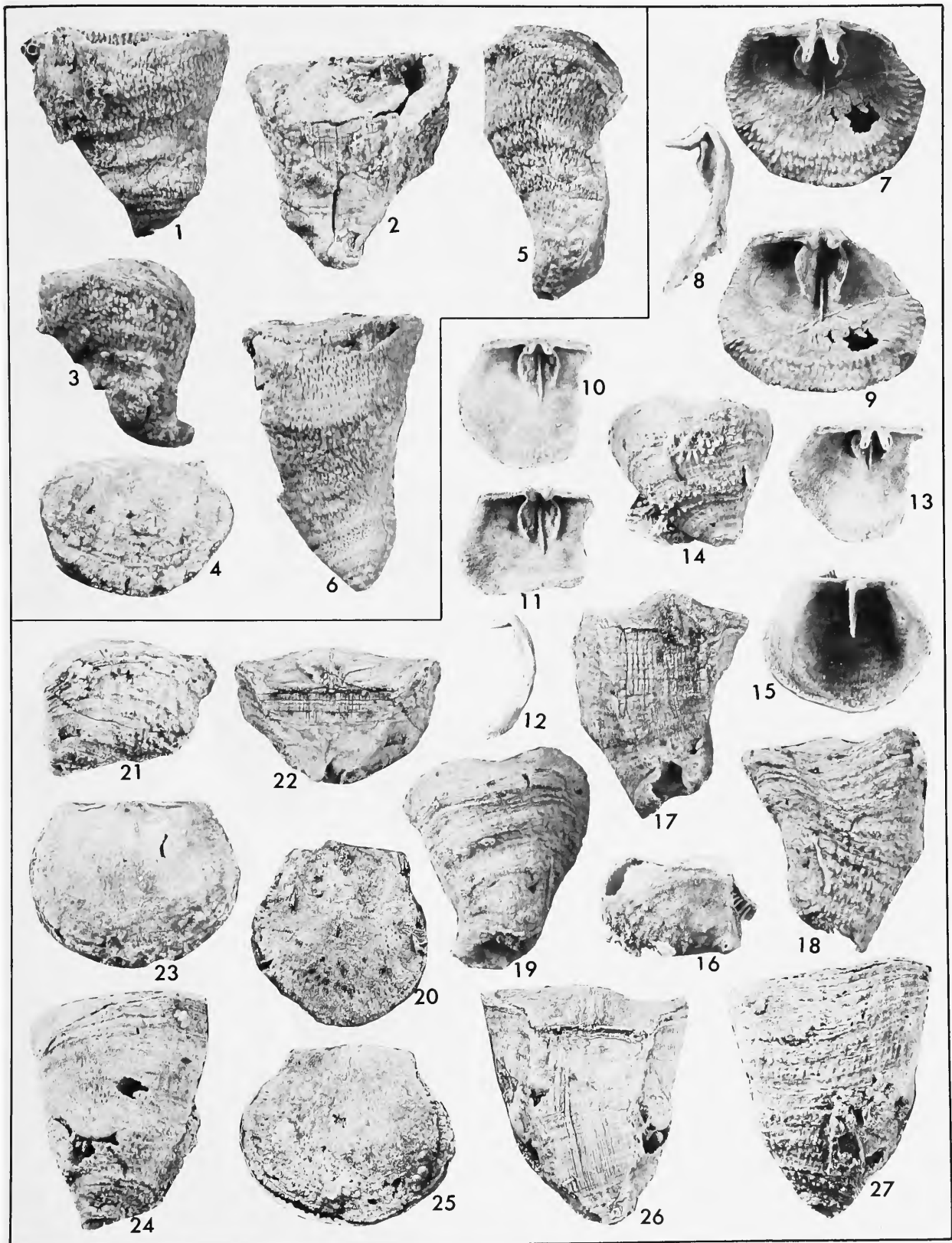


PLATE 273

Scacchinella

Scacchinella titan, new species: 1, Side view of a small pedicle valve covered by rhizoid spines, $\times 1$, figured specimen USNM 151799s; 2, interior of a small brachial valve, $\times 1$, figured specimen USNM 151799k; 3, interior of a small pedicle valve, $\times 2$, figured specimen USNM 151799-l; 4-7, dorsal, posterior, ventral, and side views of a complete specimen, $\times 1$, figured specimen USNM 151799e; 8, interior of a small brachial valve, $\times 1$, figured specimen USNM 151799m; 9, 10, posterior and ventral views of a pedicle valve, showing the distal end of the median septum, $\times 1$, figured specimen USNM 151799b; 11, small specimen attached within another shell, $\times 2$, figured specimen USNM 151799n; 12, 13, posterior and ventral views of a fragmentary dorsal valve, showing cardinal process and myophores, $\times 2$, figured specimen USNM 151799r; 14, 15, posterior and ventral views of a pedicle valve preserving many of the attachment spines, $\times 1$, figured specimen USNM 151799c; 16-19, dorsal, posterior, side, and ventral views of a well formed individual, $\times 1$, figured specimen USNM 151799d; 20, broken specimen, $\times 1$, showing median septum, figured specimen USNM 151799p; 21, interior of the brachial valve belonging to the preceding specimen, $\times 1$; 22, interior of a small pedicle valve, $\times 1$, showing the distal end of the median septum, figured specimen USNM 151799q; 23, 24, side and posterior views of a large specimen, $\times 1$, showing the median septum and broad interarea, figured specimen USNM 151799a; 25, interior of a brachial valve, $\times 1$, showing "brachial ridges," figured specimen USNM 151799o. [Cibolo Formation (Breccia Zone), AMNH 703.]

Scacchinella exasperata, new species: 26-28, Posterior, ventral, and side views of a large, complete specimen, $\times 1$, paratype USNM 151686b. [Lenox Hills Formation, USNM 705k.]

PLATE 273.—*Scacchinella*

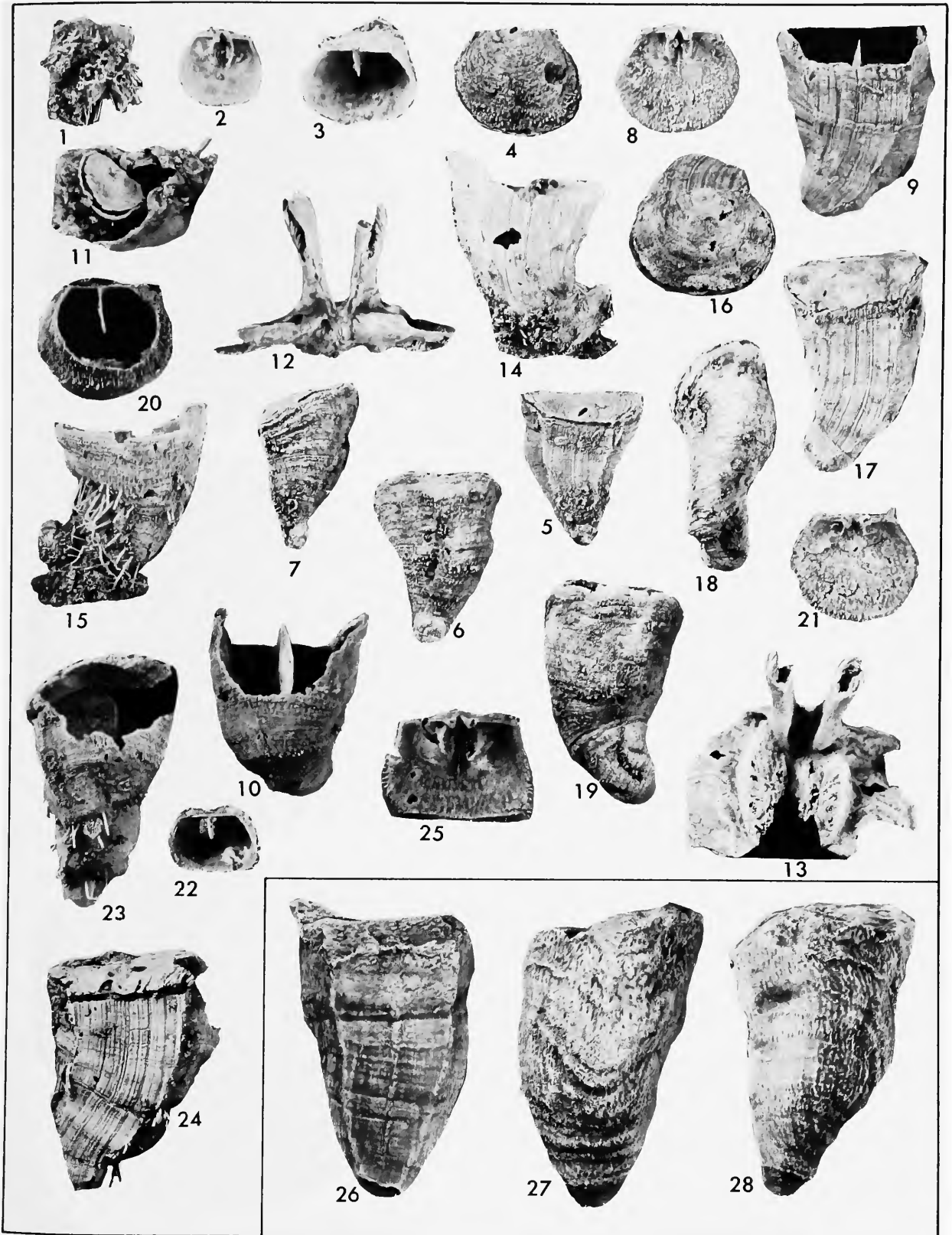


PLATE 274*Scacchinella*

Scacchinella titan, new species: 1, Dorsal view of a large specimen, showing the rounded convex brachial valve that forms a lid on the conical pedicle valve, \times 1, paratype USNM 147982b (for additional views of this specimen, see plate 276: figures 1-3); 2, 3, posterior and dorsal views of an unusually large fragmentary specimen, \times 1, paratype USNM 147978; 4, exterior of a large but decorticated brachial valve, \times 1, paratype USNM 147982m. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

5, Exterior of a silicified brachial valve, \times 1, paratype USNM 124180; 6, exterior of the preceding specimen, \times 2, showing some of the fine spines that originally covered the entire surface. [Skinner Ranch Formation (base), USNM 705a.]

PLATE 274.—*Scacchinella*

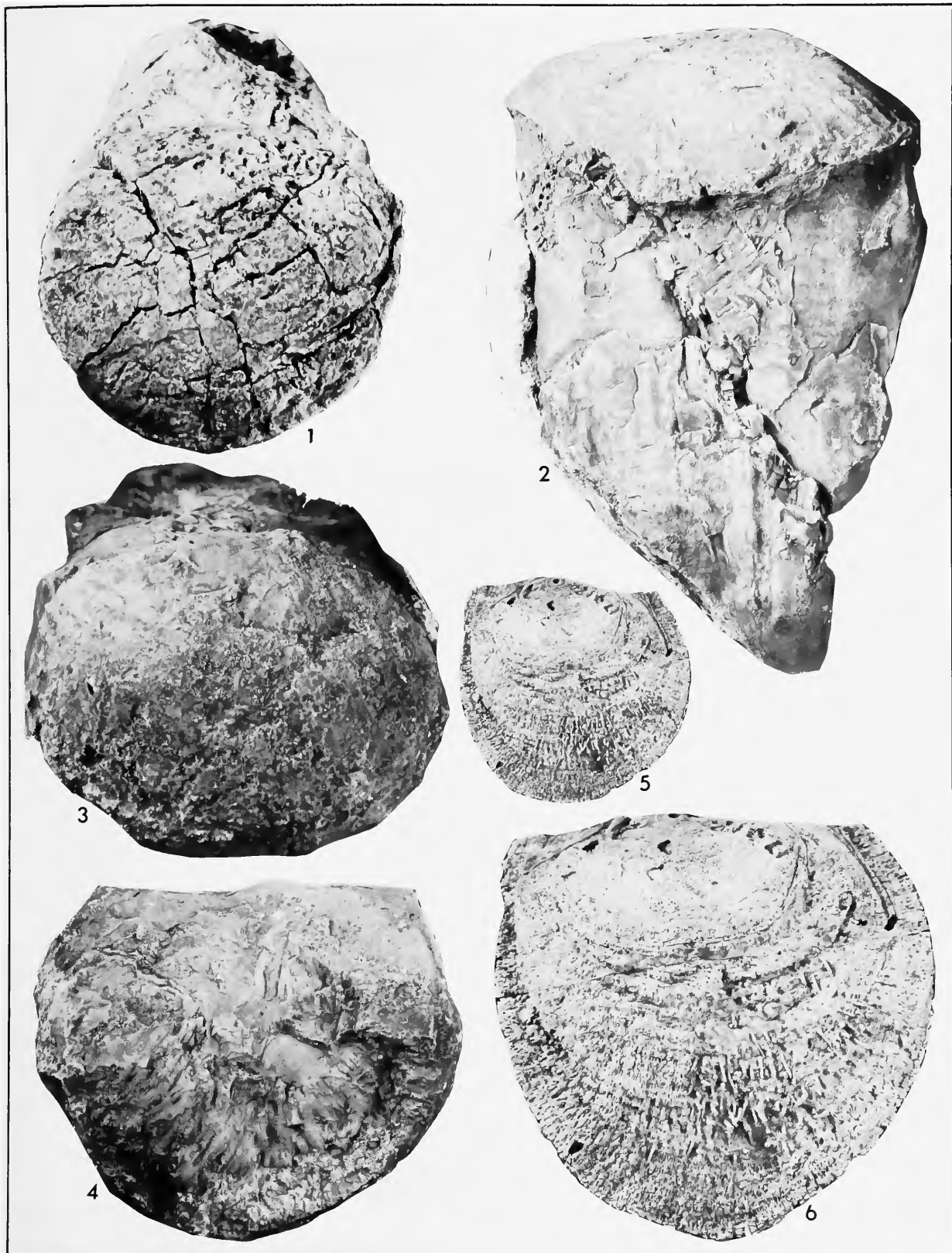


PLATE 275*Scacchinella*

Scacchinella titan, new species: 1-3, Side, posterior, and ventral views of a large individual, showing the irregular plates filling the pedicle valve, $\times 1$, paratype USNM 147982c; 4, posterior view of the largest specimen, $\times 0.5$, paratype USNM 147982a. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

PLATE 275.—*Scacchinella*

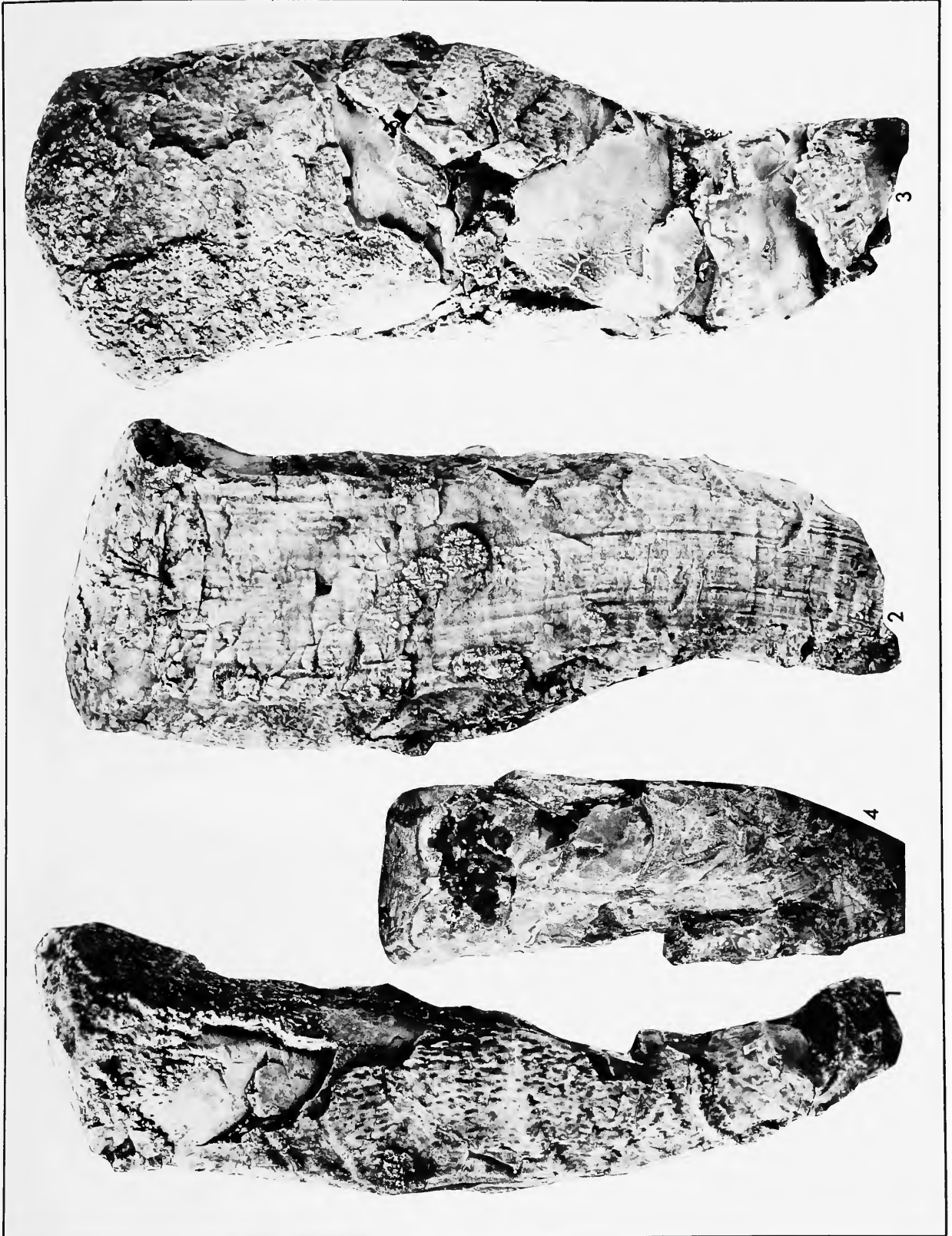


PLATE 276*Scacchinella*

Scacchinella titan, new species: 1-3, Ventral, posterior, and side views of one of the largest specimens, $\times 1$, paratype USNM 147982b (for the dorsal view of this specimen, see plate 274: figure 1). [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

PLATE 276.—*Scacchinella*

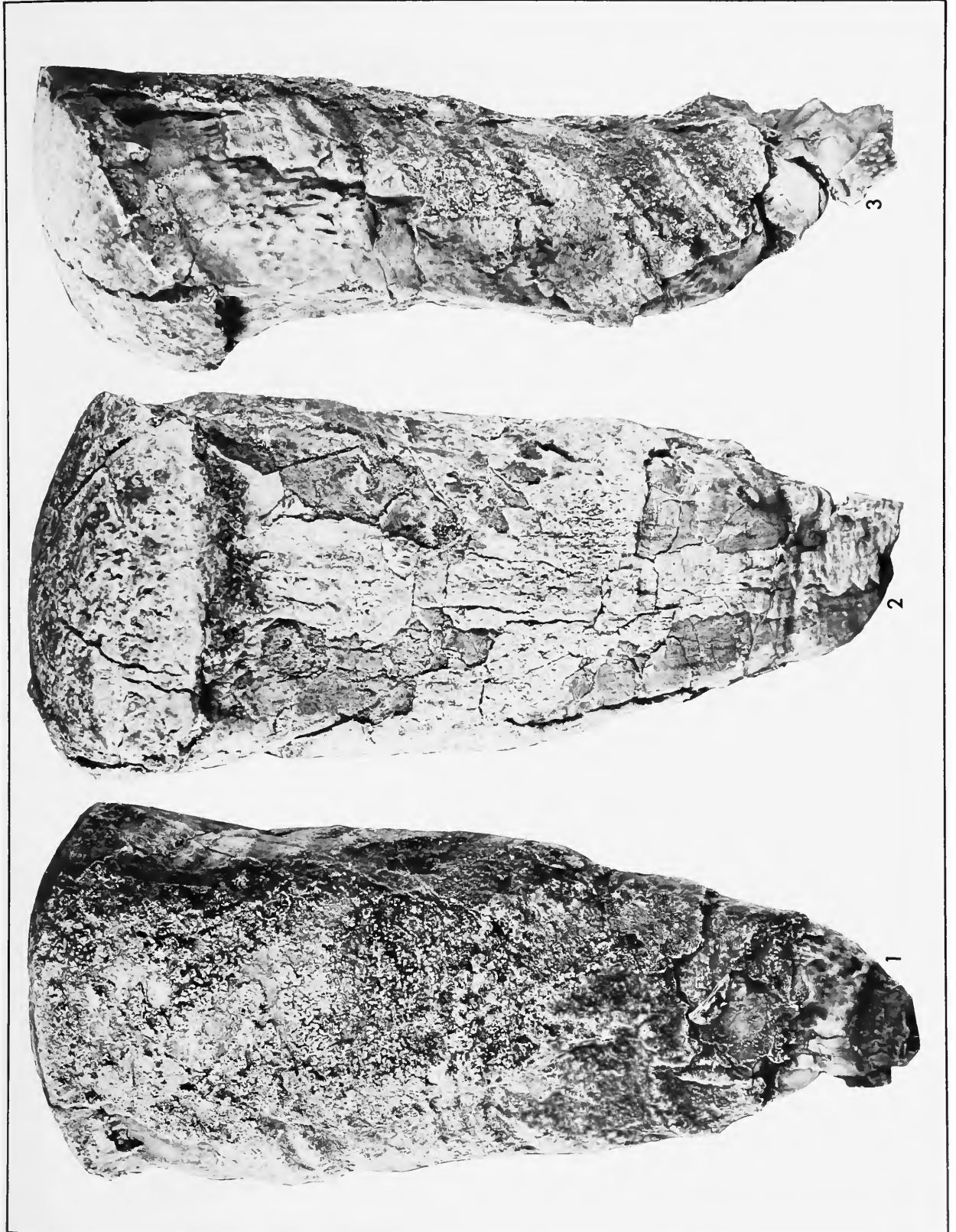


PLATE 277*Scacchinella*

Scacchinella titan, new species: 1–4, Side, dorsal, posterior, and ventral views of a large but short specimen, × 1, paratype USNM 147973. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

Scacchinella species: 5, Posterior part of the brachial valve of a badly worn, possibly reworked specimen, × 1, figured specimen USNM 153663. [Cathedral Mountain Formation, USNM 721u.]

PLATE 277.—*Scacchinella*

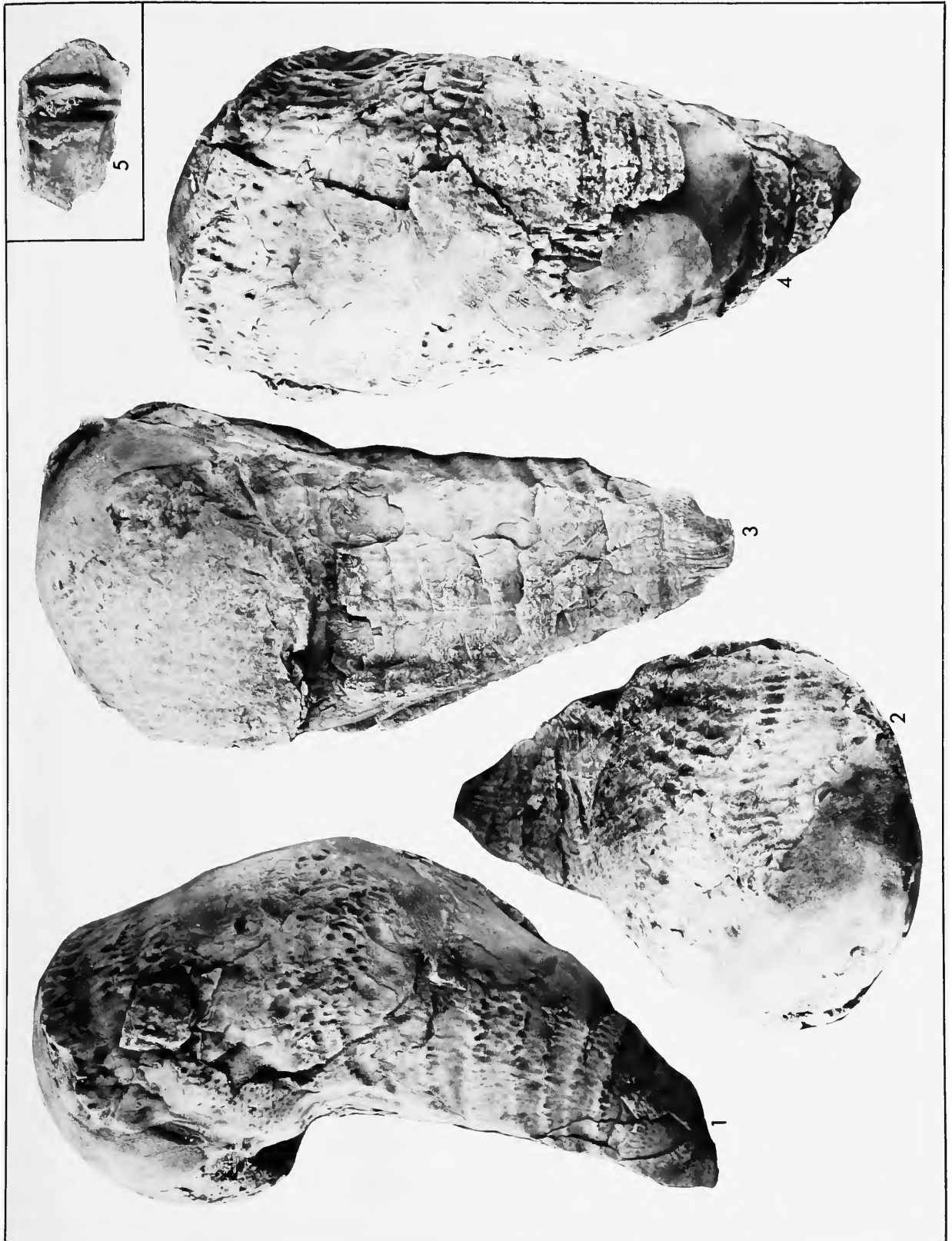


PLATE 278*Scacchinella*

Scacchinella titan, new species: 1, 2, Ventral and posterior views of a slender, young individual, $\times 1$, paratype USNM 153661b; 3, 4, ventral and posterior views of a juvenile specimen, $\times 1$, paratype USNM 153661e; 5, 6, posterior and side views of a strongly twisted young specimen, $\times 1$, paratype USNM 153661f; 7, 8, ventral and posterior views of another twisted, young specimen, $\times 1$, paratype USNM 153661d; 9, 10, posterior and side views of a large, misshapen specimen, $\times 1$, paratype USNM 153661a; 11–13, side, posterior, and ventral views of a young specimen having the form of a fishhook, $\times 1$, paratype USNM 153661g; 14, 15, posterior and ventral views of a young specimen with thin beak, $\times 1$, paratype USNM 153661c; 16–18, posterior, ventral, and side views of a nearly full-grown individual, $\times 1$, paratype USNM 153661h. [Skinner Ranch Formation (base), USNM 720c.]

19, Posterior view of a siliceous cast of the interior, showing the strong median septum as a long slit, $\times 1$, paratype USNM 153662. [Skinner Ranch Formation (base), USNM 705a.]

PLATE 278.—*Scacchinella*

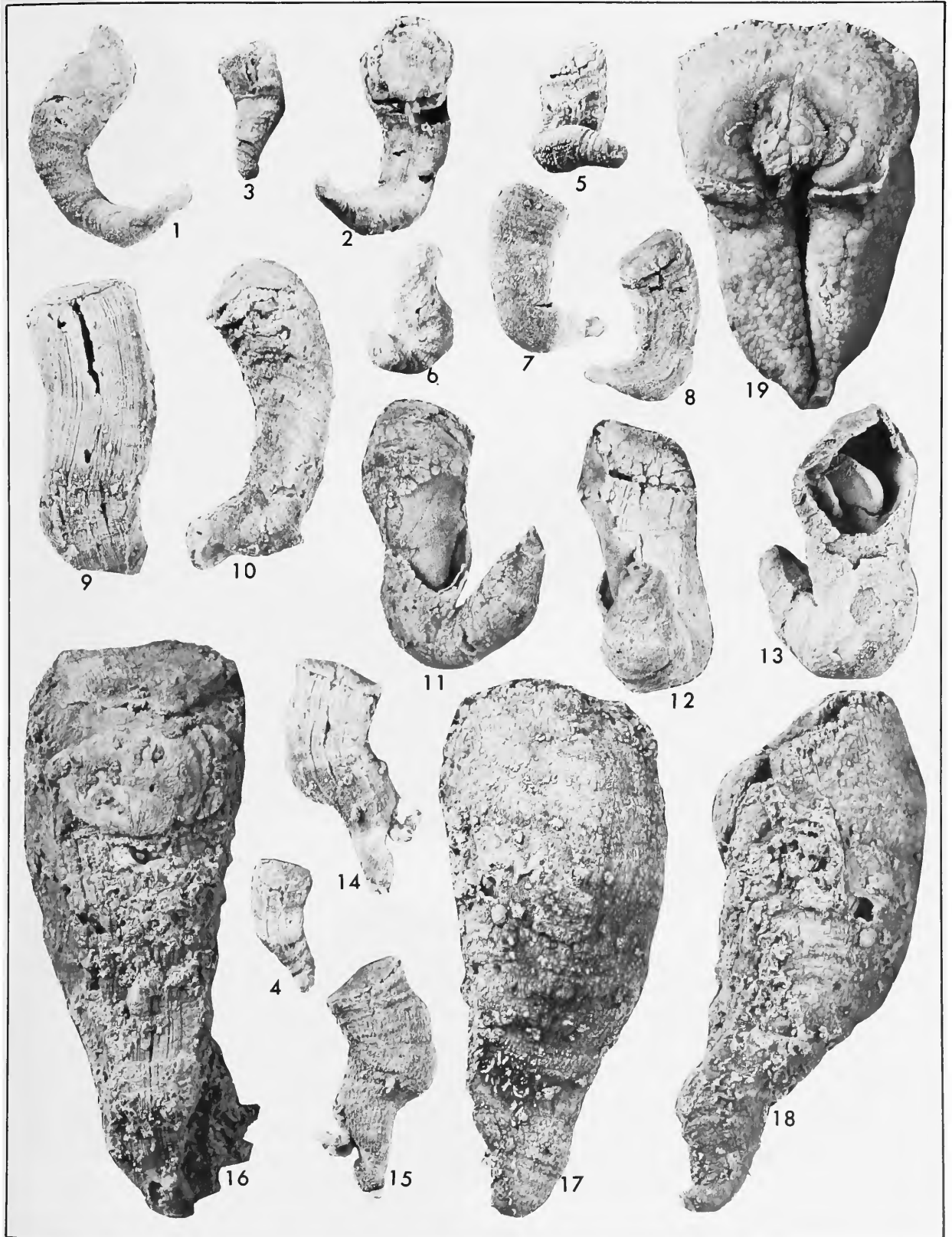


PLATE 279*Scacchinella*

Scacchinella titan, new species: 1-4, Ventral, side, dorsal, and posterior views of a large and perfect specimen, $\times 1$, holotype USNM 147923a; 5-7, posterior, ventral, and side views of the brachial valve of the holotype, $\times 1$, showing the large forked cardinal process and brevisseptum (for an additional view of the holotype, see plate 282: figure 19). [Skinner Ranch Formation (Decie Ranch Member), USNM 707w.]

8, 9, Side and posteriorly tilted views of another brachial valve, $\times 2$, showing the forked cardinal process and the elevated adductor attachments, paratype USNM 123919b. [Skinner Ranch Formation (base), USNM 705a.]

PLATE 279.—*Scacchinella*

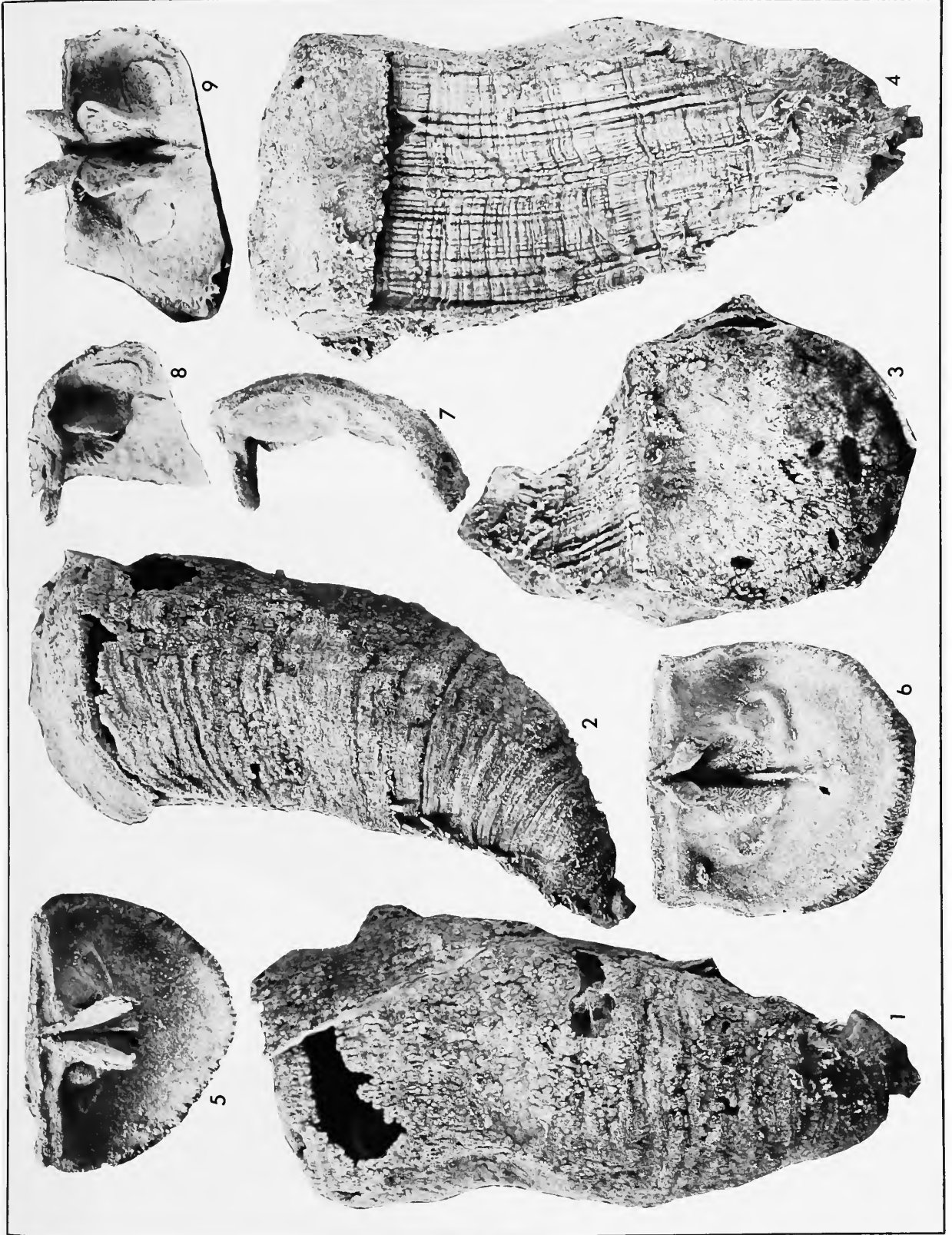


PLATE 280*Scacchinella*

Scacchinella titan, new species: 1, Posterior view of a long slender specimen, $\times 1$, showing a twisted beak, paratype USNM 153664a; 2, 3, posterior and anteroventral views, $\times 1$, showing the long median septum in the pedicle valve and the cardinal process of the brachial valve straddling it, paratype USNM 147923b; 4, 5, interior and posterior views of a brachial valve, $\times 1.5$, showing the slitlike myophores of the cardinal process, paratype USNM 123920h (for additional views, see plate 281: figures 3–5); 6, full view of another brachial valve, $\times 1$, showing thickening around adductor scars, paratype 123920e; 8, small specimen in posterior view, $\times 1$, showing the broad interarea, paratype USNM 123920g. [Skinner Ranch Formation (Decie Ranch Member), USNM 707w.]

7, Anteroventral view of a specimen from which the exterior has been removed to show the vesicular plates of the pedicle valve and their relationship to the septum, $\times 1$, paratype USNM 123919a. [Skinner Ranch Formation (base), USNM 705a.]

PLATE 280.—*Scacchinella*

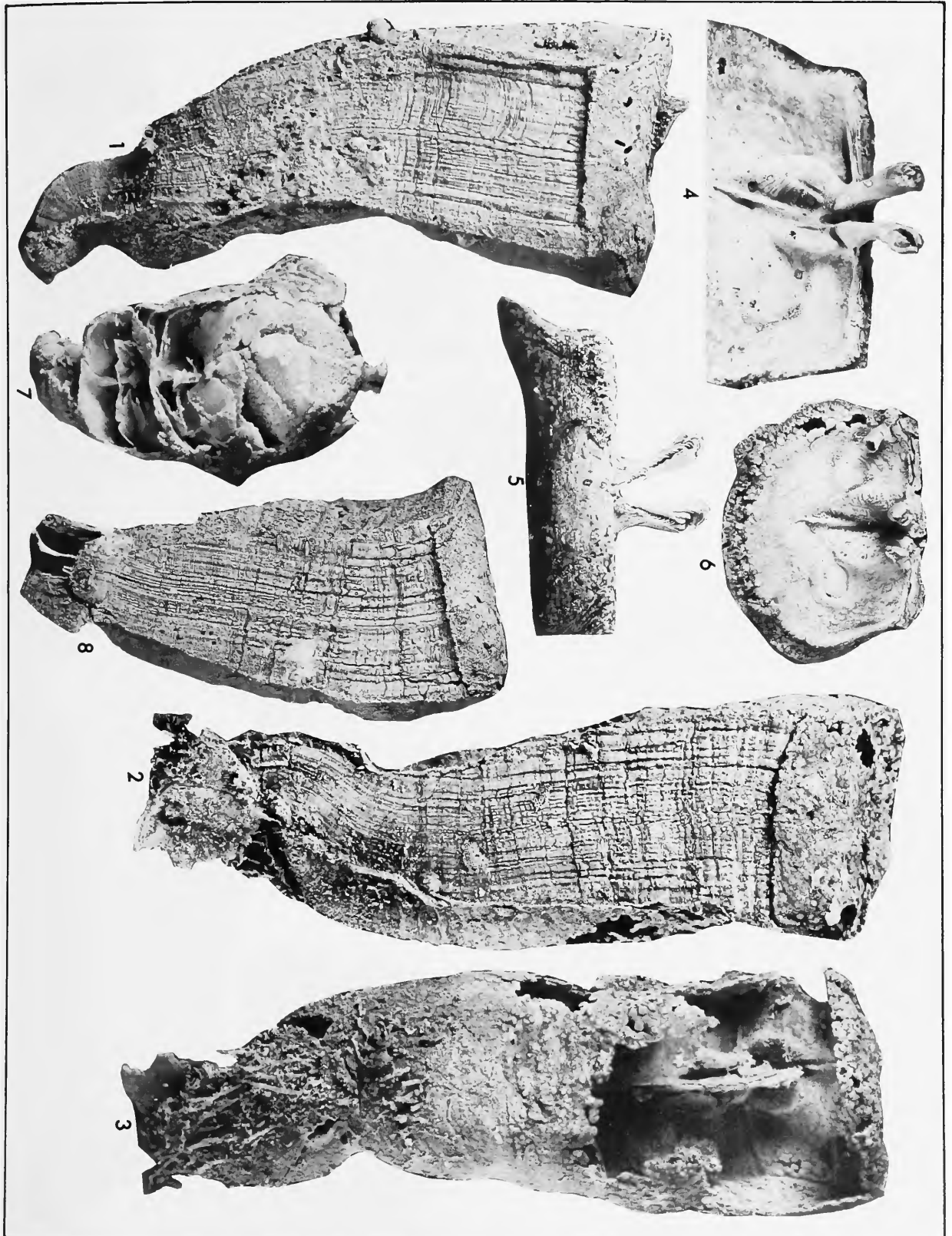


PLATE 281*Scacchinella*

Scacchinella titan, new species: 1, Partial side view of a small pedicle valve tilted to show the median septum, $\times 1$, paratype USNM 123920i; 2, anteroventral view of a specimen from which the ventral side has been stripped, $\times 1$, showing the long median septum of the pedicle valve and its relationship to the cardinal process, paratype USNM 123920a; 3-5, interior, side, and posterior views of the brachial valve, $\times 1$, paratype USNM 123920h (for enlarged views of this specimen, see plate 280: figures 4, 5); 6-8, side, posterior and ventral views of a small specimen with others attached, $\times 1$, showing mode of attachment and a brush of rhizoid spines, paratype USNM 123920d; 9, partial side view of a large specimen with window showing long median septum, $\times 1$, paratype 153664b; 10-12, ventral, posterior, and side views of a pedicle valve, showing the median septum protruding beyond the shell margin, $\times 1$, paratype USNM 147923c. [Skinner Ranch Formation (Decie Ranch Member), USNM 707w.]

13-15, Posterior, interior and side views of a young brachial valve, $\times 1$, paratype USNM 153665a; 16-18, side, interior and partial posterior views of a more fully grown specimen than the preceding, $\times 1$, paratype USNM 153665b. [Skinner Ranch Formation (base), USNM 705a.]

PLATE 281.—*Scacchinella*



PLATE 282*Scacchinella*

Scacchinella titan, new species: 1-4, Ventral, posterior, dorsal, and side views of a small specimen, $\times 1$, paratype USNM 147991d; 5-7, side, ventral, and posterior views of a half-grown individual, $\times 1$, paratype USNM 153666. [Skinner Ranch Formation (Decie Ranch Member), USNM 708q.]

8-10, Ventral, posterior, and side views of a young adult, $\times 1$, paratype USNM 153667; 11-14, side, dorsal, ventral, and posterior views, $\times 1$, of another small adult, paratype USNM 152685b; 15-17, dorsal, posterior, and ventral views of an immature specimen, $\times 1$, paratype USNM 152685c; 18, dorsal view of a very small individual, $\times 1$, paratype USNM 152685d. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707.]

19, Posterior view of the pedicle valve of the holotype USNM 147923a, $\times 1$, without the brachial valve to show the distal, rounded end of the median septum (for additional views of the holotype, see plate 279). [Skinner Ranch Formation (Decie Ranch Member), USNM 707w.]

PLATE 282.—*Scacchinella*

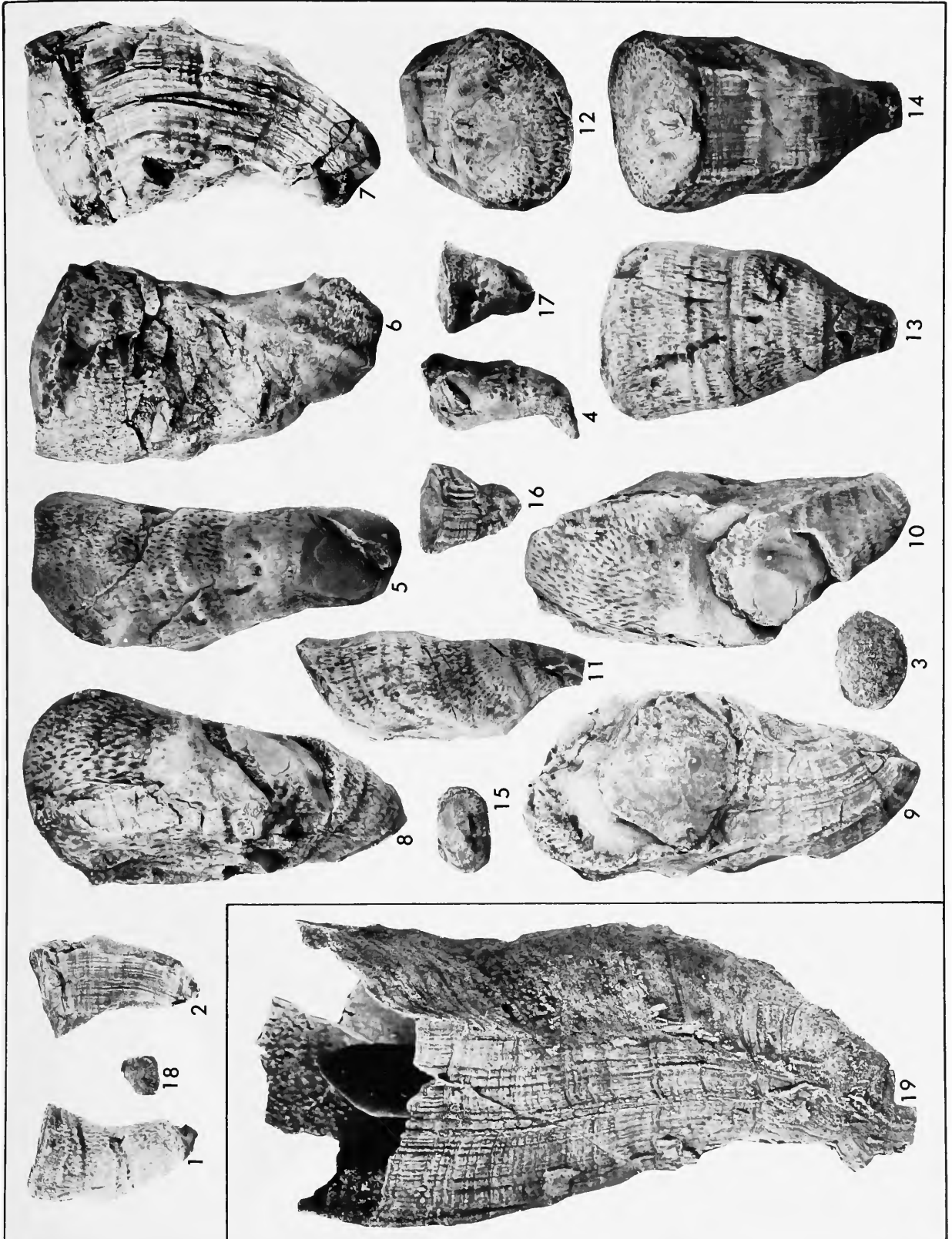


PLATE 283*Scacchinella*

Scacchinella titan, new species: 1-4, Interior, posterior, side, and posteriorly tilted views of a large brachial valve, × 1, paratype USNM 153665c. [Skinner Ranch Formation (base), USNM 705a.]

5-7, Ventral, side, and posterior views of an immature and much flattened specimen, × 1, paratype USNM 147991h; 8-11, dorsal, posterior, ventral, and side views of a young adult, × 1, paratype USNM 147991c; 12-14, posterior, side, and ventral views of an immature specimen, partially twisted, × 1, paratype USNM 147991e; 15, posterior of a middle-sized adult, × 1, paratype USNM 147991a. [Skinner Ranch Formation (Decie Ranch Member), USNM 708q.]

16-18, Ventral, posterior, and side views of a young adult, × 1, paratype USNM 153668b; 19-21, posterior, side, and ventral views of a large pedicle valve, × 1, paratype USNM 153668a. [Cibolo Formation (Breccia Zone), USNM 728k.]

22, Posterior view of a large adult, × 1, paratype USNM 152685a. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707.]

PLATE 283.—*Scacchinella*

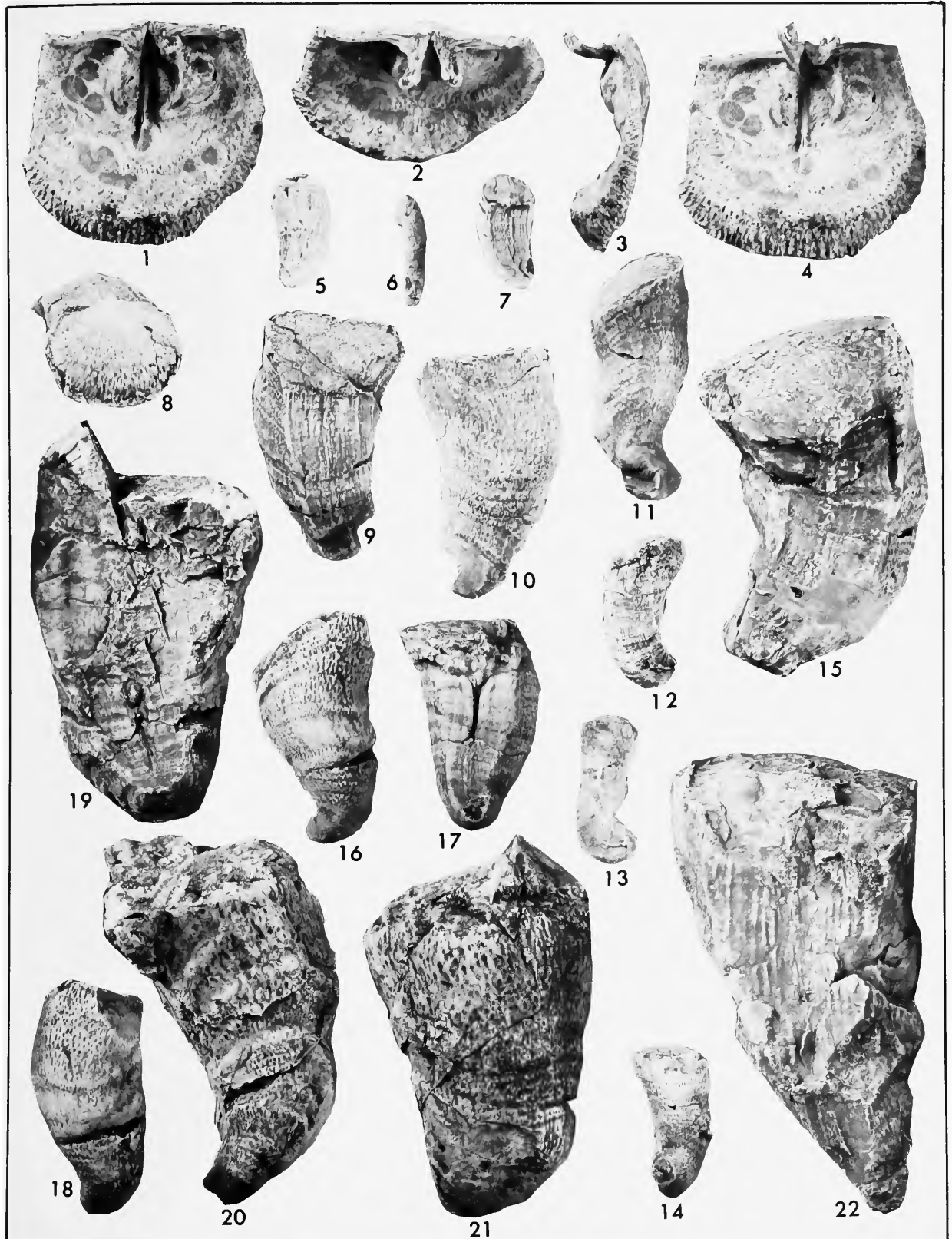


PLATE 284

Dyoros (Dyoros), Scacchinella, Sestropoma, and Acritosia

Dyoros (Dyoros) endospinus, new species: 1–5, Dorsal, anterior, posterior, ventral, and side views of a complete specimen, $\times 1$, paratype USNM 151917a; 6–10, dorsal, anterior, ventral, posterior, and side views of another complete specimen, $\times 1$, holotype USNM 151917c; 11–13, three brachial valve interiors, $\times 1.5$, showing spine development at the distal end of the median septum and the anderidia, paratypes USNM 151918a–c; 14, 15, pedicle valve interiors, $\times 1.5$, showing spiny development anterior to the diductor scars, paratypes USNM 151918d, e. [Road Canyon Formation, USNM 707e.]

Scacchinella titan, new species: 16, Dorsal view of a small flattish individual, $\times 2$, paratype USNM 153673a; 17, ventral view of an immature specimen, $\times 2$, paratype USNM 153673b; 18, posterior view of a larger, immature individual, $\times 2$, paratype USNM 153673c; 19, immature specimen with part of pedicle valve broken away and showing the median septum, $\times 2$, paratype USNM 153673d; 20, dorsal view of an immature specimen, showing presence of median septum by crack at beak, $\times 2$, paratype USNM 153673e; 21, posterior of an immature specimen, showing part of the median septum and the cardinal process, $\times 2$, paratype USNM 153673f; 22, anterior view of an immature form from which part of the pedicle valve has been stripped to show the median septum, $\times 2$, paratype USNM 153673g; 23, 24, small attached specimen in anteroventral view, $\times 2$, $\times 4$, showing the median septum, paratype USNM 153673j; 25, dorsal view of an immature but complete specimen, $\times 2$, paratype USNM 153673h; 26, same views of the preceding immature paratypes (except figure 23), showing natural size; 27–29, posterior, ventral, and side views of small adult, $\times 1$, showing dorsally directed ornament spines, paratype USNM 153673–l; 30, beak of preceding specimen, $\times 2$, showing the dorsally directed spines. [Cibolo Formation (Breccia Zone of Udden), USNM 738r.]

Sestropoma mexicanum, new species: 31–33, Side, dorsal, and posterior views of a large specimen, $\times 1$, holotype USNM 153675 [Bed 25, *Waagenoceras* zone, USNM 815.]

Acritosia teguliferoides (R. E. King): 34, 35, Dorsal and posterior views of a cluster of individuals attached to the brachial valve of *Scacchinella titan*, $\times 1$, hypotype USNM 153674. [Cibolo Formation (Breccia Zone of Udden), USNM 738r.]

PLATE 284.—*Dyoros (Dyoros)*, *Scacchinella*, *Sestropoma*, and *Acritosia*

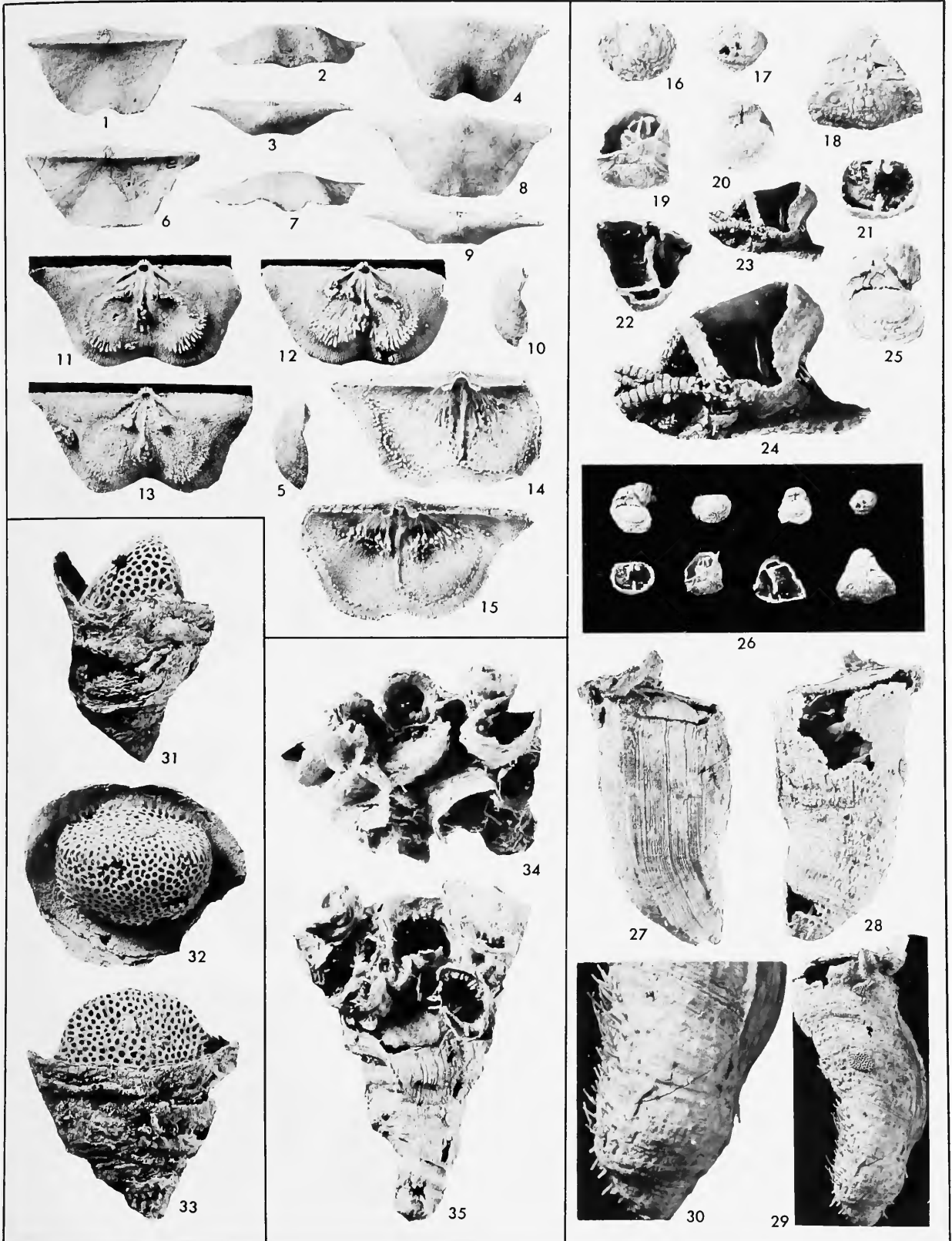


PLATE 285

Hercosia

Hercosia delicata, new species: 1, Small cluster showing an individual with reflected margin, $\times 1$, paratype USNM 154077a; 2, another small cluster, $\times 1$, paratype USNM 154077b; 3, dorsal view, showing brachial valve in place, $\times 1$, paratype USNM 154077c; 4–6, anterior, side, and dorsal views of a large pedicle valve, $\times 1$, paratype USNM 152699d; 7, 8, anterior and dorsal views of an attached specimen, $\times 1$, paratype USNM 154077e; 9–12, anterior, dorsal, side, and ventral views of a complete specimen, showing fine endospines on brachial valve, $\times 1$, paratype USNM 154077f; 13, 14, interior of the brachial valve, $\times 1$, $\times 2$, showing numerous long endospines, paratype USNM 154077g; 15–17, side, anterior, and dorsal views of a pedicle valve, $\times 1$, paratype USNM 152699e; 18, 19, side and anterior views of an immature, squat specimen, $\times 1$, paratype USNM 152699q; 20–22, side, dorsal, and anterior views of a complete specimen, $\times 1$, paratype USNM 152699f; 23–25, anterior, dorsal, and ventral views of a complete specimen, $\times 1$, holotype USNM 152699u; 26, interior of the brachial valve of the holotype, $\times 2$, showing cardinal process and endospines; 27, side view of an individual elongated by crowding, $\times 1$, paratype USNM 152699p; 28, small cluster, the open specimen revealing the median septum, $\times 1$, paratype USNM 154077j; 29, 30, specimens elongated by crowding, $\times 1$, paratypes USNM 152699n, o; 31, dorsal view of an immature specimen, $\times 4$, with both valves in place, paratype USNM 154078a; 32, dorsal view of a larger but immature specimen, $\times 4$, paratype USNM 154078c; 33, dorsal view of an immature specimen without brachial valve, $\times 4$, paratype USNM 154078b; 34, 35, posterior view, $\times 1$, and dorsal view, $\times 2$, showing the forked protective spines, paratype USNM 154106a; 36, dorsal view of a young specimen without protective spines, $\times 1$, paratype USNM 154077k; 37, side view of a broken specimen, showing the vesicular apical region and the bladelike septum, $\times 2$, paratype USNM 154106b; 38, view similar to the preceding and showing the bladelike median septum and aulacoterma, $\times 2$, paratype USNM 154106c. [Cathedral Mountain Formation, USNM 726o.]

PLATE 285.—*Hercosia*

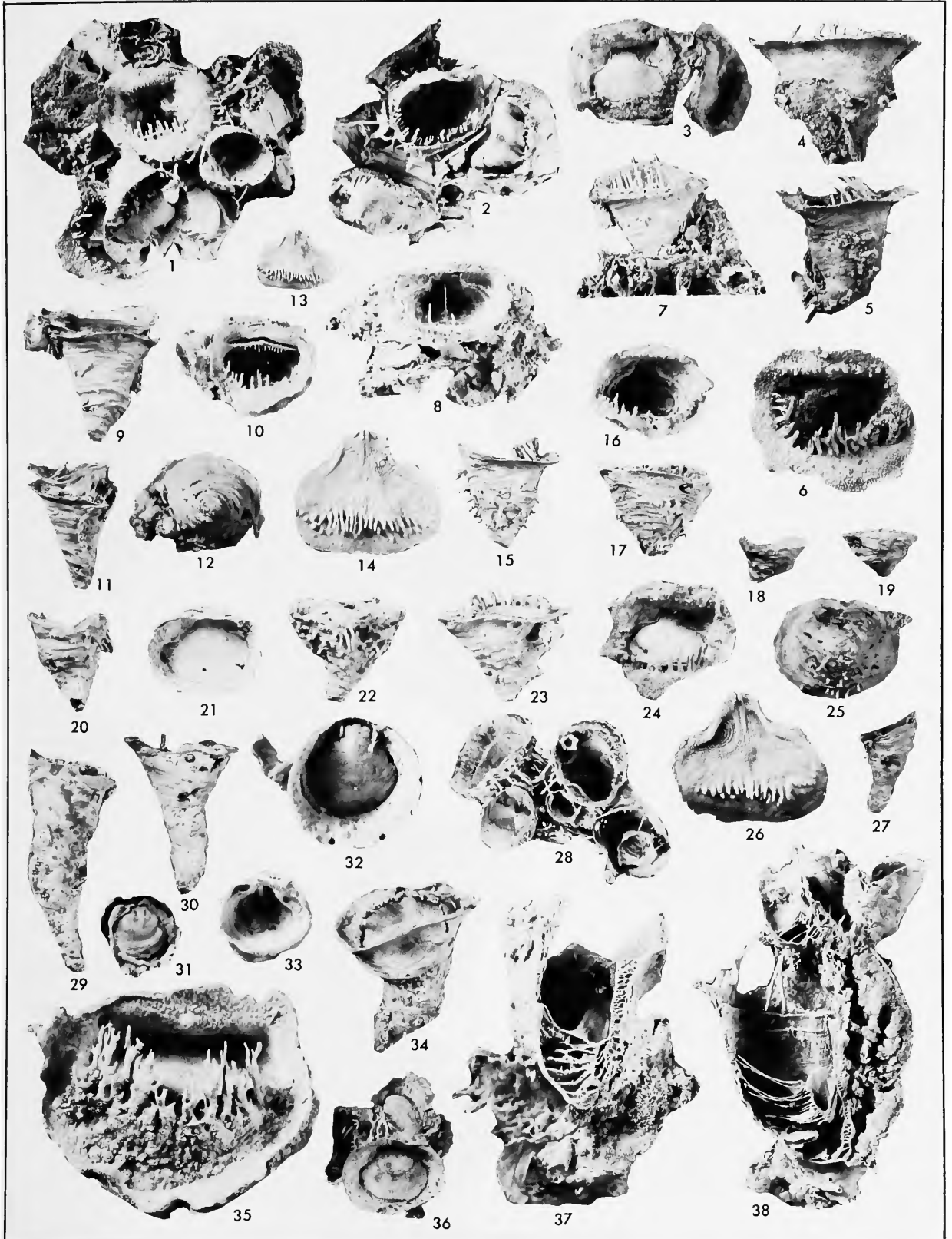


PLATE 286*Hercosia*

Hercosia uddeni (Böse): 1, Cluster, $\times 1$, showing crowding and elongation of individuals, hypotype USNM 154072a; 3, side view of a specimen attached to a fenestellid bryozoan, $\times 1$, hypotype USNM 154105; 7, 8, side and anterior views of a narrowly tapering specimen, $\times 1$, holotype USNM 151715e. [Cathedral Mountain Formation, USNM 702un.]

2, Cluster attached by rhizoid spines to a bryozoan, $\times 1$, hypotype USNM 151716. [Cathedral Mountain Formation, USNM 703a.]

4-6, Ventral, dorsal, and side views of a large cluster of adults, $\times 0.75$, showing great crowding of individuals, hypotype USNM 151622a. [Cathedral Mountain Formation, USNM 702.]

PLATE 286.—*Hercosia*

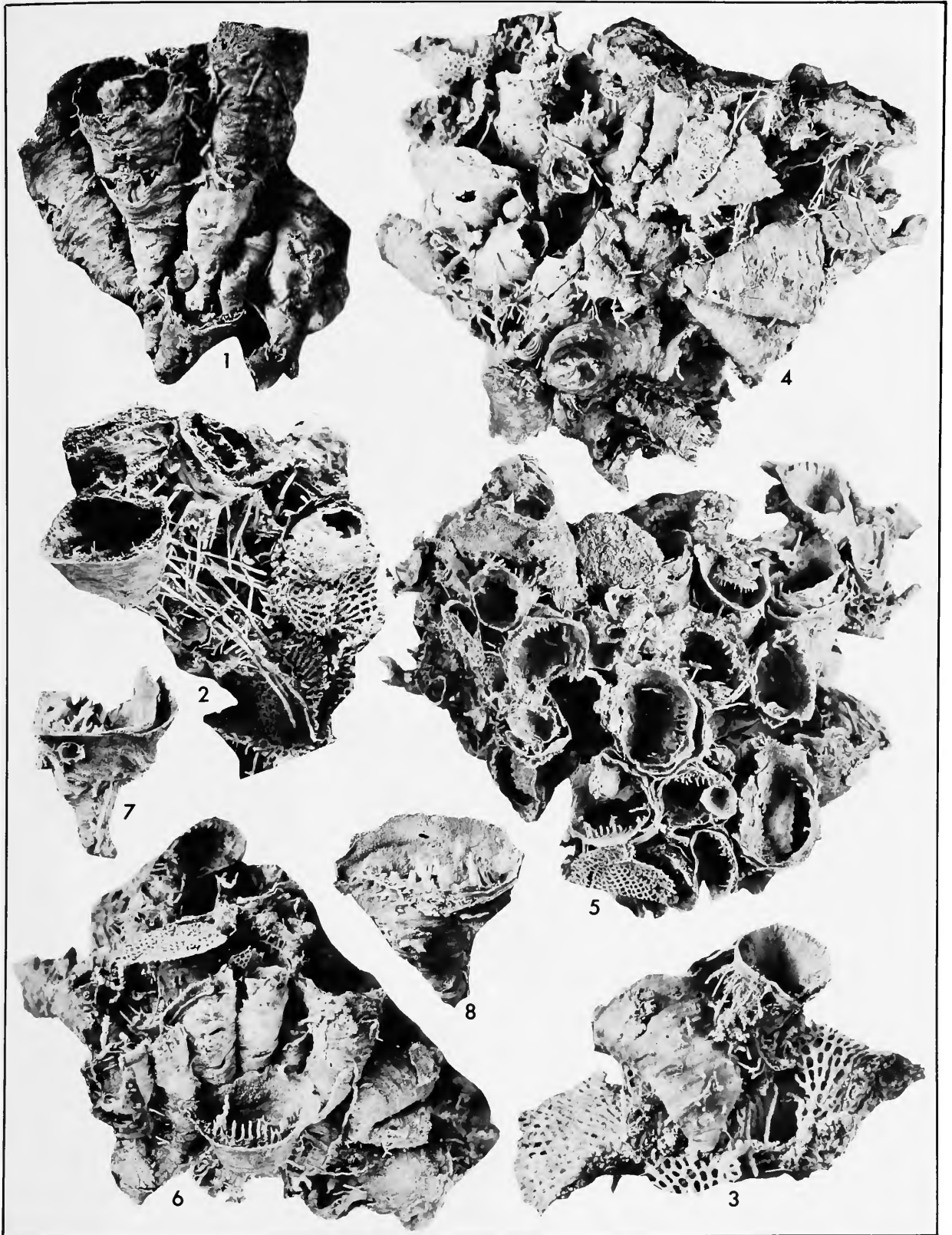


PLATE 287*Hercosia*

Hercosia uddeni (Böse): 1, Dorsal view of a cluster, $\times 1$, showing young individuals crowded among adults, hypotype USNM 154108c; 2, cluster of adults, $\times 1$, hypotype USNM 154108b; 3, 4, dorsal and partial anterior views of a young specimen attached to a fenestellid colony, $\times 1$, hypotype USNM 154108a; 5, anterior view of the preceding specimen, $\times 2$, showing mode of attachment. [Cathedral Mountain Formation, USNM 702un.]

6, Young specimens attached to a fenestellid colony, $\times 1$, hypotype USNM 151711. [Cathedral Mountain Formation, USNM 702ent.]

7, 8, Dorsal and anterior views of a small adult, $\times 2$, hypotype USNM 154107b; 9, partial anterior views of the preceding specimen, $\times 1$; 10, 11, dorsal and side views of a specimen with unusually large development of the marginal flange, $\times 1$, hypotype USNM 154532; 15, interior of an immature pedicle valve, showing the vestigial myocoelidium, $\times 2$, hypotype USNM 154107a. [Cathedral Mountain Formation, USNM 702.]

12-14, Dorsal, side, and ventral views of a cluster of large individuals, $\times 1$, hypotype USNM 154534. [Cathedral Mountain Formation, USNM 702-low.]

PLATE 287.—*Hercosia*

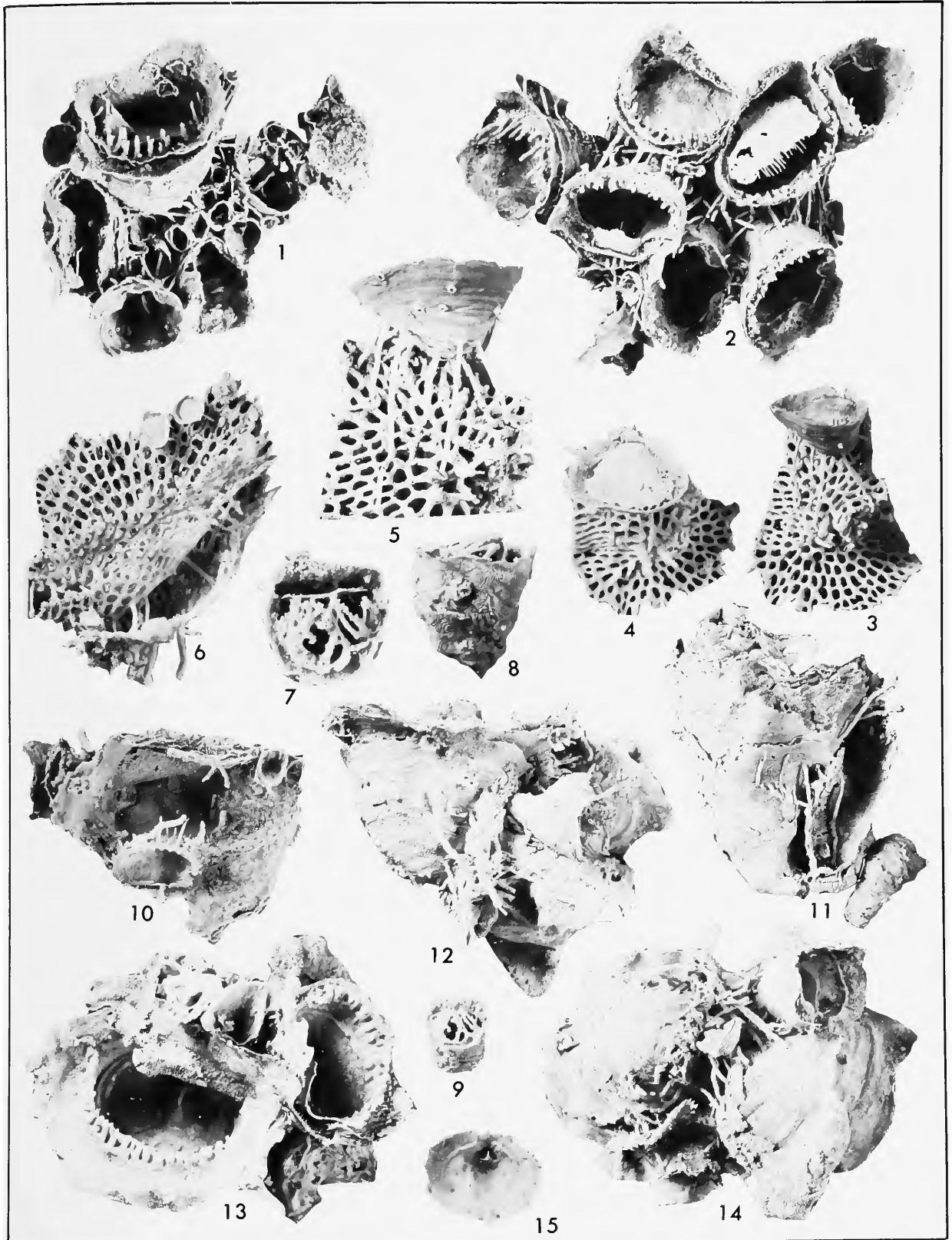


PLATE 288

Hercosia

Hercosia uddeni (Böse): 1, 2, Dorsal and anterior views of a young adult, $\times 1$, hypotype USNM 151715i; 13, 14, exterior, $\times 1$, and interior, $\times 2$, of the brachial valve, showing endospines and cardinal process, hypotype USNM 151714c; 15–18, ventral, anterior, side, and dorsal views of a pedicle valve, $\times 1$, hypotype USNM 151715k; 21, side view of a specimen elongated by close crowding, $\times 1$, hypotype USNM 154072d; 28, 29, ventral and dorsal views of a specimen having the brachial valve and showing its long endospines, $\times 1$, hypotype USNM 151715a; 30, 31, interior of the brachial valve of the preceding specimen, $\times 1$, $\times 2$, showing the endospines. [Cathedral Mountain Formation, USNM 702un.]

3, 4, Side and dorsal views of a small adult, $\times 1$, hypotype USNM 154074a; 5, dorsal view of the preceding specimen, $\times 2$, showing the protective spines; 6, anterior view of a small adult, $\times 1$, hypotype USNM 151706-l; 7, dorsal view of a specimen preserving the long protective spines over the aperture, $\times 2$, hypotype USNM 124141b; 8, side view of an elongated specimen with several layers of margin, $\times 1$, hypotype USNM 151706a; 9, side view of a specimen elongated by crowding, $\times 1$, hypotype USNM 151706q; 10, another specimen elongated by crowding, $\times 1$, hypotype USNM 154074b; 11, an immature specimen seen in side view, $\times 1$, hypotype USNM 154074c; 12, dorsal view of an immature individual, $\times 1$, hypotype USNM 154074d; 19, cluster of immature specimens, $\times 1$, hypotype USNM 154074e; 20, anterior view of a large adult with rhizoid spines, $\times 1$, hypotype USNM 151706i; 22–25, dorsal, ventral, side, and anterior views of a complete specimen, $\times 1$, hypotype USNM 151706k; 34, pedicle valve, showing the long, bladelike median septum, $\times 1$, hypotype USNM 154074f; 35, another pedicle valve, broken to show the median septum, $\times 1$, hypotype USNM 154074g. [Cathedral Mountain Formation, USNM 702.]

26, 27, Anterior and dorsal views of a young specimen, showing the vestigial myocoelidium, $\times 1$, hypotype USNM 151713a; 32, 33, broken pedicle valve, $\times 1$, $\times 2$, showing the median septum and the growth track of the hinge, hypotype USNM 154075. [Cathedral Mountain Formation, USNM 702-low.]

PLATE 288.—*Hercosia*

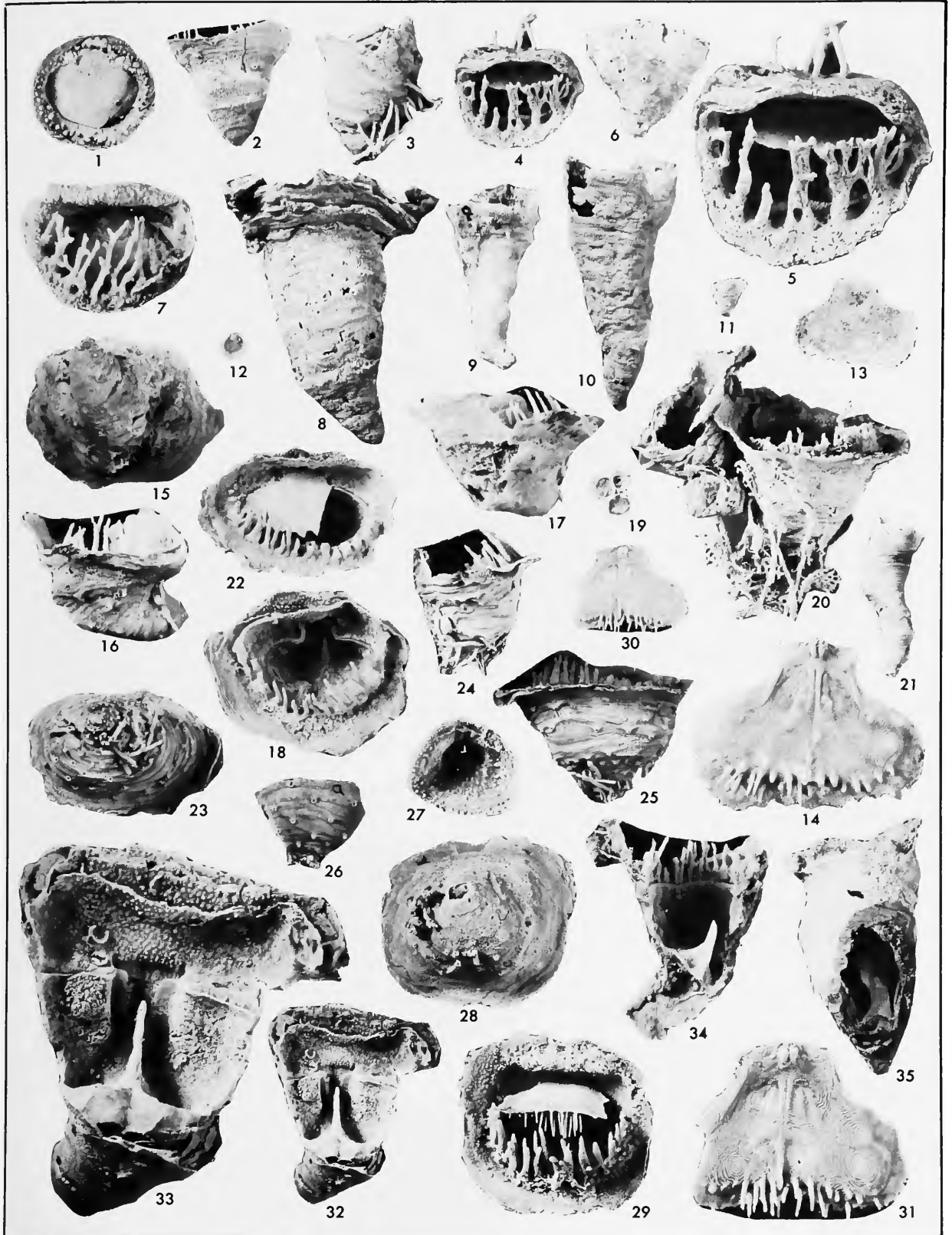


PLATE 289

Hercosestria and *Hercosia*

Hercosestria cribrosa Cooper and Grant: 1, 2, Exterior of a brachial valve, $\times 2$, $\times 1$, showing the fine spines on the exterior and some spat, hypotype USNM 154070h; 3, 4, interior of a brachial valve preserving the small endospines, $\times 1$, $\times 2$, hypotype USNM 154070i; 5, interior of a wide brachial valve, $\times 2$, hypotype USNM 154070j; 6-8, interior and exterior, $\times 1$, and interior, $\times 2$, of a brachial valve, showing numerous endospines, hypotype USNM 154070k; 9, 10, exterior, $\times 1$, and interior, $\times 2$, of another brachial valve with few endospines, hypotype USNM 154070-l; 11-13, interior and exterior, $\times 1$, and interior, $\times 2$, of a brachial valve with only vestiges of endospines, hypotype USNM 154070m; 14, 15, exterior, $\times 1$, and interior, $\times 2$, of a brachial valve having a single row of endospines, hypotype USNM 154070n; 18, interior of a brachial valve with two rows of endospines, $\times 2$, paratype USNM 153199; 23, side view of a victim to crowding, $\times 1$, hypotype USNM 154070o; 24, 25, dorsal and anterior views of a young specimen strongly contrasting in shape to the one in the preceding view, $\times 1$, hypotype USNM 154070p. [Road Canyon Formation (base), USNM 702c.]

16, Large cup, in side view, having numerous rhizoid spines, $\times 1$, hypotype USNM 151806a; 17, side view of another pedicle valve, showing a stage of arrested growth, $\times 1$, hypotype USNM 151806b. [Road Canyon Formation, USNM 719x.]

19, Lateral view of a small pedicle valve, showing tiered marginal flanges, $\times 1$, hypotype USNM 154067i; 20, another pedicle valve with tiered marginal flanges and an unusually large mass of rhizoid spines, $\times 1$, hypotype USNM 154067h; 21, dorsal view of a specimen attached to the brachial valve of *Edriostege*, $\times 1$, hypotype USNM 154071; 22, interior of a brachial valve having two rows of endospines, $\times 1$, hypotype USNM 154067j. [Road Canyon Formation (base), USNM 703a.]

Hercosia uddeni (Böse): 26, 27, Side views of two pedicle valves attached to *Lepidospirifer*, $\times 1$, hypotype USNM 124142a; 30, interior of a brachial valve, $\times 2$, showing long endospines in two rows, hypotype USNM 154076a; 31, interior of another brachial valve, $\times 2$, showing the endospines, hypotype USNM 154076b; 32, interior of a brachial valve, $\times 2$, showing strongly dendritic adductor scars, hypotype USNM 124142b; 33, dorsal view of a specimen with the brachial valve in feeding (?) position, $\times 2$, hypotype USNM 124144. [Cathedral Mountain Formation, USNM 702.]

28, 29, Two side views of a small cluster, showing rhizoid spine attachment and long, slender protective spines, $\times 1$, hypotype USNM 151714d. [Cathedral Mountain Formation, USNM 702un.]

PLATE 289.—*Hercosestria* and *Hercosia*

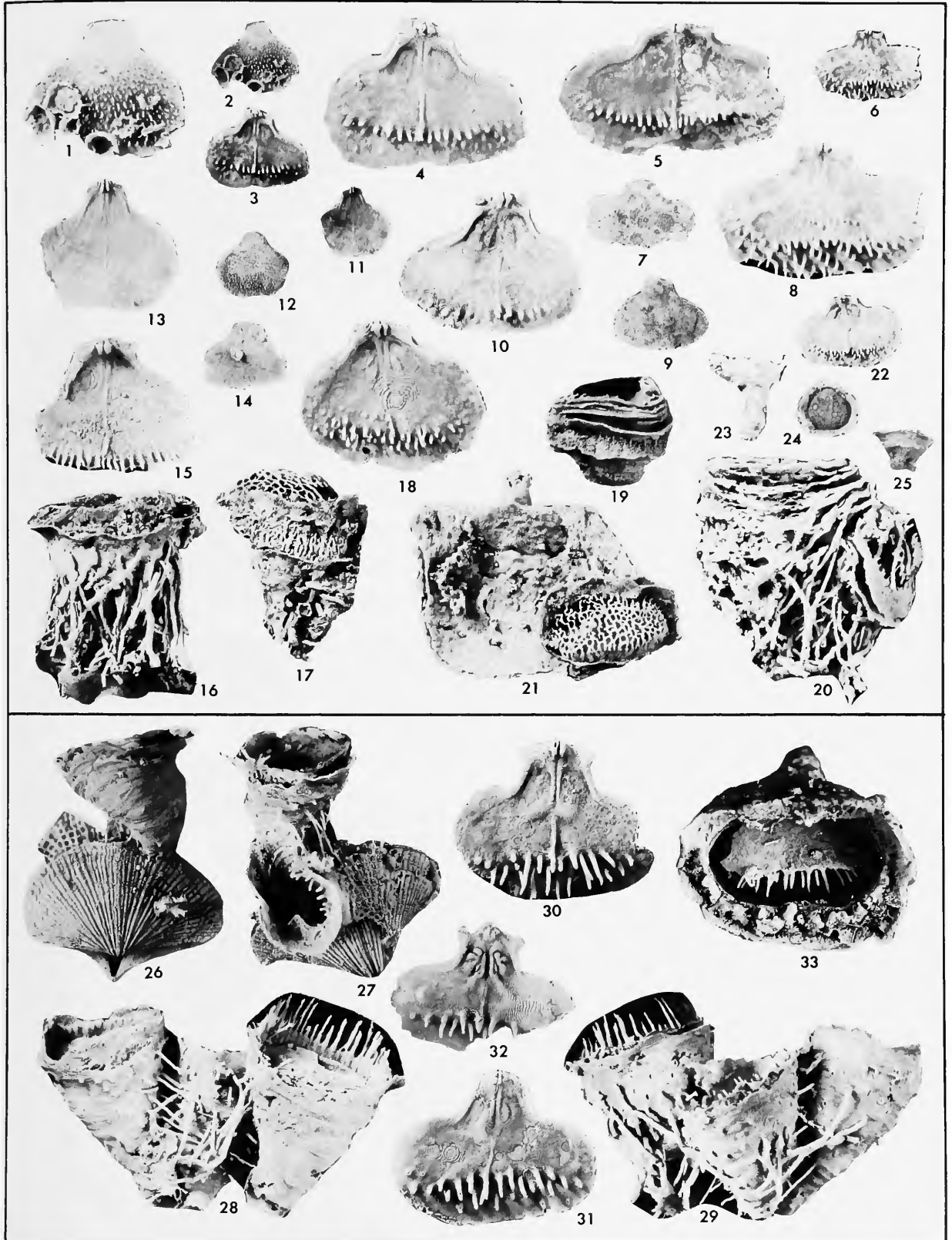


PLATE 290

Hercosia and *Hercosestria*

Hercosia uddeni (Böse): 1-3, Dorsal, posterior, and side views of an adult with numerous rhizoid spines, $\times 1$, hypotype USNM 151714a; 4, side view of a specimen attached to a fenestellid, $\times 1$, hypotype USNM 154072c; 5-7, anterior, side, and dorsal views of a pedicle valve, $\times 1$, showing its attachment spines, hypotype USNM 154072b; 8, 9, side and dorsal views of a large adult with numerous spat on the dorsal side, $\times 1$, hypotype USNM 151714b; 10, side view of a broken specimen, showing the brachial valve in place and the median septum, $\times 1$, hypotype USNM 154072e; 13, 14, anterior and dorsal views of an immature specimen not yet having developed its protective spines, $\times 1$, hypotype USNM 151715-1; 17, 18, dorsal and side views of a specimen elongated by crowding, $\times 1$, hypotype USNM 151715g; 19, side view of two elongated specimens, $\times 1$, hypotype USNM 151715h. [Cathedral Mountain Formation, USNM 702un.]

11, 12, Anterior and dorsal views of an immature individual $\times 1$, hypotype USNM 151705k. [Cathedral Mountain Formation, USNM 702.]

15, 16, Dorsal and side views of a large adult, $\times 1$, hypotype USNM 151710b. [Cathedral Mountain Formation, USNM 702b.]

Hercosestria laevis, new species: 20, Dorsal view of a pedicle valve, showing the strong, bladelike median septum, $\times 1$, paratype USNM 154073a; 21, specimen from which part of the cone has been stripped to show the brachial valve in position, $\times 1$, paratype USNM 154073b; 22, dorsal view of an immature pedicle valve, $\times 1$, showing vestigial myocoelidium, paratype USNM 154073c; 23, 24, interior of two broken pedicle valves, showing the median septum and hinge region, $\times 1$, paratypes USNM 154073d, e; 25-28, anterior, side, dorsal, and ventral views of a complete specimen, $\times 1$, paratype USNM 154073f; 29-32, dorsal, ventral, side, and anterior views of another complete specimen, $\times 1$, paratype USNM 154073g; 33-36, ventral, anterior, side, and dorsal views of a young individual, $\times 1$, paratype USNM 154073h; 37-40, anterior, side, dorsal, and ventral views of a large specimen, $\times 1$, holotype USNM 154073i; 41, 42, interior of the brachial valve, $\times 1$, $\times 2$, showing cardinal process and endospines, paratype USNM 154073j. [Cathedral Mountain Formation USNM 721u.]

PLATE 290.—*Hercosia* and *Hercosestria*

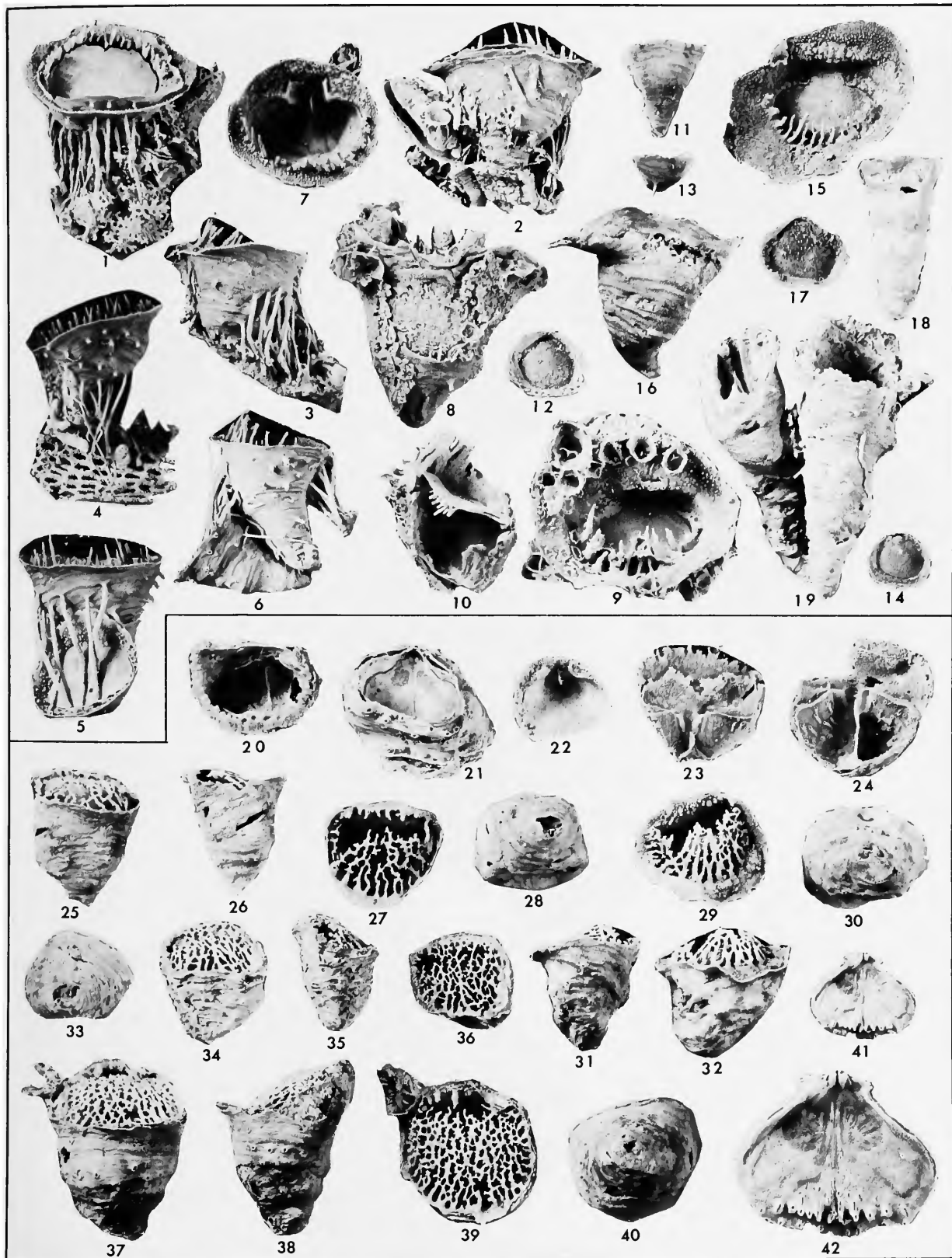


PLATE 291*Hercosestria*

Hercosestria cribrosa Cooper and Grant: 1, Side view of an adult attached to a bryozoan \times 1, showing large number of anchor spines, hypotype USNM 154067a. [Road Canyon Formation (base), USNM 703a.]

2, 3, Dorsal and anterior views of a cluster with apices convergent to an attachment object, \times 1, hypotype USNM 154068a; 4, dorsal view of a pedicle valve, \times 1, showing the bladelike median septum, hypotype USNM 154068b; 5, dorsal view of a specimen with brachial valve in place and preserving part of the coccidium, \times 1, hypotype USNM 154068e; 6, 7, ventral and dorsal views of another cluster with approximate apices, \times 1, hypotype USNM 154068f; 8, ventral view of a small cluster, showing mode of attachment, \times 1, hypotype USNM 154068d; 9, ventral view of a cluster, showing rhizoid spines and approximate apices, \times 1, hypotype USNM 154068c. [Road Canyon Formation (base), USNM 702c.]

10, Interior of a pedicle valve, \times 2, showing the median septum, hypotype USNM 154069. [Road Canyon Formation, USNM 723x.]

PLATE 291.—*Hercosestria*

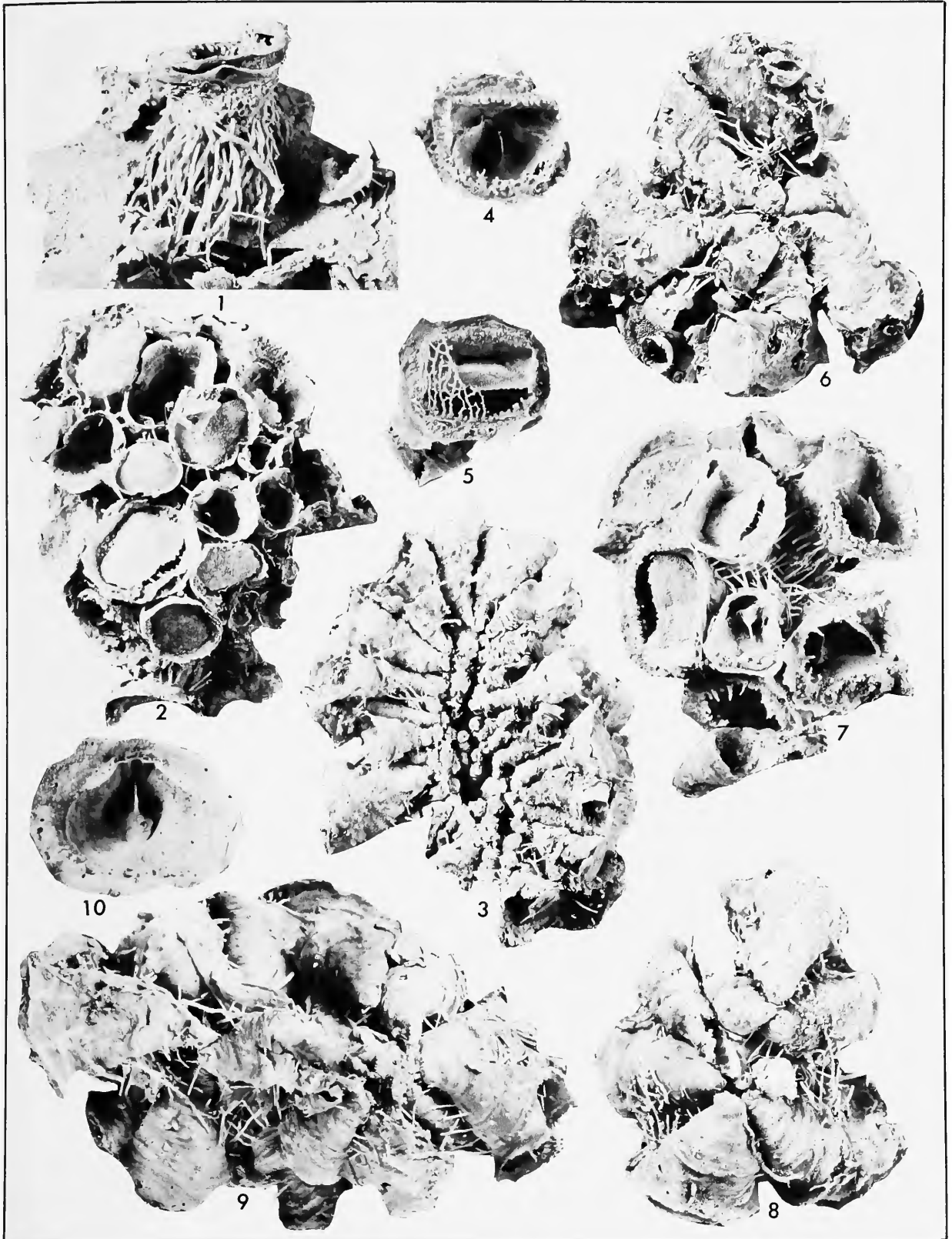


PLATE 292

Hercosestria

Hercosestria cribrosa Cooper and Grant: 1, Specimen from which coscinidium has been removed, showing an immature *Composita* in its growth position, \times 1, hypotype USNM 154533; 2, specimen with coscinidium in place but showing a captive *Composita*, \times 1, hypotype USNM 151802d; 3, small specimen attached to a large *Composita* by numerous rhizoid spines, \times 1, hypotype USNM 151802e; 4, anterior view of an adult with long rhizoid spines, \times 1, hypotype USNM 154068m; 5, 6, dorsal and posterior views of an immature specimen with no trace of coscinidium, \times 1, hypotype USNM 154068r; 7, 8, dorsal and posterior views of a specimen with coscinidium, \times 1, hypotype USNM 154068p; 9, 10, side and dorsal views of another specimen, \times 1, showing the brachial valve, hypotype USNM 154068q; 13, cluster consisting of one adult and several young, \times 1, paratype USNM 154068n; 14, 15, dorsal and tilted views of a pedicle valve, showing the median septum, \times 1, hypotype USNM 154068s; 16, dorsal view of a specimen, showing brachial valve in feeding (?) position, \times 1, hypotype USNM 154068o; 17, dorsal view of a cluster of young specimens not having formed their coscinidium, \times 1, hypotype USNM 151802f; 18, dorsal view of a specimen tilted to show the median septum, \times 1, hypotype USNM 154068t; 19, 20, dorsal and side views of immature, elongated specimen, a victim of crowding, \times 1, hypotype USNM 154068u; 21, side view of an elongated adult, \times 1, hypotype USNM 154068v; 22, 23, posterior and anterior views of an immature individual, \times 1, hypotype USNM 154068x; 24, side view of a narrowly elongated specimen having lived in crowded conditions, \times 1, hypotype USNM 154068w; 28, 29, anterior and dorsal views of a squat specimen, \times 1, hypotype USNM 154068y; 32, immature specimen, the victim of crowding, narrowly pinched below but broadening away from the base, \times 1, hypotype USNM 154070a; 33, 34, dorsal and anterior views of a young specimen prior to forming its coscinidium, \times 1, hypotype USNM 154070b; 35, another misshapen specimen, \times 1, hypotype USNM 154070c; 38, 39, anterior and dorsal views of a small specimen deformed by crowding, \times 1, hypotype USNM 154070d; 40, interior of a broken specimen showing the brachial valve in place and the large, bladelike median septum, \times 2, hypotype USNM 154070f; 41, immature pedicle valve showing vestigial myocoelidium, \times 4, hypotype USNM 154070e; 43, dorsal view of an immature pedicle valve showing the incipient myocoelidium, \times 1, hypotype USNM 154070g. [Road Canyon Formation (base), USNM 702c.]

11, 12, Dorsal and side views of a small individual attached to a spiriferinid, \times 1, hypotype USNM 154067c; 25, 26, cluster of young on a crinoid stem (now gone) and some specimens, showing the incipient myocoelidium, \times 1, hypotype USNM 154067b; 27, interior of a pedicle valve, \times 2, showing the median septum, hypotype USNM 154067d; 30, interior of an elongated, broken pedicle valve, showing the median septum, \times 1, hypotype USNM 154067e; 31, broken specimen, showing interior of the brachial valve in place, \times 1, hypotype USNM 154067k; 36, 37, anterior view, \times 2, \times 1, showing broken specimen revealing the long median septum, hypotype USNM 155130c; 42, another broken pedicle valve, \times 1, showing the median septum, \times 1, hypotype USNM 154067f; 44, dorsal view of a broken pedicle valve, showing the median septum, \times 1, hypotype USNM 154067g. [Road Canyon Formation (base), USNM 703a.]

PLATE 292.—*Hercosestria*

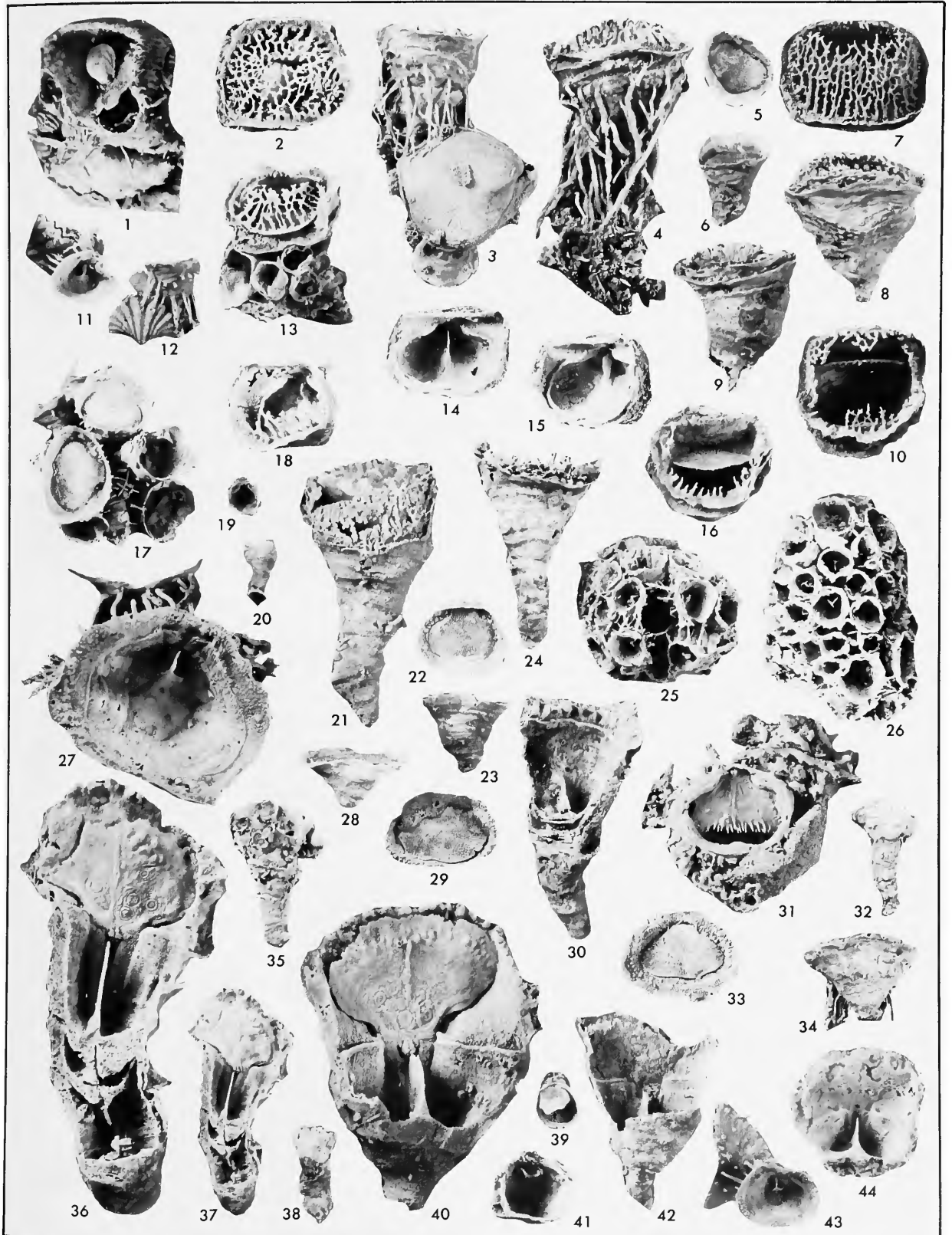


PLATE 293*Hercosestria*

Hercosestria cribrosa Cooper and Grant: 1, 2, Dorsal, and anterior views of a complete specimen with well preserved coscinidium, $\times 1$, holotype USNM 151804; 3, dorsal view of the preceding specimen, $\times 1.5$; 7-10, dorsal, anterior, side, and ventral views of a complete specimen, $\times 1$, hypotype USNM 155130a; 13-16, dorsal, anterior, ventral, and side views of another complete specimen, $\times 1$, hypotype USNM 155130b. [Road Canyon Formation (base), USNM 703a.]

4, Dorsal view of a small cluster, showing rhizoid spines, $\times 1$, hypotype USNM 154004; 5, 6, dorsal and side views of a small elongated specimen, $\times 1$, hypotype USNM 154068g; 11, 12, dorsal (apertural) and side views of an adult attached to a *Composita*, $\times 1$, hypotype USNM 154068h; 17, posterior view of an attached specimen, showing numerous spat, $\times 1$, hypotype USNM 151802a; 18, side view of a specimen distorted by impinging against a bryozoan, $\times 1$, hypotype USNM 154068i; 19, 20, anterior and dorsal views of a squat specimen, $\times 1$, hypotype USNM 154068j; 21, 22, dorsal and anterior views of a specimen with numerous rhizoid spines, $\times 1$, hypotype USNM 154068k; 23, a cluster of immature specimens, $\times 1$, hypotype USNM 154068-l; 24, 25, pelecypod shell fragment with numerous immature *Hercosestria*, $\times 1$, $\times 2$, hypotype USNM 151802b; 26, dorsal view of small specimens attached with corals, $\times 1$, hypotype USNM 151802c. [Road Canyon Formation (base), USNM 702c.]

PLATE 293.—*Hercosestria*

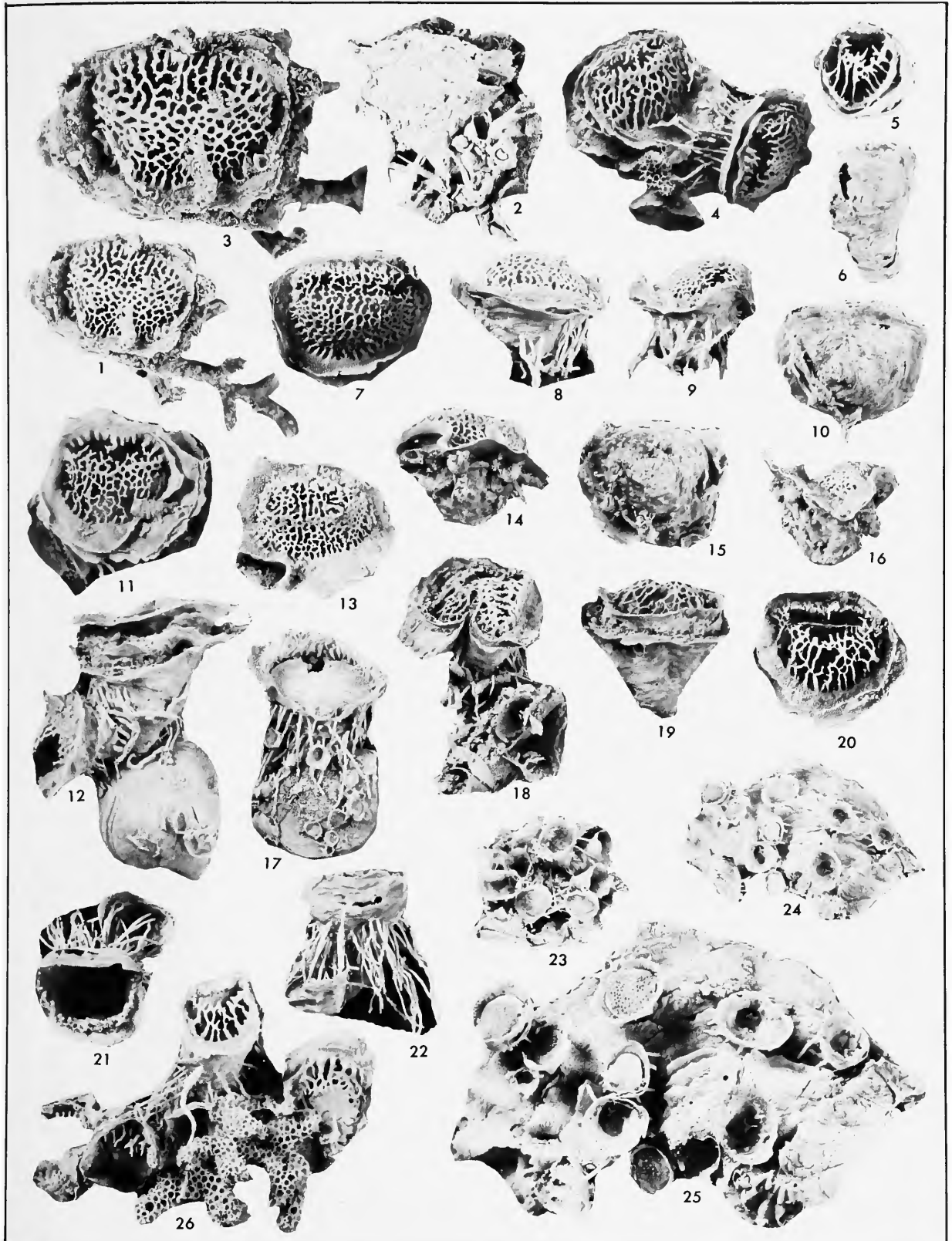


PLATE 294

Acritosia and *Cyclacantharia*

Acritosia? vestibula, new species: 1, Dorsal view of a specimen preserving most of the protective spines on the anterior side, $\times 1$, paratype USNM 151742a; 2-5, anterior, ventral, dorsal, and side views of a complete specimen, $\times 1$, paratype USNM 151743a; 6-9, anterior, ventral, side, and dorsal views of another complete specimen, $\times 1$, paratype USNM 151743f; 10, dorsal view, $\times 2$, of an immature specimen, paratype USNM 151743i; 11-14, dorsal, side, ventral, and anterior views of a small specimen, $\times 1$, paratype USNM 151743h; 15, 16, side and dorsal views of a specimen attached to a large pelecypod valve, $\times 1$, paratype USNM 151742b. [Road Canyon Formation, USNM 702c.]

Cyclacantharia, species 4: 17, 18, Dorsal and side views of a small specimen attached to a branch of a bryozoan, $\times 1$, figured specimen 154053. [Hess Formation (Taylor Ranch Member), USNM 702d.]

Cyclacantharia transitoria, new species: 19, 20, Side and anterior views of a large cup, $\times 1$, paratype USNM 152691c; 21-23, side, dorsal, and anterior views of a well formed cup, $\times 1$, paratype USNM 152691a; 24-26, dorsal, anterior, and side views of the complete specimen, $\times 1$, holotype USNM 152691b; 27, 28, interior of the brachial valve of the holotype, $\times 1$, $\times 2$, showing the cardinal process and the strongly developed protective spines. [Road Canyon Formation, USNM 724c.]

29-31, Dorsal, anterior, and side views of a large, complete specimen with rhizoid spines, $\times 1$, paratype USNM 152692a. [Road Canyon Formation, USNM 726j.]

32, 33, Side and dorsal views of another pedicle valve, with circle of protective spines, $\times 1$, paratype USNM 152693b. [Road Canyon Formation, USNM 726d.]

Cyclacantharia paucispinosa, new species: 34, 35, Anterior and side views of a large cup, $\times 1$, paratype USNM 154065. [Road Canyon Formation (base), USNM 703a.]

36, Dorsal view of a broken specimen, showing the adductor callosity, $\times 1$, paratype USNM 154066a; 37, another broken specimen, showing the adductor callosity and thick aulacoterma, $\times 1$, paratype USNM 154066b. [Road Canyon Formation (base), USNM 702c.]

PLATE 294.—*Acritosia* and *Cyclacantharia*

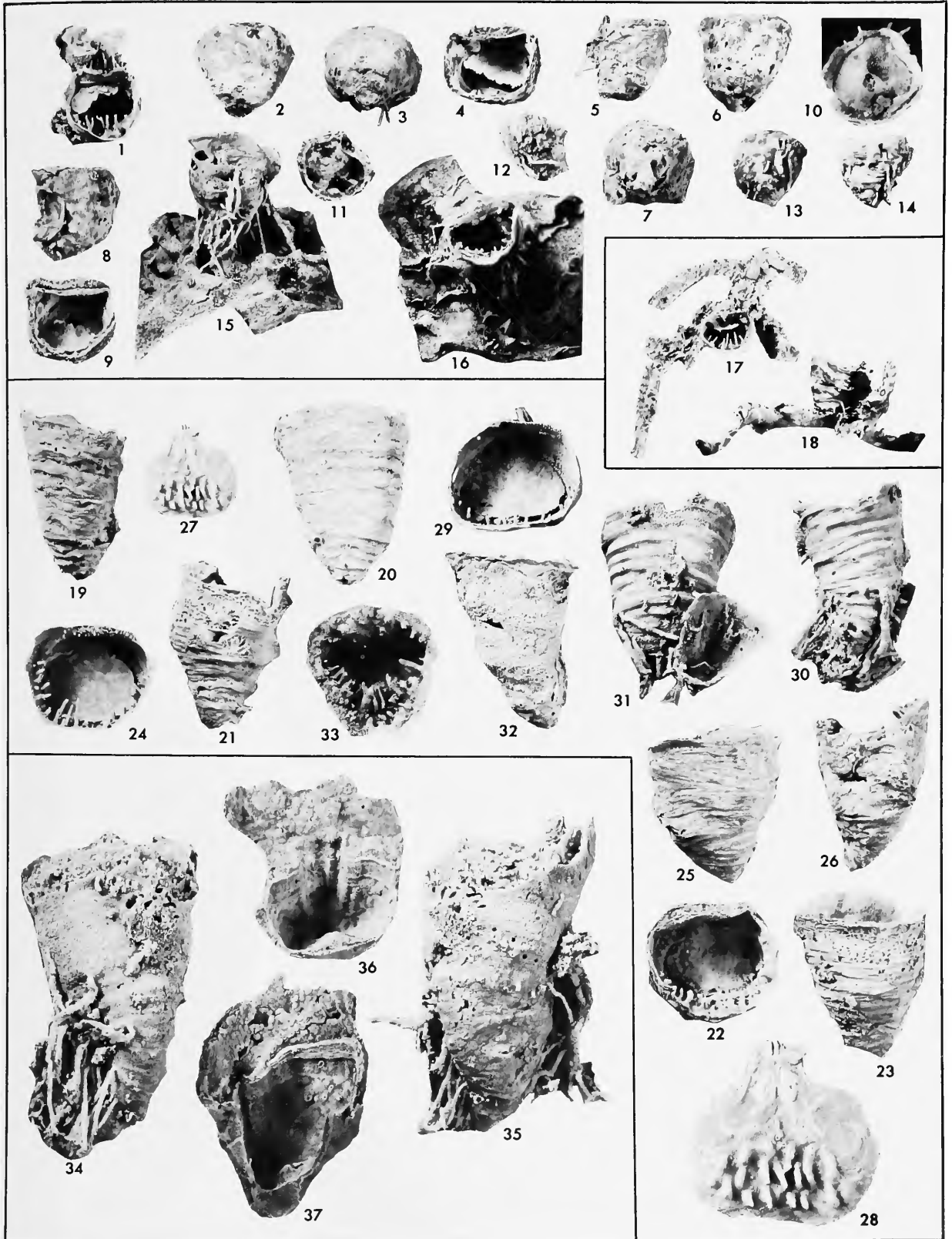


PLATE 295*Cyclacantharia*

Cyclacantharia gigantea, new species: 1, 2, Anterior and side views of a long slender specimen, × 1, paratype USNM 151647. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

3, 4, Side and anterior views of a large specimen, × 1, holotype USNM 151648; 5, 6, holotype broken at brachial valve, × 1. [Skinner Ranch Formation (Decie Ranch Member), USNM 714t.]

Cyclacantharia robusta, new species: 7, Exterior of a brachial valve of *Rhamnaria* with spat of *Cyclacantharia robusta*, × 1, paratype USNM 154069o; 8, one of the preceding spat enlarged, × 2; 9–11, side, dorsal, and anterior views of a complete specimen, × 1, showing a circle of protective spines on the cup rim, paratype USNM 151645a; 12, 13, interior of the brachial valve of the preceding specimen, × 1, × 2, showing dendritic adductor scars, cardinal process and thick endospines. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 295.—*Cyclacantharia*

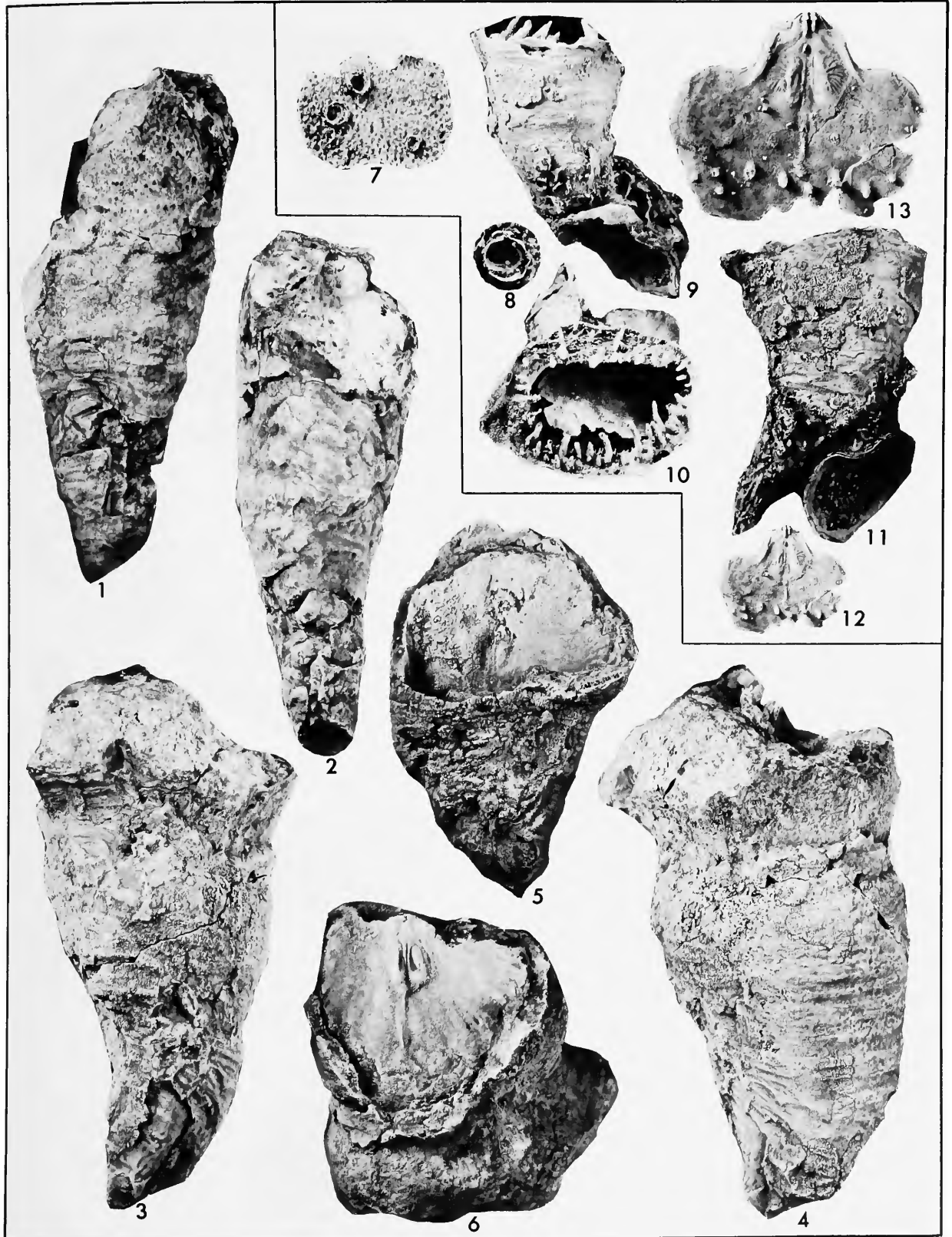


PLATE 296*Cyclacantharia*

Cyclacantharia paucispinosa, new species: 1, 2, Interior of a poorly preserved brachial valve, $\times 1$, $\times 2$, showing cardinal process and dendritic adductor scars, paratype USNM 151765c; 3, posterior of the preceding brachial valve, $\times 4$, showing chilidium and myophore, 7, 8, 21, side and dorsal views of a young specimen, $\times 1$, paratype USNM 151765d; 14–16, side, dorsal, and anterior views of a young adult, $\times 1$, paratype USNM 151766q; 17–20, dorsal, anterior, side and posterior views of a large adult, $\times 1$, holotype USNM 151766t. [Road Canyon Formation (base), USNM 702c.]

4–6, Side, anterior, and dorsal views of a young specimen, $\times 1$, paratype USNM 154060b. [Road Canyon Formation, USNM 719x.]

9, 10, Anterior and side views of a pedicle valve attached to *Edriostege*s, $\times 1$, paratype USNM 154062a; 11, 12, side and dorsal views of a short, squat cone, $\times 1$, paratype USNM 154062b. [Road Canyon Formation, USNM 721z.]

13, Posterior view of a small cone with long marginal hood, $\times 1$, paratype USNM 154061e. [Road Canyon Formation (base), USNM 703a.]

PLATE 296.—*Cyclacantharia*

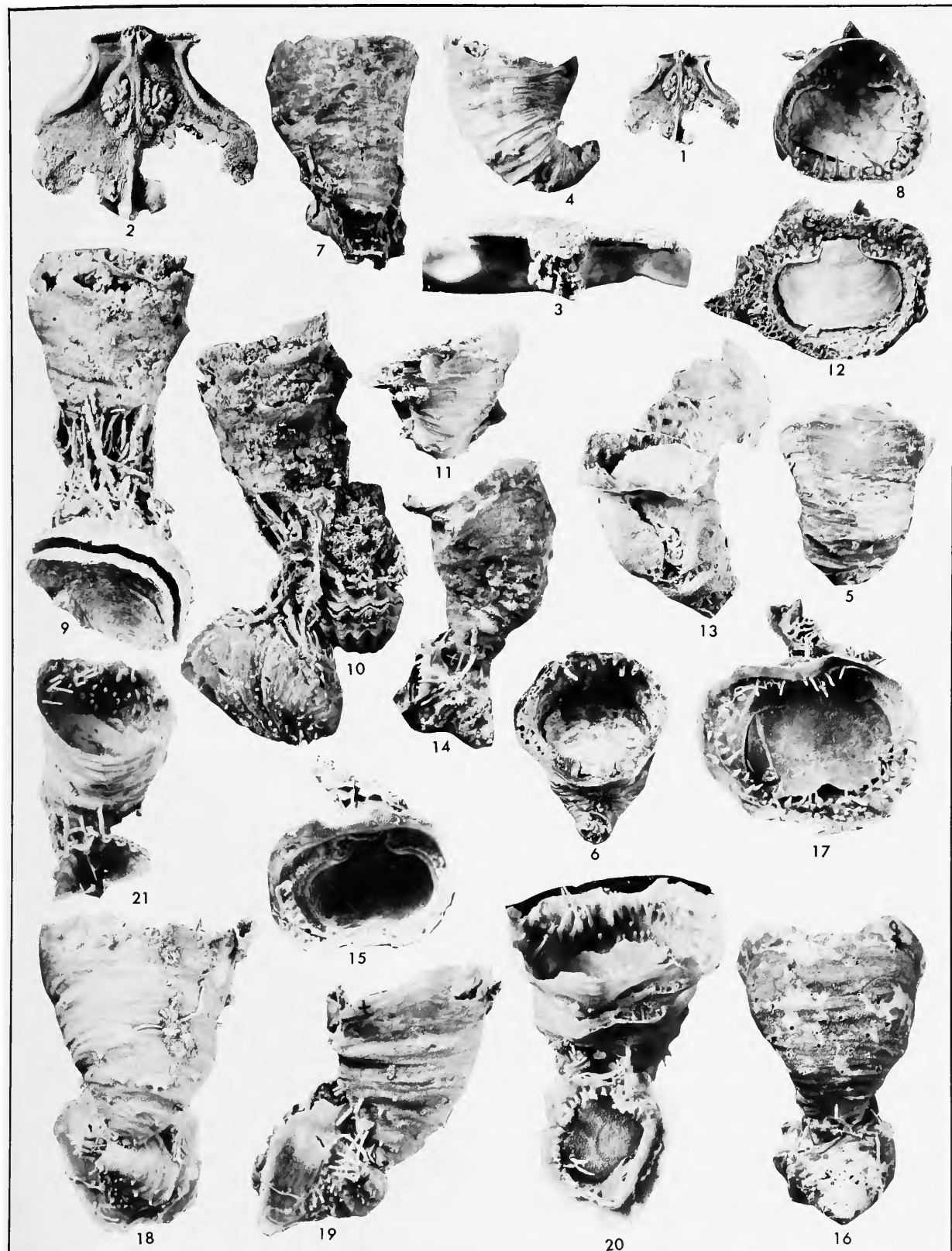


PLATE 297

Cyclacantharia

Cyclacantharia paucispinosa, new species: 1, 2, Posterior and dorsal views of a stout pedicle valve, $\times 1$, paratype USNM 151765a; 4, interior of a brachial valve, $\times 1$, paratype USNM 151765b; 6, cluster of young individuals, $\times 1$, paratype USNM 151765e. [Road Canyon Formation (base), USNM 702c.]

3, Side view of a broken specimen, $\times 1$, showing the vesicular shell in the apical and posterior regions, paratype USNM 154060a. [Road Canyon Formation, USNM 719x.]

5, Another imperfect pedicle valve, $\times 1$, showing the vesicular shell, paratype USNM 154061a; 7, interior of a pedicle valve, showing part of brachial valve in place, $\times 1$, paratype USNM 154061b; 8, cluster of adult individuals, $\times 1$, paratype USNM 154061c. [Road Canyon Formation (base), USNM 703a.]

Cyclacantharia robusta, new species: 9, Dorsal view of an immature specimen, $\times 2$, paratype USNM 154059j; 10, 11, dorsal view of two spat, $\times 1$, $\times 2$, paratype USNM 154059m; 12, another immature specimen, $\times 2$, paratype USNM 154059i; 13, anterior view of the interior of a pedicle valve, showing growth paths of sockets, $\times 1$, paratype USNM 154059n; 14, partial side view of a broken pedicle valve, $\times 1$, showing adductor callosity, paratype USNM 154059p; 15, 16, interior of the brachial valve, $\times 1$, $\times 2$, showing thick protective spines, paratype USNM 154059a; 17, side view of a broken pedicle valve, $\times 1$, showing adductor callosity, paratype USNM 154059r; 18, interior of the posterior side of a pedicle valve, $\times 2$, showing the growth path of the sockets and the groove in which the cardinal process is located, paratype USNM 154059s; 19, interior of another pedicle valve, $\times 2$, showing the relationship of the grooves to the cardinal process and teeth and also showing inner extensions of the rhizoid spines of attachment, paratype USNM 154059t. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 297.—*Cyclacantharia*

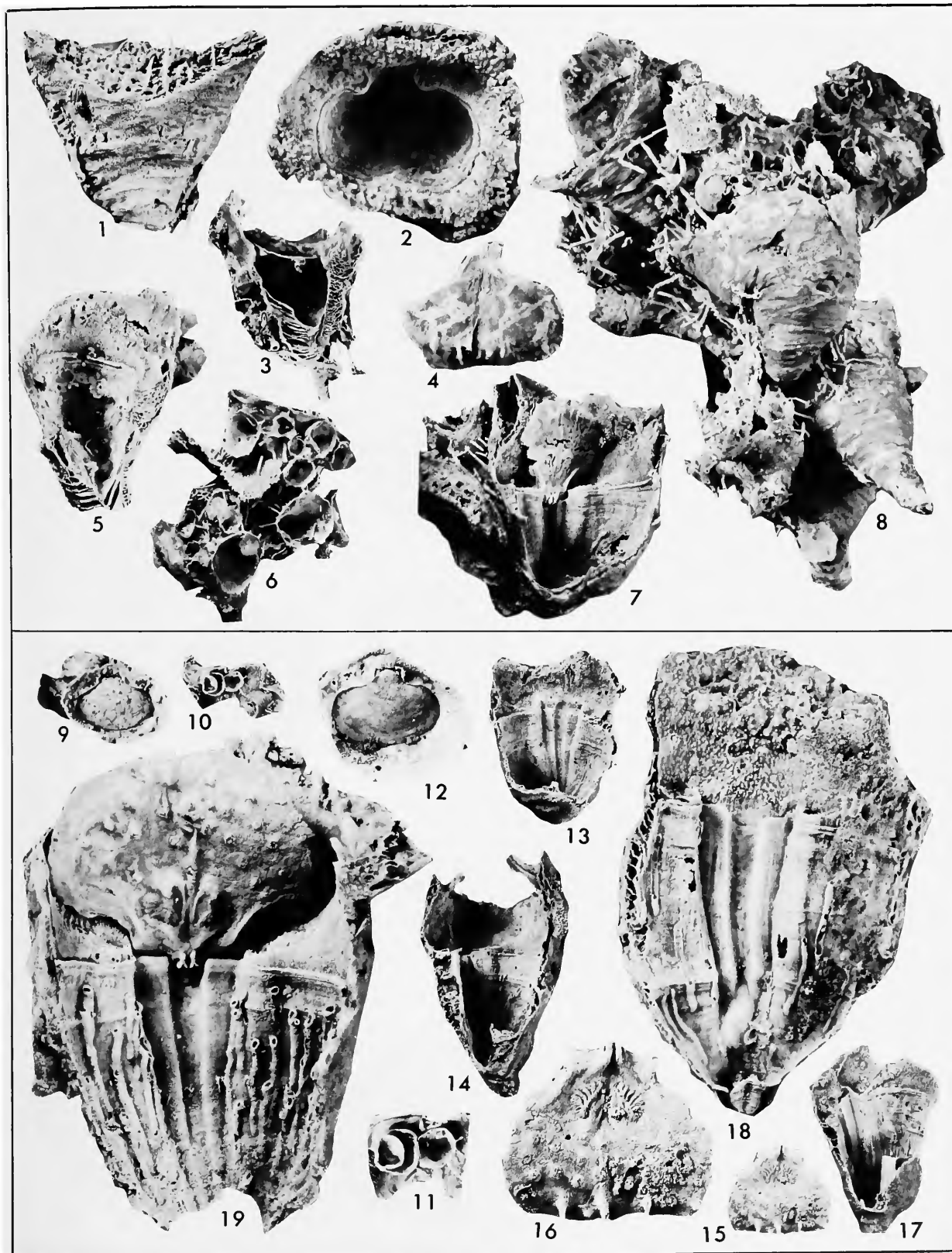


PLATE 298*Cyclacantharia*

Cyclacantharia kingorum agaricoidea, new subspecies: 1–3, Dorsal (apertural), ventral and anterior views of a large specimen with reflected apertural margins, $\times 1$, holotype USNM 151780a; 4, a small cluster of immature specimens, $\times 1$, paratype USNM 151780c; 5–8, dorsal, ventral, anterior, and side views of another specimen with reflected apertural sides, $\times 1$, paratype USNM 151780b. [Word Formation (lens between Willis and Appel Ranch members), USNM 706b.]

Cyclacantharia kingorum Cooper and Grant: 9, Young, elongated pedicle valve, $\times 1$, hypotype USNM 154064a; 10, another young elongated pedicle valve, side view, $\times 1$, hypotype USNM 154064c; 11, 12, side and dorsal views of an elongated cup, $\times 1$, showing rhizoid spines and brachial valve in feeding position (?), $\times 1$, paratype USNM 123918; 13–15, dorsal, side, and anterior views, $\times 1$, showing rhizoid spines and crowded apertural spines, holotype USNM 153831; 16, posterior view of a specimen with brachial valve in feeding position (?), $\times 1$, hypotype USNM 151785d; 17, dorsal view of a specimen with brachial valve in feeding (?) position, $\times 1$, hypotype USNM 153832; 18, dorsal view of a specimen with brachial valve in feeding (?) position but with small protective spines, $\times 2$, hypotype USNM 151786w; 19, side view of a cluster of crowded specimens, $\times 1$, hypotype USNM 151785c (for apertural view, see plate 299: figure 20). [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 298.—*Cyclacantharia*

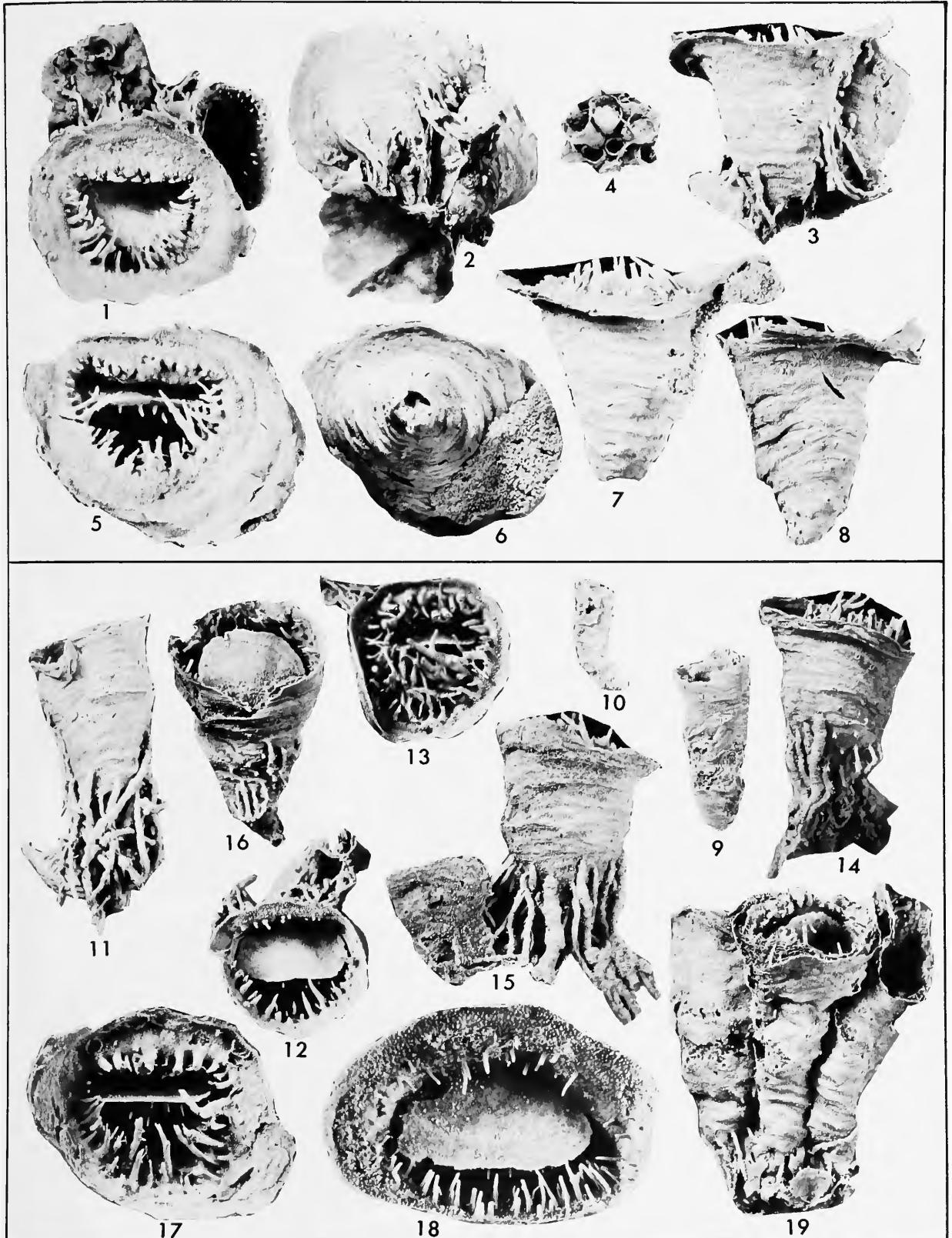


PLATE 299*Cyclacantharia*

Cyclacantharia kingorum Cooper and Grant: 1, 2, Interior and exterior of a brachial valve, $\times 1$, hypotype USNM 124140d; 3, interior of the preceding specimen, $\times 2$, showing cardinal process and endospines; 4, 5, interior and exterior of another brachial valve, $\times 1$, paratype USNM 124140a; 6, interior of the preceding specimen, $\times 2$; 7, 8, exterior and interior of a brachial valve, $\times 1$, paratype USNM 124140b; 9, interior of the preceding specimen, $\times 2$, showing stout endospines; 10, exterior of a brachial valve, $\times 1$, hypotype USNM 124140c; 11, interior and posterior views of the preceding specimen, $\times 2$, showing cardinal process and endospines; 12, posterior view of the preceding brachial valve, $\times 3$, showing chilidium over the myophore of the cardinal process; 15, 16, side and dorsal views of a cluster of immature specimens, $\times 3$, showing spiny brachial valves and incipient protective spines, paratype USNM 123917b; 17, dorsal view of a specimen, showing brachial valve in place (feeding position?), and the ring of striated protective spines surrounding the aperture, $\times 2$, hypotype USNM 151786v; 18, dorsal view of the aperture of another specimen, $\times 2$, showing branched and striated protective spines and a healed injury in the southeast quadrant, paratype USNM 123917a; 20, dorsal view of another specimen with brachial valve in feeding (?) position and showing the crowded protective spines on the anterior side, $\times 1$, hypotype USNM 151785c (for side view, see plate 298: figure 19). [Word Formation (Willis Ranch Member), USNM 706c.]

13, 14, Anterior and dorsal views of a large pedicle valve, showing interrupted growth stages and the circle of spines around the aperture, $\times 1$, hypotype USNM 154535b; 19, anterior view of two specimens attached on a length of crinoid stem, $\times 1$, hypotype USNM 154535a. [Word Formation (China Tank Member), USNM 706c.]

PLATE 299.—*Cyclacantharia*

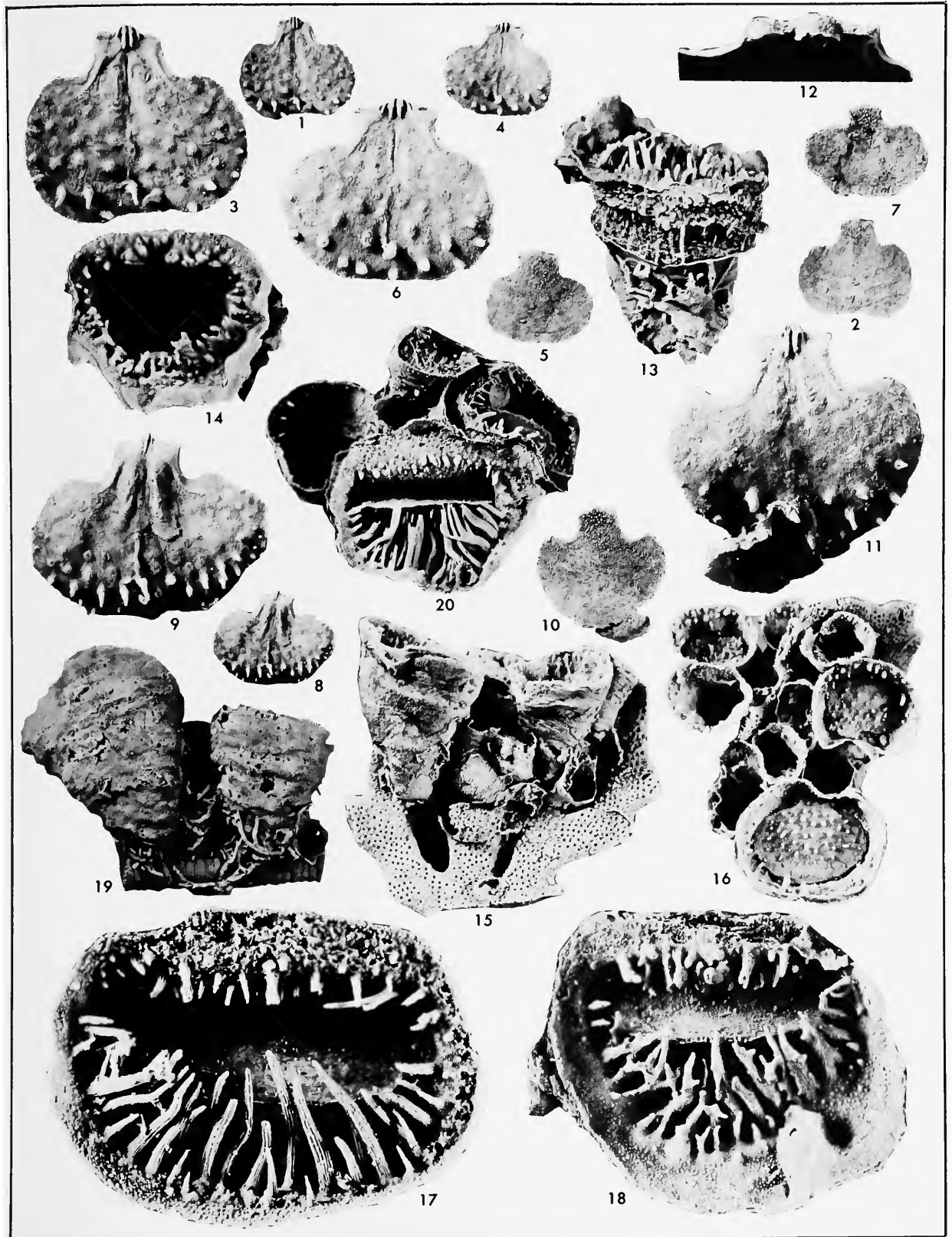


PLATE 300

Cyclacantharia

Cyclacantharia kingorum Cooper and Grant: 1, Dorsal view of six immature, complete specimens having no protective spines, $\times 1$, hypotypes USNM 154063a–f; 2, 3, ventral and dorsal views of a cluster of immature valves attached to a fragment of pelecypod shell, $\times 1$, hypotype USNM 154063g; 4, dorsal view of an immature specimen, $\times 1$, hypotype USNM 154063p; 5, imperfect pedicle valve, $\times 1$, showing vesicular area, hypotype USNM 154063h; 7, dorsal view of an immature specimen showing development of the protective spine ring, $\times 1$, hypotype USNM 154063i; 8, dorsal view of two attached individuals showing incipient development of protective spines, $\times 1$, hypotype USNM 154063j; 9, 10, dorsal view of a group of immature specimens attached to *Collemataria*, $\times 1$, $\times 2$, hypotype USNM 154063k; 11, dorsal view of another group of immature specimens attached to *Collemataria*, $\times 1$, hypotype USNM 154063–l; 12, 13, dorsal view of an immature specimen starting life on the concave surface of a productid brachial valve exterior, $\times 2$, $\times 1$, hypotype USNM 154063m; 14, dorsal view of a fairly large immature specimen not yet having developed protective spines, $\times 2$, hypotype USNM 154063e (middle specimen in figure 1); 15, dorsal view, $\times 1$, of a specimen with several spat on the brachial valve, $\times 1$, hypotype USNM 154063n; 16, dorsal view of a specimen in which the protective spines completely cover the aperture, $\times 1$, hypotype USNM 154063o; 18, side view of a cluster of adults attached by their spines, $\times 1$, hypotype USNM 151785b; 19, dorsal view of a cluster of immature specimens with incipient protective spines, $\times 1$, hypotype USNM 154063q; 20, exterior of a brachial valve of *Rhamnaria* occupied by immature specimens seen in dorsal view, $\times 1$, hypotype USNM 154063r; 21, dorsal view of an immature individual, $\times 2$, same as lower right in figure 1; 22, 23, dorsal and side views of a cluster of adult specimens showing protective and rhizoid spines, $\times 1$, hypotype USNM 151785a; 24, cross section of a pedicle valve, showing hinge region, $\times 1$, hypotype USNM 124168a; 25, matted cluster of immature specimens, $\times 1$, hypotype USNM 154063s. [Word Formation (Willis Ranch Member), USNM 706e.]

6, Two specimens in side view, $\times 1$, showing tangle of rhizoid spines binding them together, hypotype USNM 151782a; 17, anterior view of a large adult, showing its mass of rhizoid spines, $\times 1$, hypotype USNM 151782b. [Word Formation (China Tank Member), USNM 706c.]

PLATE 300.—*Cyclacantharia*

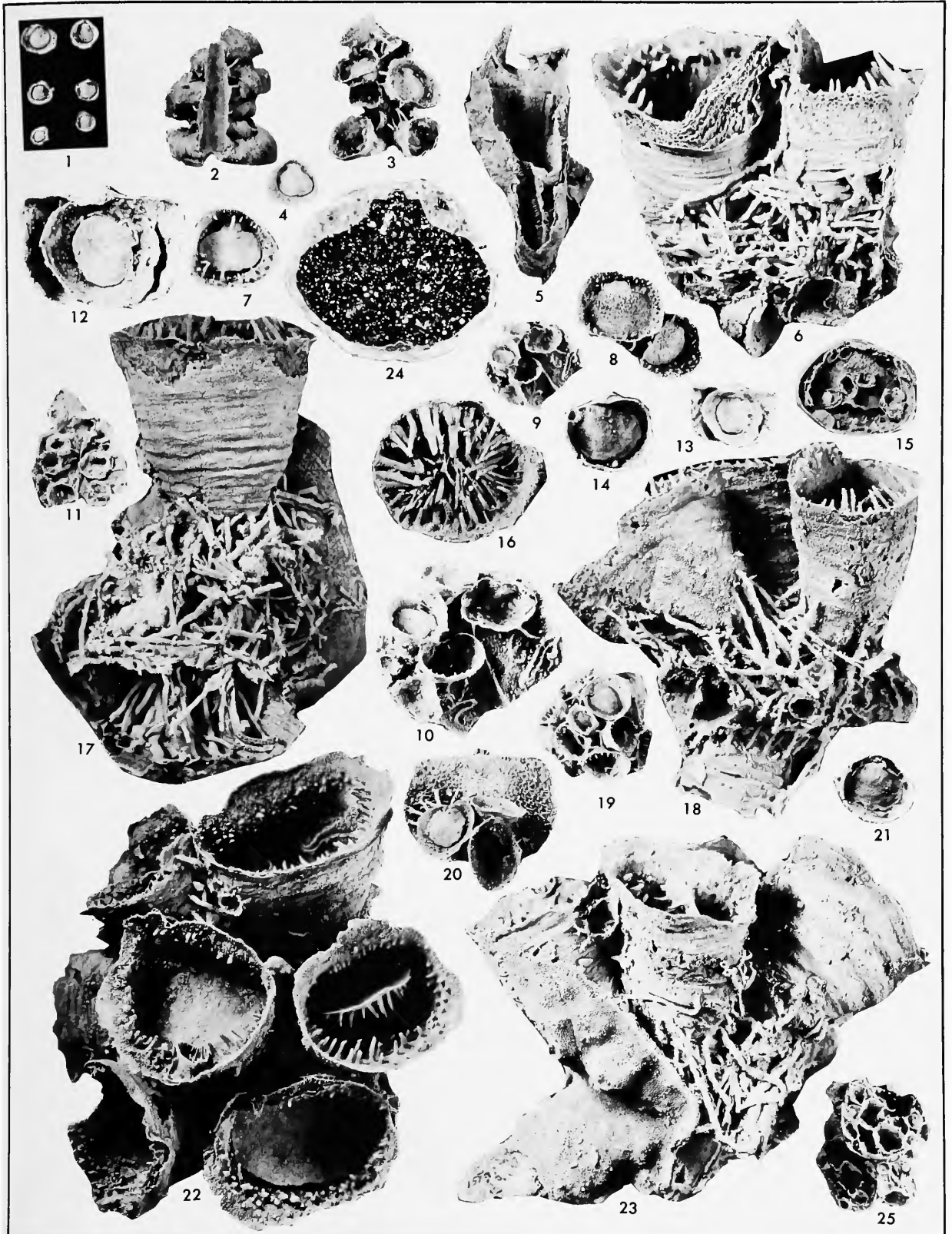


PLATE 301

Hercosia and *Cyclacantharia*

Hercosia delicata, new species: 1, 2, Dorsal and ventral views of a small cluster, $\times 1$, paratype USNM 154077i. [Cathedral Mountain Formation, USNM 726o.]

Cyclacantharia kingorum Cooper and Grant: 3, Dorsal view of a cluster of young specimens of various sizes attached to a large adult, $\times 1$, hypotype of USNM 154064d; 4, 5, spat attached to the brachial valve of *Rhamnaria*, $\times 1$, $\times 2$, hypotype USNM 154064e; 6, 23, spat attached to a young *Collemataria*, $\times 1$, $\times 2$, hypotype USNM 154064f; 7, cluster of spat occupying the exterior of a *Collemataria*, $\times 1$, hypotype USNM 154064g; 8, young individual attached to the brachial valve of *Paucispinifera*, $\times 1$, hypotype USNM 154064h; 9, 10, dorsal and posterior views of a small adult with small protective spines, $\times 1$, paratype USNM 124166; 11, large specimen of *Collemataria* partially covered by spat of *Cyclacantharia*, $\times 1$, paratype USNM 124165a; 12, interior of a pedicle valve, $\times 1$, showing hinge region and its growth track, hypotype USNM 154064i; 13, interior of another broken pedicle valve, $\times 1$, showing brachial valve in position and the track of the hinge area, hypotype USNM 154064j; 14, interior of another pedicle valve, side view, $\times 1$, showing aulacoterma, and vesicular region at the apex, hypotype USNM 154064k; 15, pedicle valve interior, anterior side, $\times 1$, showing adductor callosity hypotype USNM 154064-l; 16, 17, halves of the same pedicle valve, showing vesicular tissue, adductor callosity and aulacoterma, $\times 1$, hypotypes USNM 154064m, n; 18, interior of an elongated specimen, $\times 1$, showing posterior part of brachial valve in place and the growth path of the hinge, hypotype USNM 154064o; 19, interior of a pedicle valve, showing the adductor callosity, $\times 1$, hypotype USNM 154064p; 20, fragment of the posterior of a pedicle valve, $\times 2$, showing aulacoterma and growth tracks of rhizoid spines of the exterior, hypotype USNM 154064q; 21, 22, two parts of one pedicle valve of another specimen, $\times 2$, showing bases of protective spines, brachial valve in place, adductor callosity and growth path of the hinge, paratype USNM 154064r. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 301.—*Hercosia* and *Cyclacantharia*

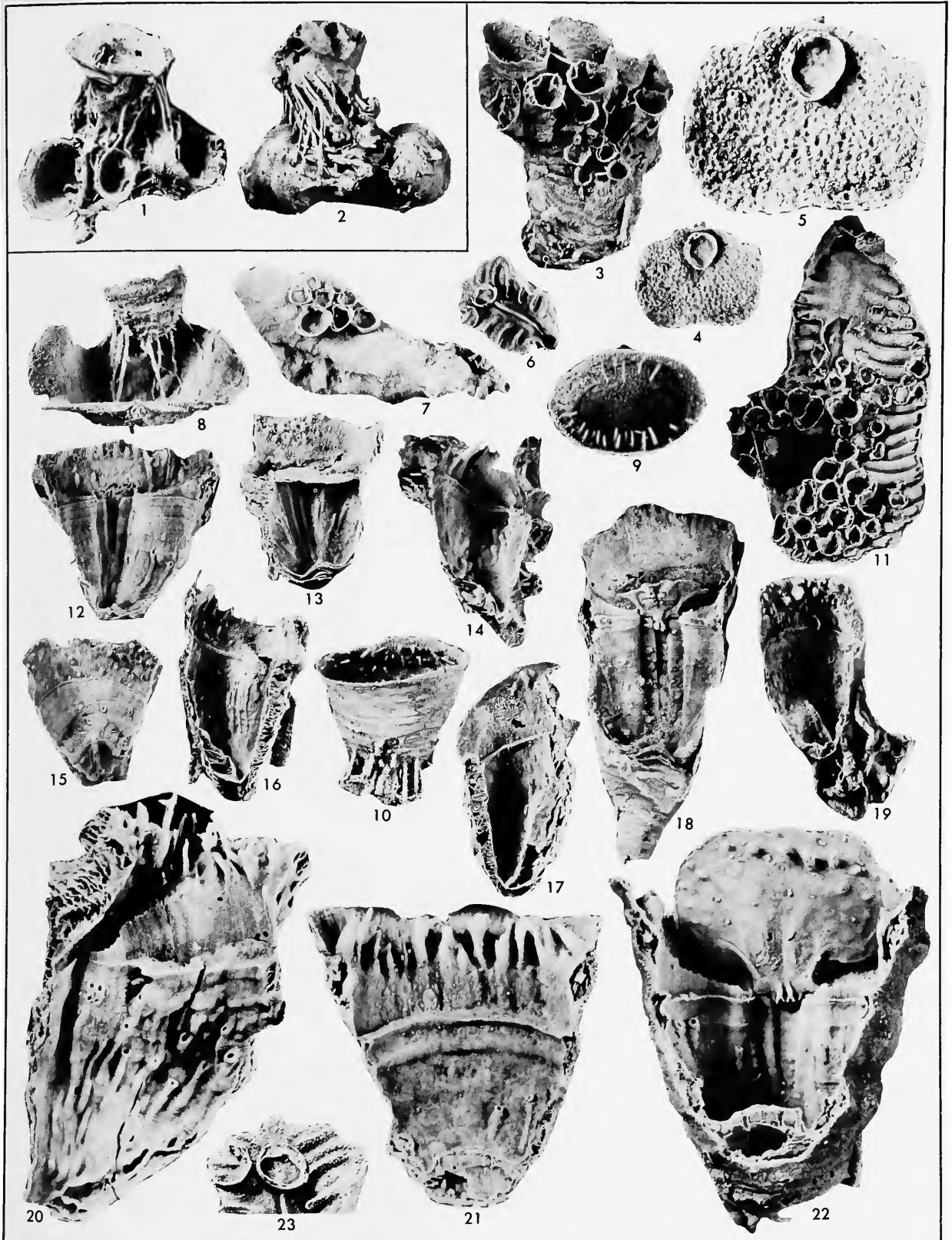


PLATE 302*Cyclacantharia*

Cyclacantharia robusta, new species: 1, 2, Side and dorsal views of a cluster of small individuals, $\times 1$, paratype USNM 154059b; 3, 4, anterior and side views of another small specimen, $\times 1$, paratype USNM 154059c; 5, 6, side and anterior views of a pedicle valve attached to a small cluster, $\times 1$, paratype USNM 154059d; 7, side view of the preceding cluster, $\times 1$; 8, anterior view of a small, elongate pedicle valve, $\times 1$, paratype USNM 154059-l; 9-11, side, anterior, and dorsal views of a specimen with long protective spines over the aperture, $\times 1$, paratype USNM 151645b; 12-14, anterior, side, and posterior views of a small pedicle valve, $\times 1$, paratype USNM 154059e; 15, 16, side and posterior views of a young pedicle valve, $\times 1$, paratype USNM 154059f; 17, 18, interior of a brachial valve, $\times 1$, $\times 2$, showing stout protective spines, paratype USNM 154059g; 19, dorsal view, showing brachial valve in place, $\times 1$, paratype USNM 151646g; 20-22, side, dorsal (apertural), and anterior views of a full-grown adult, $\times 1$, holotype USNM 151646b; 23, 24, interior of the brachial valve of the holotype, $\times 1$, $\times 2$, showing numerous stout protective spine bases; 25-27, side, posterior, and dorsal views of another large adult, $\times 1$, paratype USNM 151646a; 28, 29, anterior and dorsal views of a long slender specimen, $\times 1$, paratype USNM 151646e; 30, interior of a pedicle valve, $\times 1$, showing aulacoterma and adductor callosity, paratype USNM 154059u; 31, dorsal view of an immature specimen, $\times 1$, paratype USNM 154059k; 32, dorsal (apertural) view of a pedicle valve, showing adductor callosity and hingement, $\times 1$, paratype USNM 151646j. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 302.—*Cyclacantharia*

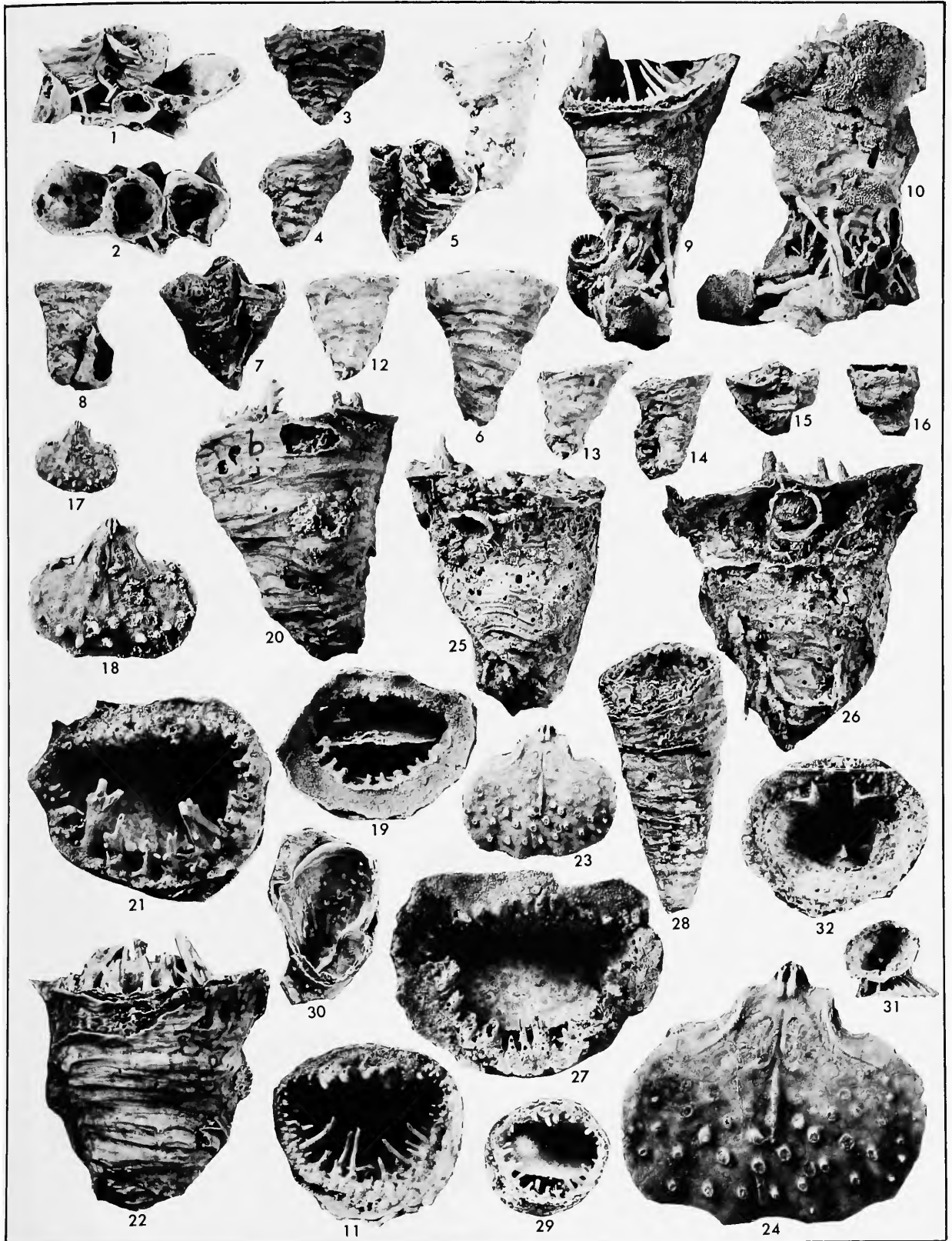


PLATE 303*Taphrosestria*

Taphrosestria peculiaris, new species: 1–5, Anterior, ventral, dorsal, side, and posterior views, $\times 1$, of the holotype USNM 154082a; 6–10, dorsal (apertural), ventral, anterior, side and posterior views of another pedicle valve, $\times 1$, paratype USNM 154082b. [Road Canyon Formation, USNM 721y.]

Taphrosestria species: 11, Dorsal view of a squat, thick-shelled species, $\times 1$, figured specimen USNM 154083a. [Cathedral Mountain Formation, USNM 702–low.]

Taphrosestria expansa, new species: 12–15, Anterior, side, dorsal, and ventral views, $\times 1$, of the holotype USNM 152688h; 16, 17, interior and exterior of the brachial valve from the holotype, $\times 2$, showing no endospines but strong external spines; 18, 19, anterior and dorsal views of a pedicle valve, showing the muscle region, $\times 1$, paratype USNM 154084; 20–23, dorsal, side, ventral, and posterior views of a pedicle valve, $\times 1$, paratype USNM 152688f; 24–26, side, ventral, and dorsal views of a complete specimen, $\times 1$, paratype USNM 152688b; 27, interior of the brachial valve, $\times 2$, of the preceding paratype with only vestigial endospines; 28–30, dorsal, anterior, and side views of a narrow pedicle valve, $\times 1$, paratype USNM 152688d; 31–33, dorsal, anterior, and side view of another pedicle valve with stout protective spines, $\times 1$, paratype USNM 152688e. [Road Canyon Formation, USNM 724b.]

PLATE 303.—*Taphrosestria*

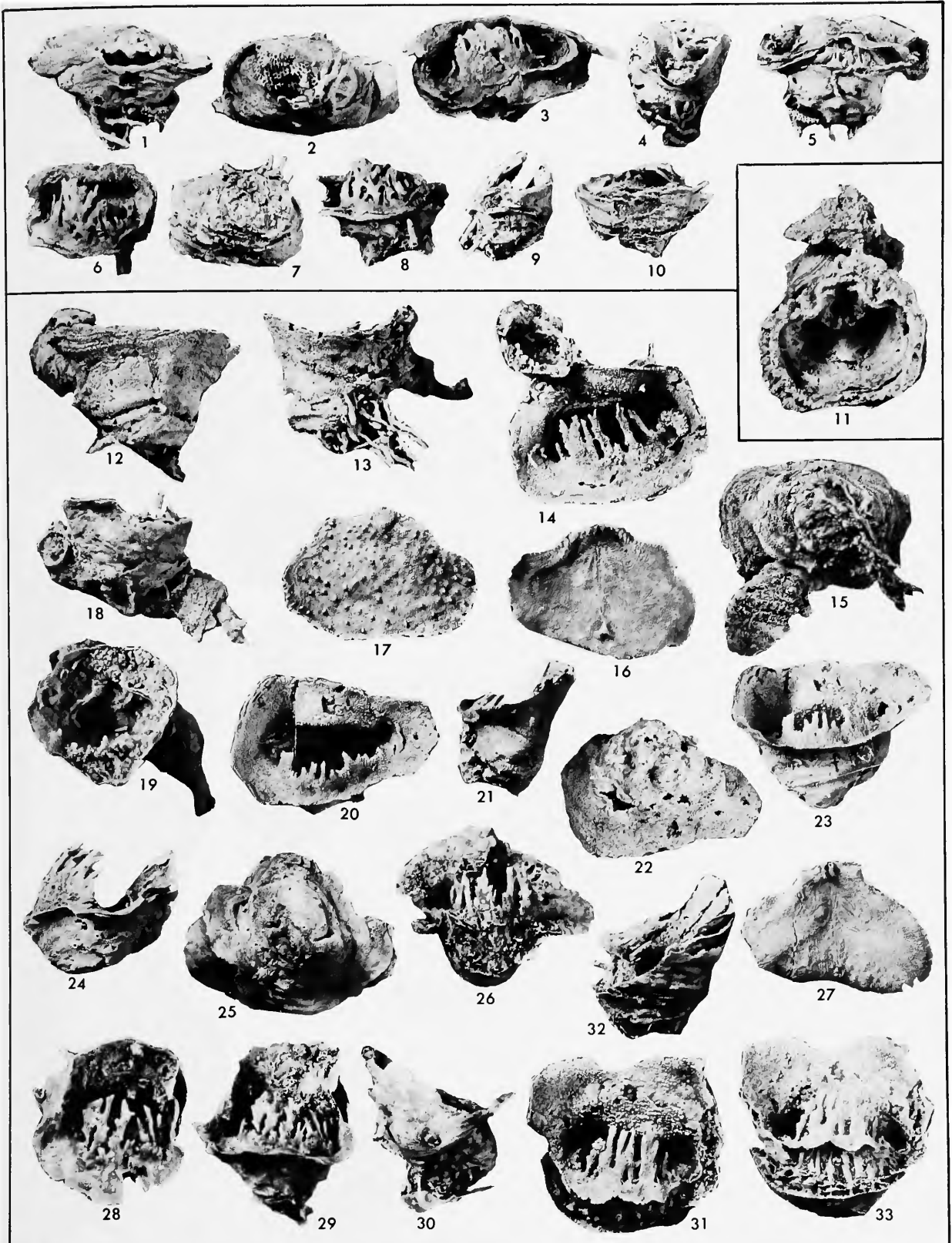


PLATE 304

Taphrosestria

Taphrosestria peculiaris, new species: 1-5, Anterior, ventral, posterior, side, and dorsal views, $\times 1$, of a small specimen, paratype USNM 151760h; 6, dorsal view of the preceding, $\times 2$, showing the fused protective spines; 7-11, dorsal, posterior, ventral, side and anterior views of another specimen, $\times 1$, paratype USNM 151760f; 12-16, dorsal, posterior, ventral, anterior, and side views of an average specimen, $\times 1$, paratype USNM 151760d; 17, dorsal view of the preceding specimen, $\times 2$, showing spines fusing together; 18-22, side, anterior, ventral, posterior, and dorsal views of a small individual, $\times 1$, paratype USNM 151760g; 23-27, dorsal, side, posterior, anterior, and ventral views of a pedicle valve, showing tiered marginal flanges, $\times 1$, paratype USNM 151760a; 28, dorsal view of the preceding specimen, $\times 2$, showing the tiered flanges and fusing protective spines; 29-33, dorsal, posterior, side, anterior, and ventral views of a small individual, $\times 1$, paratype USNM 151760i; 34, dorsal view of the preceding paratype, $\times 2$, showing the fused, protective spines; 35, 36, side and dorsal views of specimen with tiered marginal flanges and rhizoid spines, $\times 1$, paratype USNM 154109; 37, 38, interior of the pedicle valve, $\times 1$, $\times 2$, showing thickened muscle area and openings of rhizoid spines, paratype USNM 151760m; 39, 40, dorsal and side views of two attached specimens, $\times 1$, paratype USNM 154085; 41, interior of a pedicle valve, $\times 1$, showing thick muscle field, paratype USNM 151760n; 42, pedicle valve attached to *Coscinophora*, $\times 1$, paratype USNM 151759a; 43, interior of a pedicle valve, $\times 2$, showing hinge region and "valva falsa," paratype USNM 151760o; 44, interior of a broken specimen, showing the vesicular regions and the brachial valve in place, $\times 1$, paratype USNM 151760p; 45, broken pedicle valve, $\times 2$, showing brachial valve in place, paratype USNM 151760q. [Road Canyon Formation, 710u.]

PLATE 304.—*Taphroestria*

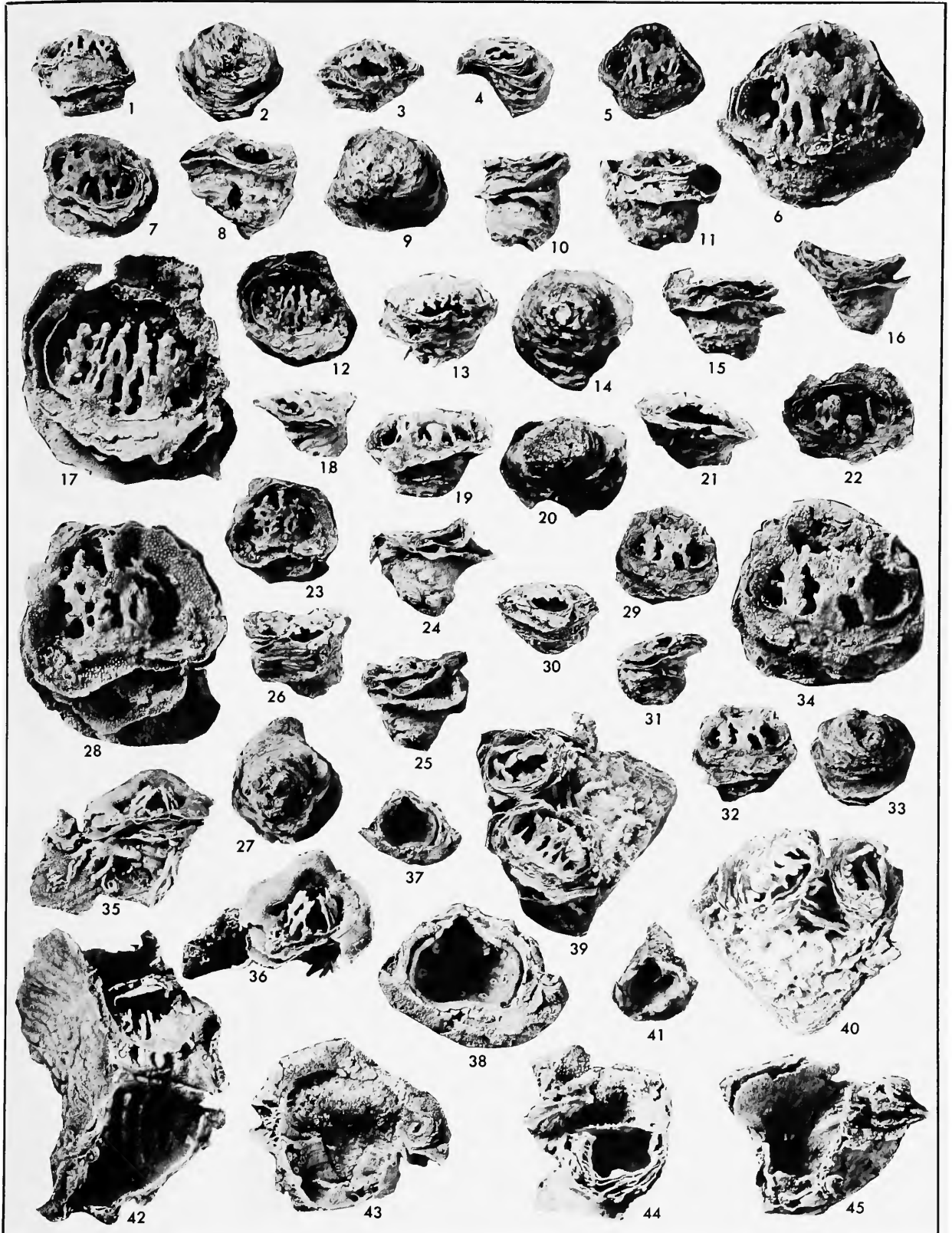


PLATE 305

Taphroestria and *Collumatus*

Taphroestria peculiaris, new species: 1-3, Dorsal, side, and anterior views of a specimen with tiered marginal flanges, × 1, paratype USNM 151759c; 4, 5, side and dorsal views of two attached individuals, × 1, paratype USNM 151759e; 6, 7, dorsal and side view of a specimen with tiered marginal flanges, × 1, paratype USNM 151759d; 10, 11, interior and exterior views of a brachial valve, × 2, showing coarse spine bases on the exterior and thickened adductor patches on the interior, paratype USNM 154087; 19, 20, interior of a broken specimen, showing the brachial valve in place, × 1, × 2, paratype USNM 151759f. [Road Canyon Formation, USNM 710u.]

8, 9, Dorsal and anterior views of a complete specimen, showing coarse pustules on brachial valve, × 1, paratype USNM 154086. [Road Canyon Formation, USNM 723x.]

12, 13, Dorsal view of a complete specimen, × 1, × 2, showing coarse spines on the brachial valve, paratype USNM 151757a; 14, 15, dorsal and side views of complete specimen, × 1, paratype USNM 151757b; 16, interior of a pedicle valve, showing hinge region, × 1, paratype USNM 151757c; 17, 18, anterior and dorsal views of a pedicle valve, showing filled in protective spine area and the muscle callosity, × 1, paratype USNM 151757d. [Road Canyon Formation, USNM 707e.]

Collumatus solitarius Cooper and Grant: 21-23, Anterior, side, and ventral views of a pedicle valve, × 1, hypotype USNM 154088a; 26-29, ventral, side, dorsal, and dorsal tilted views of a pedicle valve, × 1, showing adductor callosity, hypotype USNM 154088b (for enlargement see plate 306: figure 31); 30-33, dorsal, ventral, side, and anterior views of another pedicle valve, × 1, hypotype USNM 154088c; 34-36, dorsal, side, and ventral views of a young specimen attached to the valve of a *Neospirifer*, × 1, hypotype USNM 154088d; 43, 44, side and anterior views of a well formed pedicle valve, × 1, hypotype USNM 154088e; 49-52, side, ventral, dorsal, and side views of two individuals attached to a fragment of *Meekella*, × 1, hypotype USNM 153043o; 53, broken specimen, × 2, showing part of brachial valve in place and lateral layers of attachment, hypotype USNM 154088f. [Road Canyon Formation, USNM 732j.]

24, 25, Dorsal and ventral views of a small individual, showing attachment rings and brachial valve in place, × 1, hypotype USNM 154089a; 37-40, anterior, dorsal, side, and ventral views of a large specimen, × 1, hypotype USNM 154089b; 41, 42, dorsal and ventral views of a pedicle valve, × 1, showing aulacoterma and rings of attachment, × 1, hypotype USNM 154089c; 45-48, dorsal, anterior, side, and partial ventral views, × 1, showing sheets of shell for attachment, hypotype USNM 154089d. [Road Canyon Formation, USNM 700v.]

PLATE 305.—*Taphroestria* and *Collumatus*

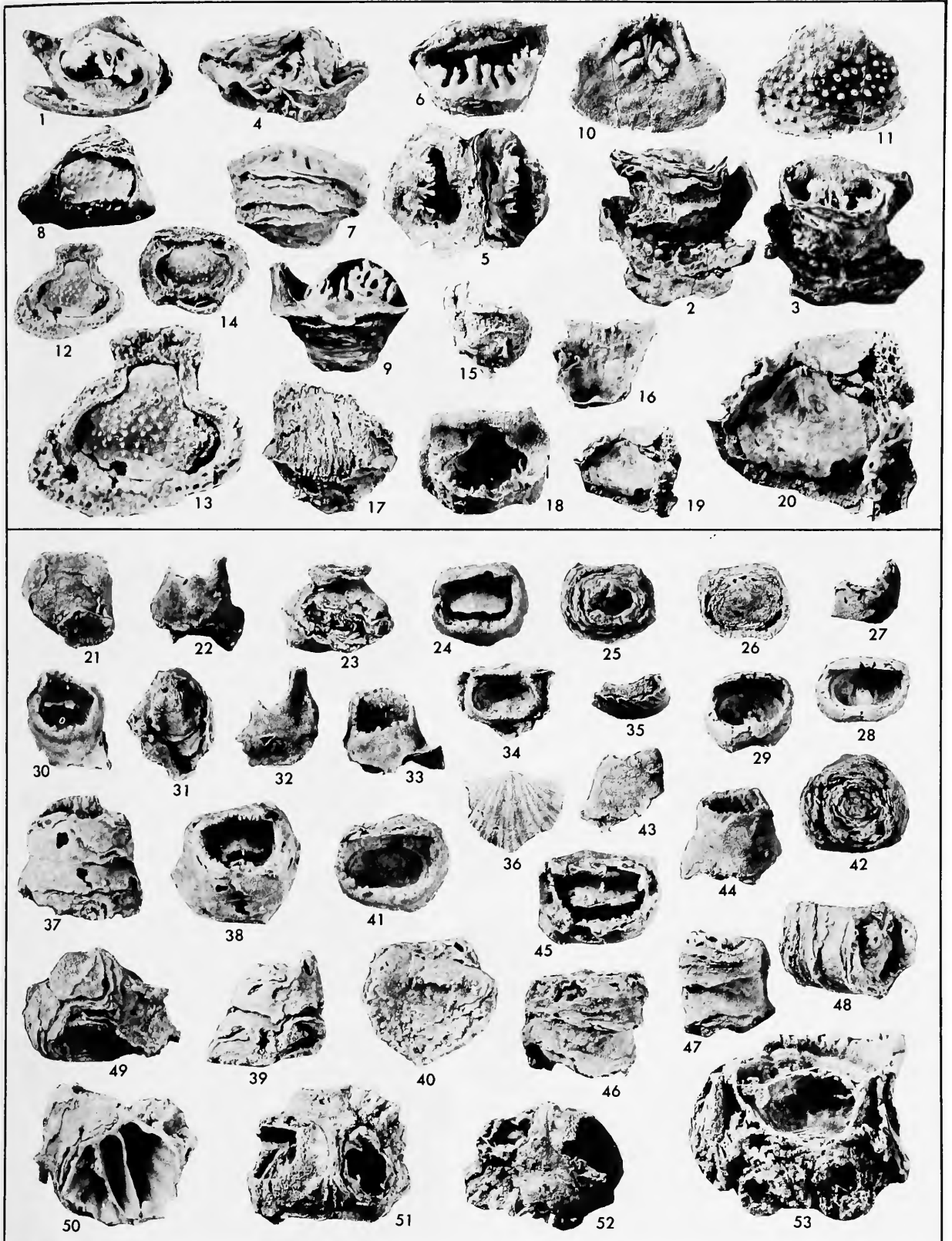


PLATE 306

Collumatus and *Sestropoma*

Collumatus solitarius Cooper and Grant: 1, 2, Ventral and side views of a pedicle valve, showing the concentric layers of attachment, $\times 1$, hypotype USNM 153043d; 3-6, anterior tilted, anterior, ventral, and side views of a young specimen, showing concentric layers, $\times 1$, hypotype USNM 154088g; 7-9, anterior, ventral, and dorsal views of a small pedicle valve, $\times 1$, hypotype USNM 154088h; 10-12, dorsal, side, and anterior views of a complete specimen, $\times 1$, hypotype USNM 154088i; 13-15, ventral, anterior and side views of an immature specimen, $\times 1$, hypotype USNM 154088j; 16, 17, ventral and anterior views of a pedicle valve, $\times 2$, showing concentric layers of attachment shell, hypotype USNM 153043b; 18, 19, anterior and dorsal views of a pedicle valve, $\times 1$, hypotype USNM 153043a; 20, 21, interior and exterior, $\times 3$, of the brachial valve belonging to the preceding hypotype; 22-26, side, dorsal, ventral, anterior, and opposite side views, $\times 1$, of a specimen preserving the coscinidium, hypotype USNM 154090; 27, 28, anterior and dorsal views of the preceding hypotype, $\times 2$, showing granular texture of shell body; 29, 30, exterior and interior of another brachial valve, $\times 3$, showing cardinal process and dendritic adductor scars, hypotype USNM 153043p; 31, dorsal view, $\times 2$, showing adductor callosity, hypotype USNM 154088b (for additional views of this specimen, see plate 305: figures 26-29); 32-34, anterior, dorsal, and side views of a nearly complete specimen, $\times 1$, paratype USNM 153043c; 35, dorsal view of the preceding paratype showing bases of coscinidium, $\times 2$. [Road Canyon Formation, USNM 732j.]

Sestropoma cribriferum Cooper and Grant: 36-38, Anterior, side, and dorsal views of a complete specimen, $\times 1$, hypotype USNM 154080g; 39-41, side, anterior, and dorsal views of specimen with wide marginal flange, $\times 1$, hypotype USNM 154080a; 42-44, anterior, side, and dorsal views of a small specimen, $\times 1$, hypotype USNM 154080d; 45-47, dorsal, side, and anterior views of a complete specimen, $\times 1$, hypotype USNM 154080c; 48, dorsal view of the preceding specimen, $\times 1.5$, showing well formed coscinidium; 49, 50, exterior and interior of the brachial valve, $\times 2$, showing scattered coarse endospines and smooth exterior, hypotype USNM 154080k; 51, interior of a broken specimen, showing the adductor callosity, $\times 1$, hypotype USNM 154080-l. [Bell Canyon Formation (Rader Member), USNM 725f.]

PLATE 306.—*Collumatus* and *Sestropoma*

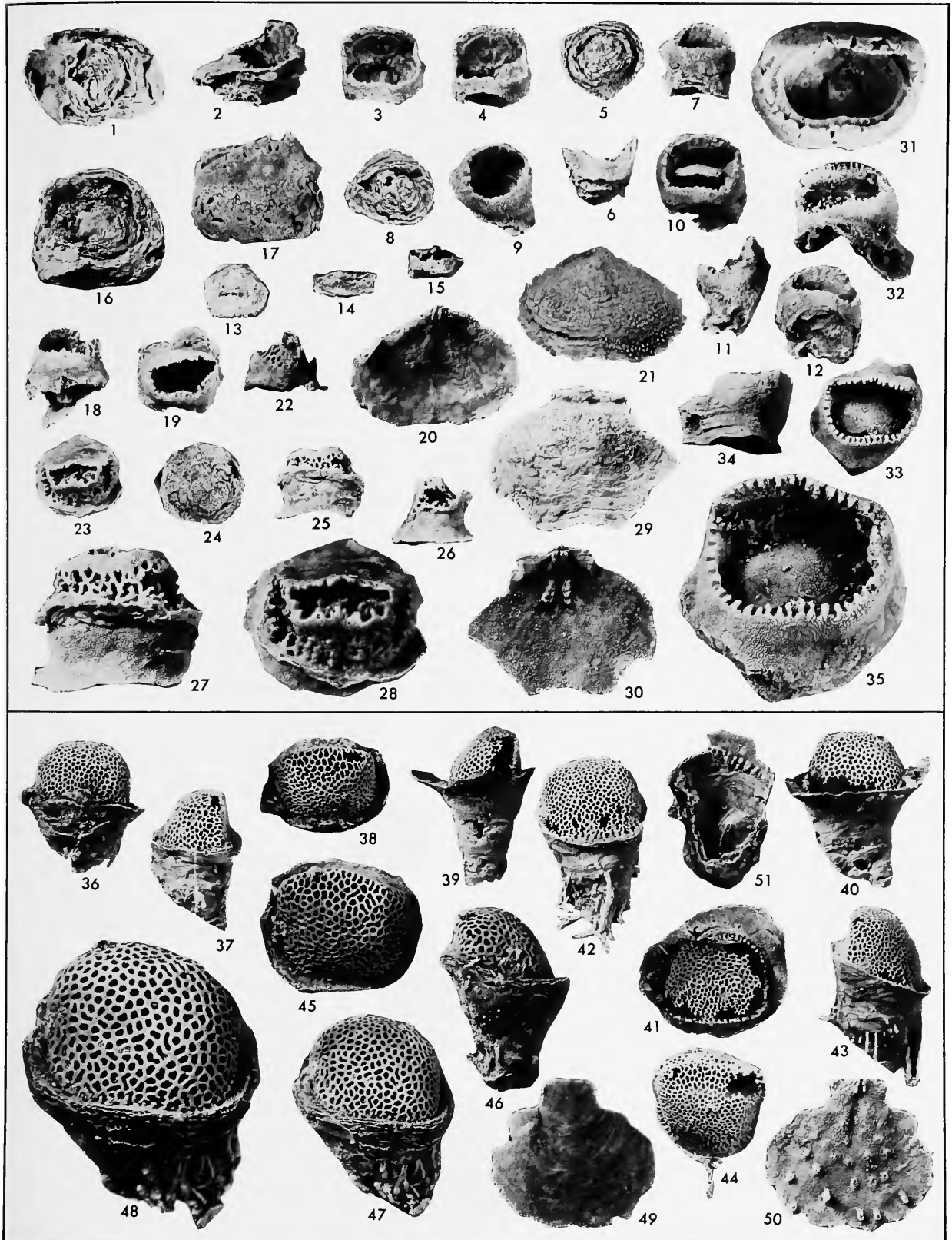


PLATE 307

Sestropoma

Sestropoma cribriferum Cooper and Grant: 1–3, Dorsal, anterior and side views of a complete specimen with broken coscinidium, $\times 1$, showing brachial valve in place, $\times 1$, hypotype USNM 154079a; 4–6, anterior, side, and dorsal views of a complete specimen with coscinidium, $\times 1$, hypotype USNM 154079e; 7, anterior view, $\times 1.5$, of the preceding specimen, showing coscinidium and rhizoid spines; 8, interior of a pedicle valve, $\times 2$, showing hinge area, adductor callosity and basal part of coscinidium, hypotype USNM 154080b. [Bell Canyon Formation (Rader Member), USNM 725f.]

9, Dorsal view of a young specimen with complete coscinidium, $\times 1$, paratype USNM 151656f; 10, 11, side and dorsal (apertural) views of an adult without coscinidium, $\times 1$, showing the carinate adductor callosity, paratype USNM 151656h; 12, 13, dorsal and anterior views of a young individual, $\times 1$, paratype USNM 151656i; 17–19, dorsal, side, and anterior views of a large paratype with thick spines, $\times 1$, USNM 151656a; 20–23, anterior, dorsal, and side views, $\times 1$, and dorsal view, $\times 1.5$, of the holotype USNM 151656b; 24–26, dorsal, side, and anterior views of a complete specimen with thick spines, $\times 1$, paratype USNM 151656c; 28, dorsal view of a small specimen, $\times 1$, paratype USNM 151656j; 29, fragment of a pedicle valve interior, $\times 1$, showing adductor callosity, hypotype USNM 151656–l; 30, side view of a specimen elongated by crowding, $\times 1$, hypotype USNM 151656m; 31, side view of a small specimen, $\times 1$, paratype USNM 151656k; 32, 33, exterior and interior views of the brachial valve of the preceding specimen, $\times 3$, showing cardinal process and scattered stout endospine bases. [Bell Canyon Formation (Hegler Member), USNM 731.]

14–16, Dorsal, anterior, and side views of a complete specimen, $\times 1$, hypotype USNM 151665. [Bell Canyon Formation (probably Hegler Member), AMNH 397.]

27, Small cluster, $\times 1$, showing the stout rhizoid spines, hypotype USNM 154081a. [Bell Canyon Formation (Hegler Member), USNM 732a.]

PLATE 307.—*Sestropoma*

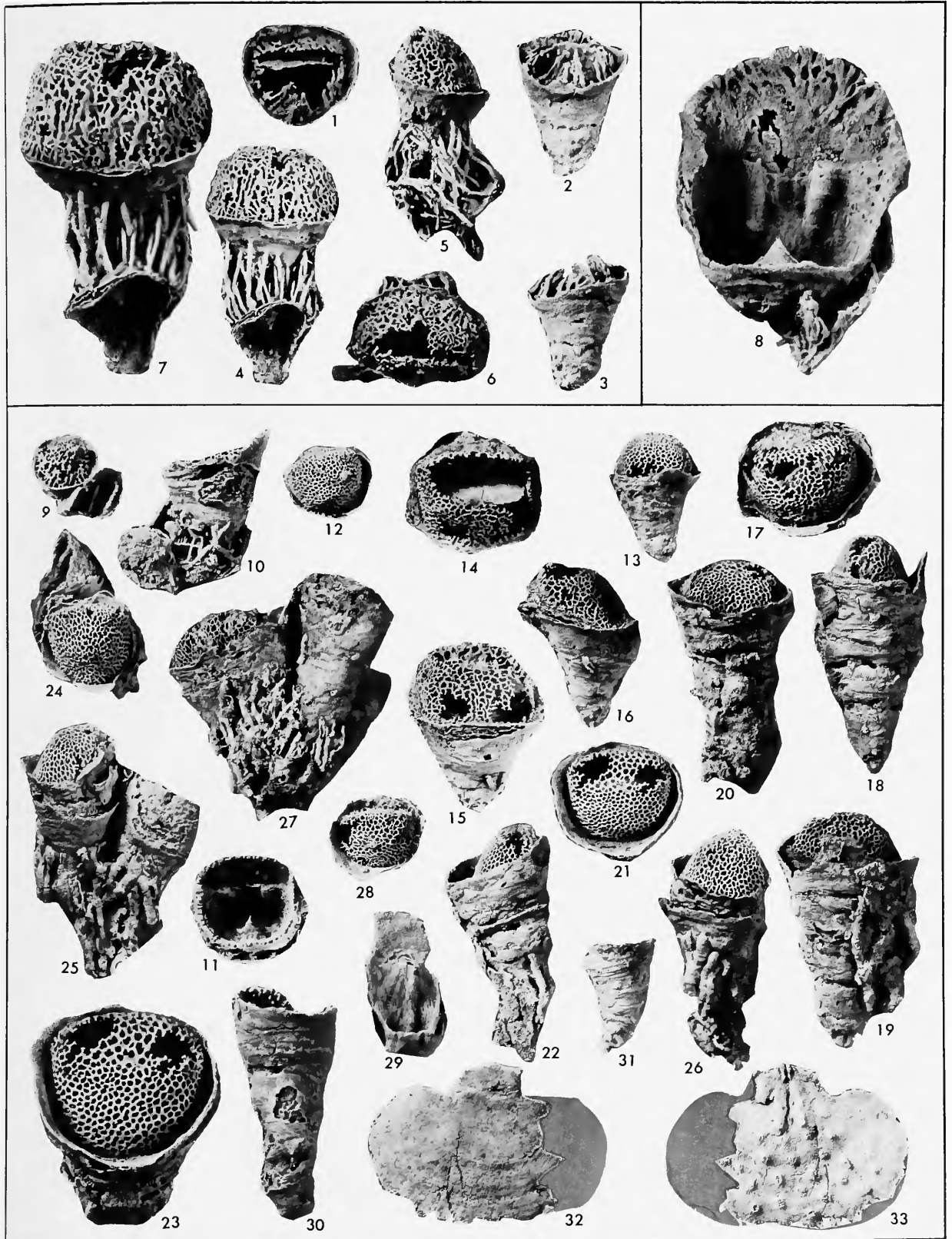


PLATE 308

Acritosia, *Cyclacantharia*, and *Sestropoma*

Acritosia? vestibula, new species: 1, Dorsal view of an attached pedicle valve, \times 1, paratype USNM 151743j; 2-5, ventral, anterior, side, and dorsal views, \times 1, holotype USNM 151743b. [Road Canyon Formation (base) USNM 702c.]

Cyclacantharia kingorum Cooper and Grant: 6, Side view of a young specimen with rhizoid spines, \times 1, hypotype USNM 154063t. [Word Formation (Willis Ranch Member), USNM 706e.]

22, Longitudinal section, showing vesicular shell in the apical part, \times 1, hypotype USNM 151782c; 23, polished longitudinal section of another specimen, showing the vesicular shell in the apical region, \times 1, hypotype USNM 154054. [Word Formation (Willis Ranch Member), USNM 723w.]

Cyclacantharia species 5: 7-9, Side, posterior, and dorsal (apertural) views of a well formed cup showing a circle of protective spines, \times 1, figured specimen USNM 151641. [Bell Canyon Formation, AMNH 404.]

Sestropoma cribriferum Cooper and Grant: 10, Interior of a broken specimen, showing the thick, carinate adductor callosity, \times 1, hypotype USNM 154056a; 11, partial side view of another broken specimen, showing the adductor callosity and basal parts of the protective net or coscinidium, \times 1, hypotype USNM 154056b; 20, small cluster of specimens attached to a proctid, \times 1, hypotype USNM 154056c. [Bell Canyon Formation (Hegler Member), USNM 731.]

12, Interior, \times 1, showing growth track of sockets and the valva falsa with base of coscinidium, hypotype USNM 151671a; 13, side view of a small specimen, showing brachial valve in place (in cross section), \times 1, hypotype USNM 151671b. [Bell Canyon Formation (probably Hegler Member), AMNH 404.]

14, 15, Two views of a broken pedicle valve, showing the aulacoterma and adductor callosity, \times 1, hypotype USNM 151670d; 16, interior of another pedicle valve, \times 1, showing the adductor callosity, hypotype USNM 151670f. [Bell Canyon Formation (Rader Member), AMNH 410.]

17, Interior of a pedicle valve in anterior view, showing track of socket growth and the base of the coscinidium, \times 1, hypotype USNM 154057. [Bell Canyon Formation (Pinery Member), USNM 733.]

18, Dorsal view of a pedicle valve, showing the adductor callosity, \times 1, hypotype USNM 151668. [Bell Canyon Formation (Rader Member), AMNH 403.]

19, Two specimens attached by rhizoid spines, \times 1, hypotype USNM 151676. [Bell Canyon Formation (Lamar Member), AMNH 39.]

21, Dorsal (apertural) view of a specimen in which the coscinidium has not yet been completed, \times 2, figured specimen 152694. [Bell Canyon Formation (Hegler Member), USNM 731.]

Acritosia magnifica, new species: 24, 25, Side and anterior views of rotund pedicle valve, showing squat form of early stage, \times 1, paratype USNM 154055a; 26, 27, dorsal and anterior views of a squat individual, \times 1, holotype USNM 154055b, showing the hunched shoulders of the brachial valve. [Road Canyon Formation, USNM 724j.]

PLATE 308.—*Acritosia*, *Cyclacantharia*, and *Sestropoma*

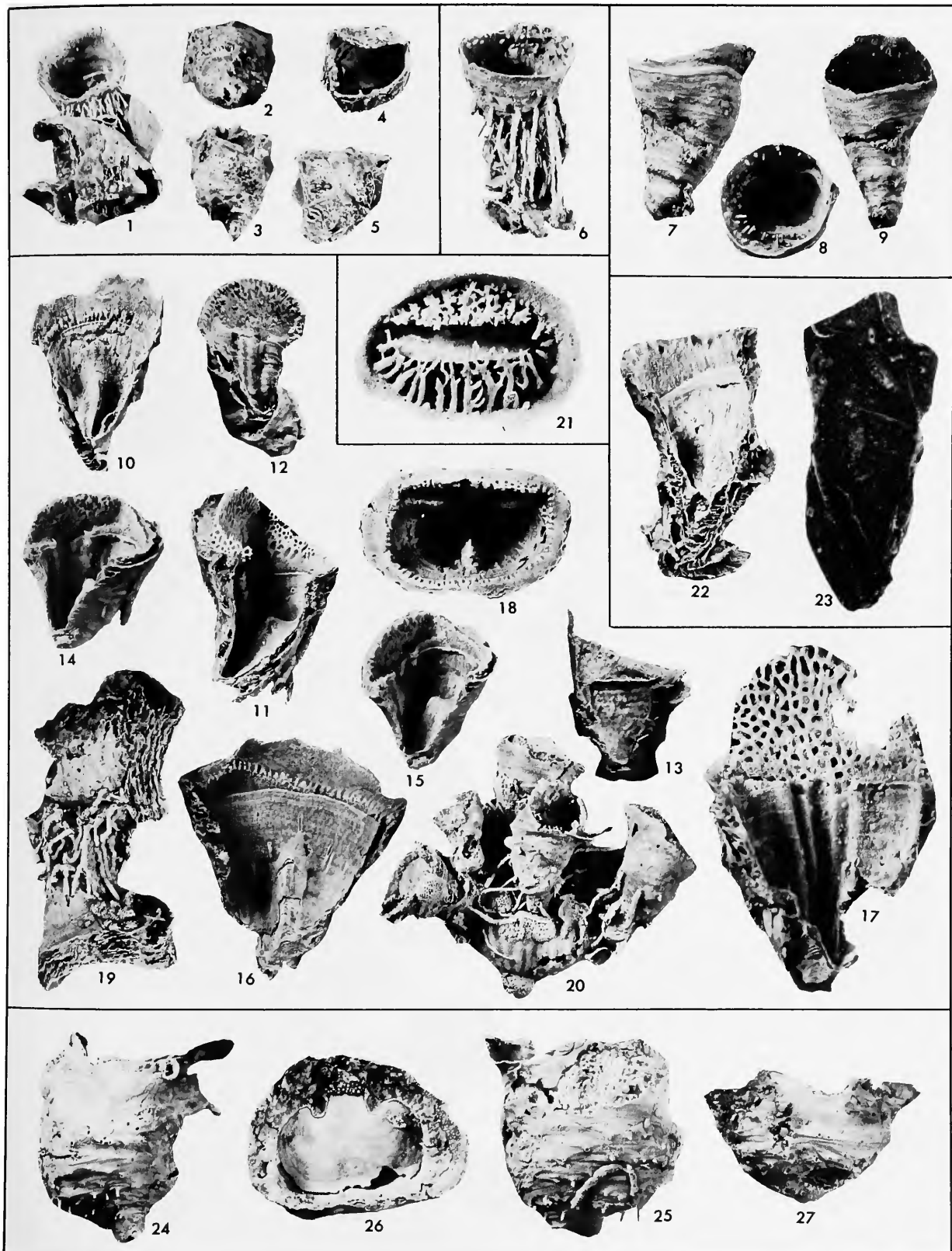


PLATE 309

Acritosia, Hercosia, Teguliferina, Collumatus, and Cyclacantharia

Acritosia silicica, new species: 1, 2, Dorsal view, $\times 1$, $\times 2$, of the pedicle valve, holotype USNM 152687c; 3-5, interior, $\times 1$, and exterior and interior, $\times 3$, of the brachial valve of the holotype showing external granules, the cardinal process and endospines. [Hueco Formation, USNM 725b.]

Hercosia uddeni (Böse): 6, Anterior view of a small cluster attached to the pedicle valve of *Collemataria*, $\times 1$, hypotype USNM 154112. [Cathedral Mountain Formation, USNM 702un.]

15, Dorsal view of a specimen with strong, long protective spines and a flaring marginal flange, $\times 1$, hypotype USNM 154113. [Cathedral Mountain Formation, USNM 735b.]

Teguliferina conida (Stehli): 7-9, Ventral, anterior, and dorsal views of a complete specimen with tiered marginal flanges and dorsal valve, $\times 1$, hypotype USNM 154098b; 10, 11, side and interior views of the brachial valve of the preceding specimen showing a strong 'breviseptum' but only vestigial endospines, $\times 1$; 12-14, exterior view, $\times 1$, and interior and side views of another brachial valve with stubby endospines but strong median ridge, $\times 2$, hypotype USNM 154111. [Bone Spring Formation, USNM 728f.]

Collumatus solitarius Cooper and Grant: 16, Side of a small pedicle valve cemented to a branch of a bryozoan, $\times 1$, hypotype USNM 154114a; 17-20, posterior, both sides, and ventral views of the preceding specimen showing mode of attachment to the bryozoan, $\times 2$; 21, anterior view of a small pedicle valve with coscinidium well preserved, $\times 1$, hypotype USNM 154114b; 22-26, ventral, anterior, side posterior, and dorsal views of the preceding specimen, $\times 2$, showing coscinidium, 27-29, sides of three specimens, $\times 1$, showing lamellae used for attachment, hypotype USNM 154526a-c. [Road Canyon Formation, USNM 732j.]

Cyclacantharia kingorum Cooper and Grant: 30, Anterior view of a large pedicle valve with small, crowded specimens attached to its side and elongated by the close crowding, $\times 1$, USNM 154064b. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 309.—*Acritosia*, *Hercosia*, *Teguliferina*, *Collumatus* and *Cyclacantharia*

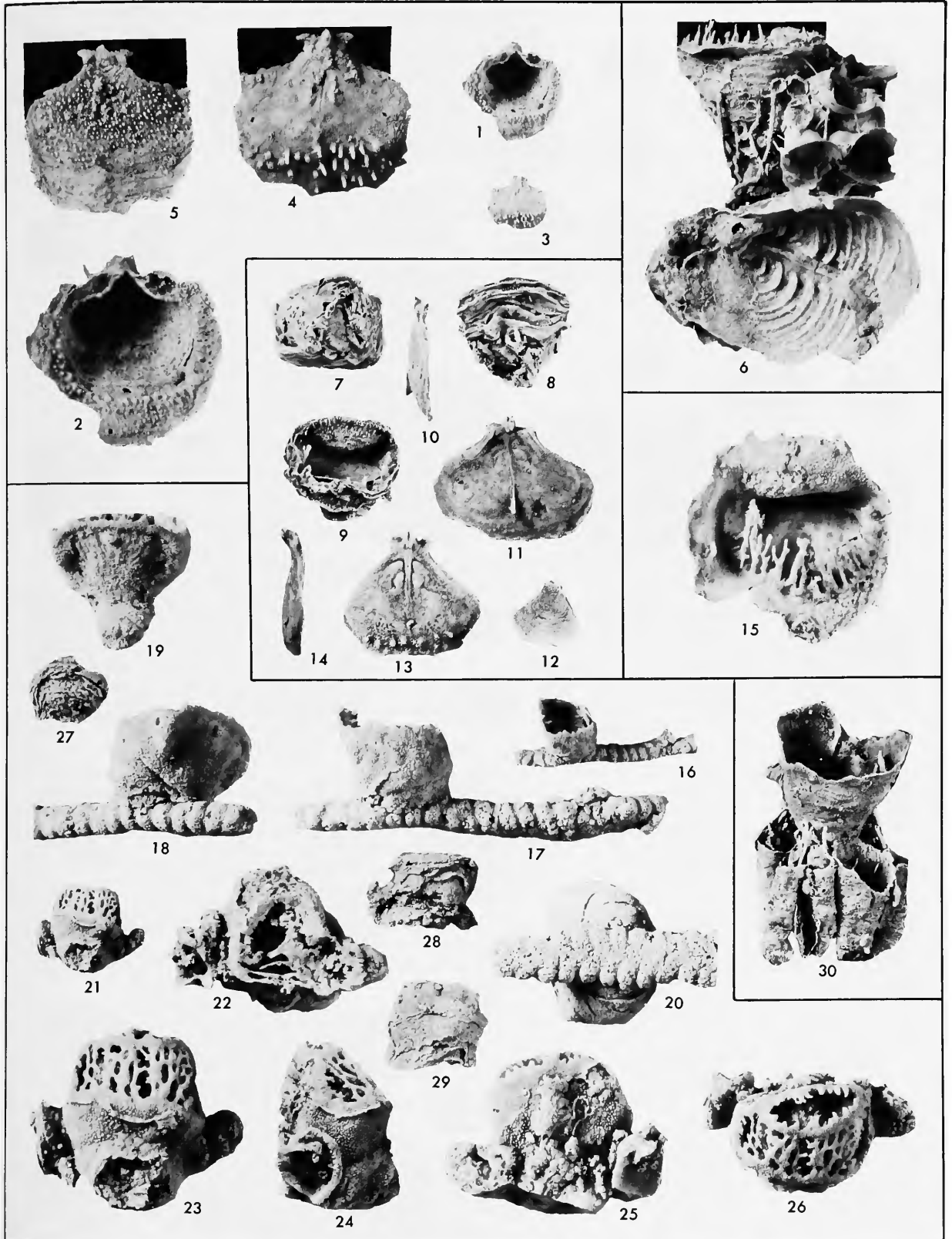


PLATE 310

Fimbrinia, *Simplicarina*, *Oncosarina*, and *Costispiniifera*

Fimbrinia ovata, new species: 1-4, Ventral, posterior, anterior, and side views of a pedicle valve, × 1, paratype USNM 153873; 5, 6, side and ventral views, × 2, of the preceding specimen. [Bone Spring Formation, USNM 728h.]

7-10, Posterior, ventral, anterior, and side views, × 1, of another paratype USNM 152701-1; 11, 12, side and ventral views of the preceding specimen, × 2; 13-15, posterior, anterior, and ventral views of a paratype, × 1, USNM 152701m; 16, 17, ventral and side views of the preceding paratype, × 2; 18-20, anterior, ventral, and side views of the holotype, × 1, USNM 152701a; 21, 22, side and ventral views of the holotype, × 2; 23, exterior, of a brachial valve, × 2, paratype USNM 152701i; 24, 25, exterior, × 2, and interior × 4, of another brachial valve, paratype USNM 152701j; 26, interior of a brachial valve, × 4, showing platforms, paratype USNM 152701k. [Bone Spring Formation, USNM 728f.]

27, 28, Dorsal view, × 1, × 2, of a complete specimen, paratype USNM 153874c; 29, exterior of a small brachial valve, × 2, paratype USNM 153874b; 30, interior, × 4, of the preceding specimen; 31, exterior of an imperfect valve, × 2, paratype USNM 153874a. [Skinner Ranch Formation (base), USNM 705a.]

Fimbrinia species 2: 32, Dorsal view of a poorly preserved complete specimen, × 2, figured specimen USNM 153876. [Neal Ranch Formation (bed 4 of P. B. King), USNM 727e.]

Fimbrinia species 3: 33, 34, Ventral views, × 1, × 4, of a small pedicle valve, figured specimen USNM 153877. [Cibolo Formation (Breccia Zone of Udden), USNM 728-1.]

Simplicarina incompta, new species: 35-39, Posterior, dorsal, side, anterior, and ventral views of the holotype, × 1, USNM 153927a; 40, 41, side and dorsal views, × 2, of the holotype. [Road Canyon Formation, USNM 726d.]

Oncosarina whitei (R. E. King): 42-44, Anterior, ventral, and side views of a pedicle valve, × 1, hypotype USNM 149843. [Hess Formation (Taylor Ranch Member), USNM 716n.]

45-47, Ventral, side, and anterior views of another pedicle valve, × 1, hypotype USNM 149845d; 48-50, ventral, side, and anterior views of a small pedicle valve, × 1, hypotype USNM 149845c. [Hess Formation Taylor Ranch Member), USNM 716o.]

51-55, Dorsal, side, posterior, anterior, and ventral views of a complete specimen, × 1, hypotype USNM 149840. [Hess Formation (Taylor Ranch Member), USNM 702m.]

56, Interior of the brachial valve, × 2, showing the elevated adductor platforms, hypotype USNM 153195. [Hess Formation (Taylor Ranch Member), USNM 722p.]

57-61, Anterior, posterior, side, ventral, and dorsal views of another complete specimen, × 1, hypotype USNM 149838. [Hess Formation (Taylor Ranch Member), USNM 702f.]

Costispiniifera rugatula (Girty): 62-65, Ventral, posterior, side, and dorsal views of a complete specimen, × 1, hypotype USNM 153878a; 66-70, side, posterior, anterior, dorsal, and ventral views of another complete specimen, × 1, hypotype USNM 153878b. [Word Formation (China Tank Member), USNM 706c.]

PLATE 310.—*Fimbrinia*, *Simplicarina*, *Oncosarina*, and *Costispinifera*

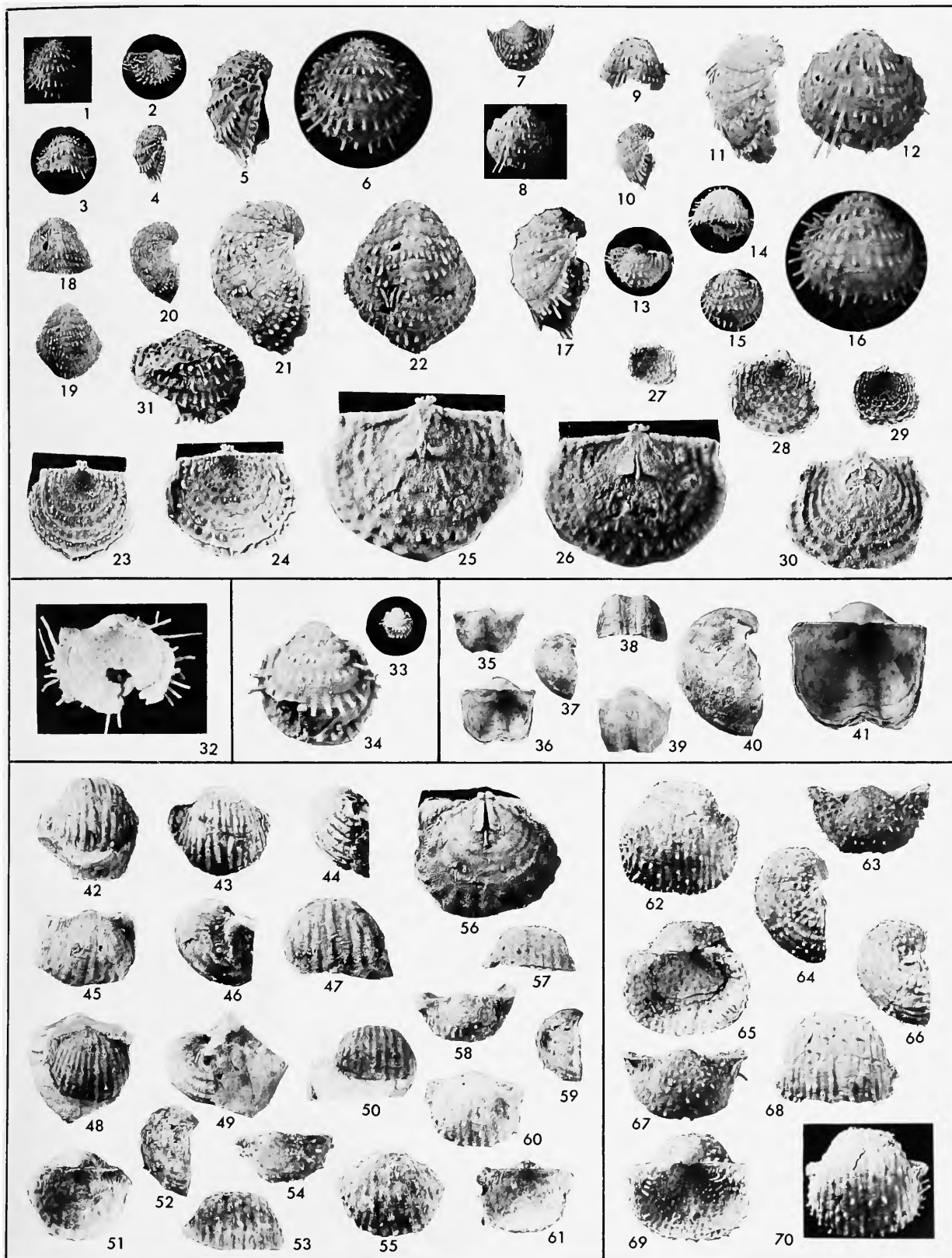


PLATE 311

Fimbrinia and *Rhytisia*

Fimbrinia species 1: 1, 2, Dorsal view, $\times 1$, $\times 2$, of a brachial valve, figured specimen, USNM 153999b; 3, 4, ventral views of a pedicle valve, $\times 2$, $\times 1$, figured specimen USNM 153999a. [Lenox Hills Formation (base), USNM 707j.]

Fimbrinia plummeri (R. H. King): 5–9, Ventral, side, anterior, posterior, and dorsal views of a pedicle valve, $\times 1$, hypotype YPM 11499a; 10, 11, ventral and side views, $\times 2$, of the preceding specimen; 12, 13, ventral and side views of another pedicle valve, $\times 1$, hypotype YPM 11499b; 14, side view, $\times 2$, of the preceding specimen. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), R. E. King, locality 94.]

Rhytisia rugosa, new species: 15–18, Ventral, posterior, side, and anterior views of a pedicle valve, $\times 1$, paratype USNM 152704a; 19, 20, ventral and side views, $\times 2$, of the preceding specimen; 21, ventral view of a small pedicle valve, $\times 1$, paratype USNM 152704d; 22–24, ventral, side, and posterior views, $\times 2$, of the preceding specimen, showing the wrinkled umbonal region; 25, 26, ventral, $\times 1$, and dorsal, $\times 2$, views of a complete specimen, paratype USNM 152704b; 27, 28, posterior and interior views, $\times 4$, of a brachial valve, showing cardinal process and brevisseptum, paratype USNM 152704i; 29, 30, posterior and interior views, $\times 4$, of another brachial valve, showing strong ear baffles, paratype USNM 152704j; 31, 32, exterior, $\times 1$, and interior, $\times 4$, of a brachial valve, paratype USNM 152704k. [Road Canyon Formation, USNM 724c.]

33–35, Ventral, posterior, and anterior views of a pedicle valve, $\times 1$, paratype USNM 152703e; 36, ventral view, $\times 3$, of the preceding specimen; 37, 38, dorsal views of a complete specimen, $\times 1$, $\times 2$, holotype USNM 152703c; 39, ventral view, $\times 3$, of the holotype; 40, ventral view of a strongly wrinkled pedicle valve, $\times 2$, paratype USNM 152703f; 41, ventral view of another wrinkled specimen, $\times 2$, paratype USNM 152703g; 42, 43, exterior, $\times 3$, and interior, $\times 4$, of a wrinkled brachial valve, paratype USNM 152703h; 44, exterior of a brachial valve, $\times 2$, showing wrinkles, paratype USNM 152703i; 45, 46, posterior and interior of the preceding specimen, $\times 3$, showing cardinal process; 47, exterior of another brachial valve, $\times 2$, showing wrinkles, paratype USNM 152703–1; 48, ventral view of a pedicle valve, $\times 2$, paratype USNM 152703b; 49, exterior of a brachial valve, $\times 2$, paratype USNM 152703k; 50, 51, posterior and interior views, $\times 3$, of the preceding specimen. [Road Canyon Formation, USNM 721z.]

52, 53, Ventral and posterior views of a pedicle valve, $\times 2$, paratype USNM 152979c; 54–56, ventral and posterior views, $\times 2$, and ventral view, $\times 1$, of another pedicle valve, paratype USNM 152979a. [Road Canyon Formation, USNM 721j.]

57, Ventral view of a pedicle valve preserving the initial attachment ring, $\times 2$, paratype USNM 154000a; 58, 59, ventral view of another pedicle valve, $\times 1$, $\times 3$, showing its stout halteroid spines, paratype USNM 154000b. [Road Canyon Formation, USNM 726d.]

PLATE 311.—*Fimbrinia* and *Rhythisia*

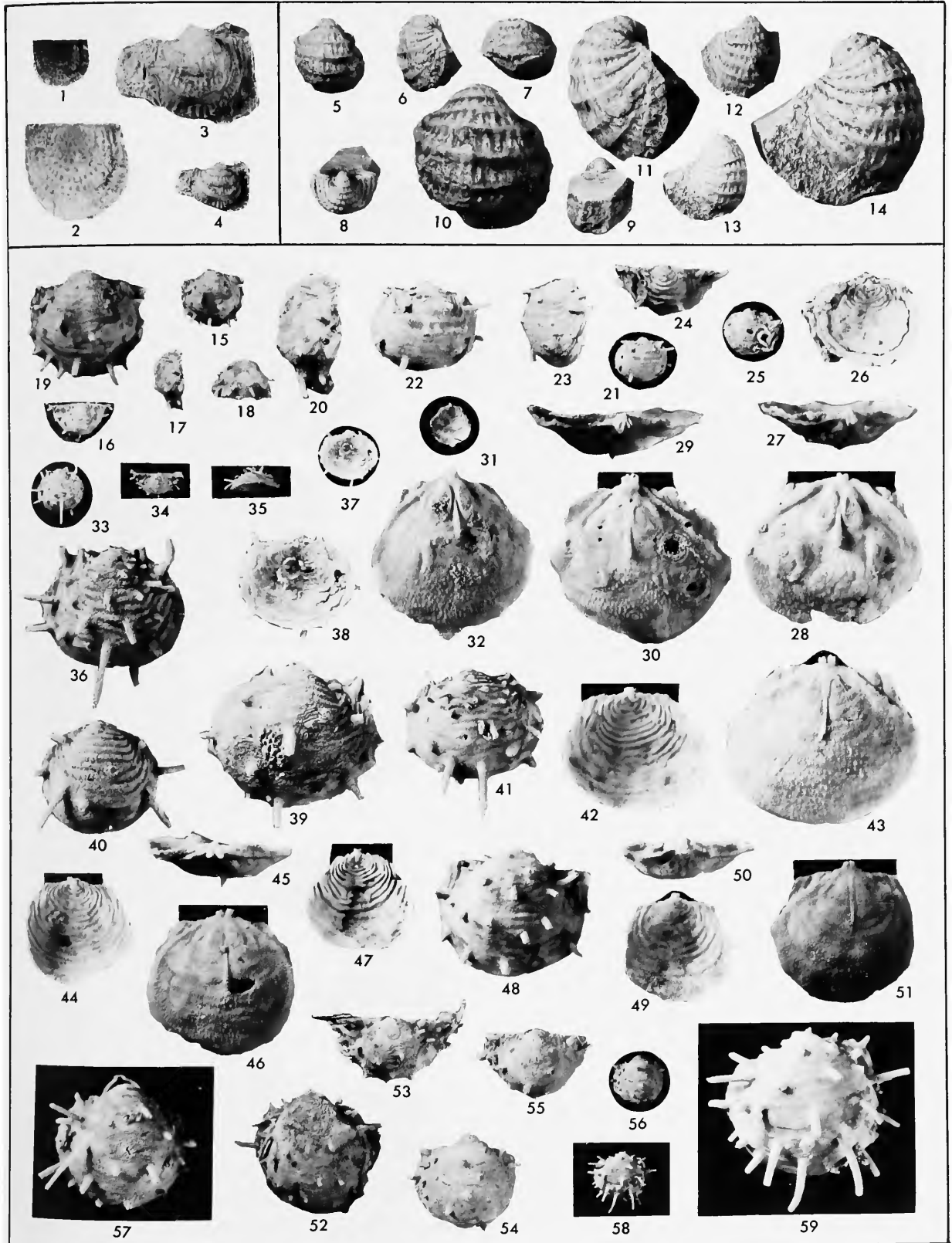


PLATE 312

Kozlowskia, *Costispinifera*, and *Simplicarina*

Kozlowskia alata, new species: 1–4, Ventral, dorsal, posterior, and anterior views of a complete specimen, $\times 1$, holotype USNM 149800d; 5–8, anterior, ventral, posterior, and dorsal views of another complete specimen, $\times 1$, paratype USNM 149800b; 9–11, anterior, side, and interior views of a brachial valve, $\times 1$, showing margin and long trail, paratype USNM 149799b; 12, 13, posterodorsal and interior views of the preceding brachial valve, $\times 2$, showing fluted ear baffles and cardinal process; 14, posterior of the preceding, $\times 3$, showing the cardinal process; 15–17, interior, anterior, and side views of an alate brachial valve, $\times 1$, showing the margin and trail, paratype USNM 149799a; 18, 19, interior and posterodorsal views of the preceding, $\times 2$, showing elevated muscle scars, brachial ridges, and cardinal process; 20, posterodorsal view of the preceding, $\times 3$, showing the cardinal process (for an additional view of this specimen see plate 453: figure 34.) [Skinner Ranch Formation (base), USNM 705a.]

Costispinifera rugatula (Girty): 21–24, anterior, side, posterior, and ventral views of a large pedicle valve, $\times 1$, hypotype USNM 153905. [Word Formation (China Tank Member), USNM 706c.]

Simplicarina incompta, new species: 25–28, Exterior, $\times 1$, and interior, posterior, and exterior, $\times 2$, of a brachial valve, paratype USNM 151585c; 29–32, exterior, $\times 1$, and interior, exterior, and posterior, $\times 2$, of another brachial valve, showing the small, narrow cardinal process and broad brachial ridges, paratype USNM 151585b; 33–36, side, posterior, anterior, and dorsal views of a complete specimen, $\times 1$, paratype USNM 151585a; 37–41, posterior, anterior, ventral, side, and dorsal views of the preceding specimen, $\times 2$. [Road Canyon Formation, USNM 721j.]

42–45, Dorsal, anterior, posterior, and side views of a complete specimen preserving parts of its spines, $\times 1$, paratype USNM 151583; 46–50, posterior, anterior, ventral, side, and dorsal views of the same paratype, $\times 2$. [Road Canyon Formation, USNM 720d.]

PLATE 312.—*Kozlowskia*, *Costispinifera*, and *Simplicarina*

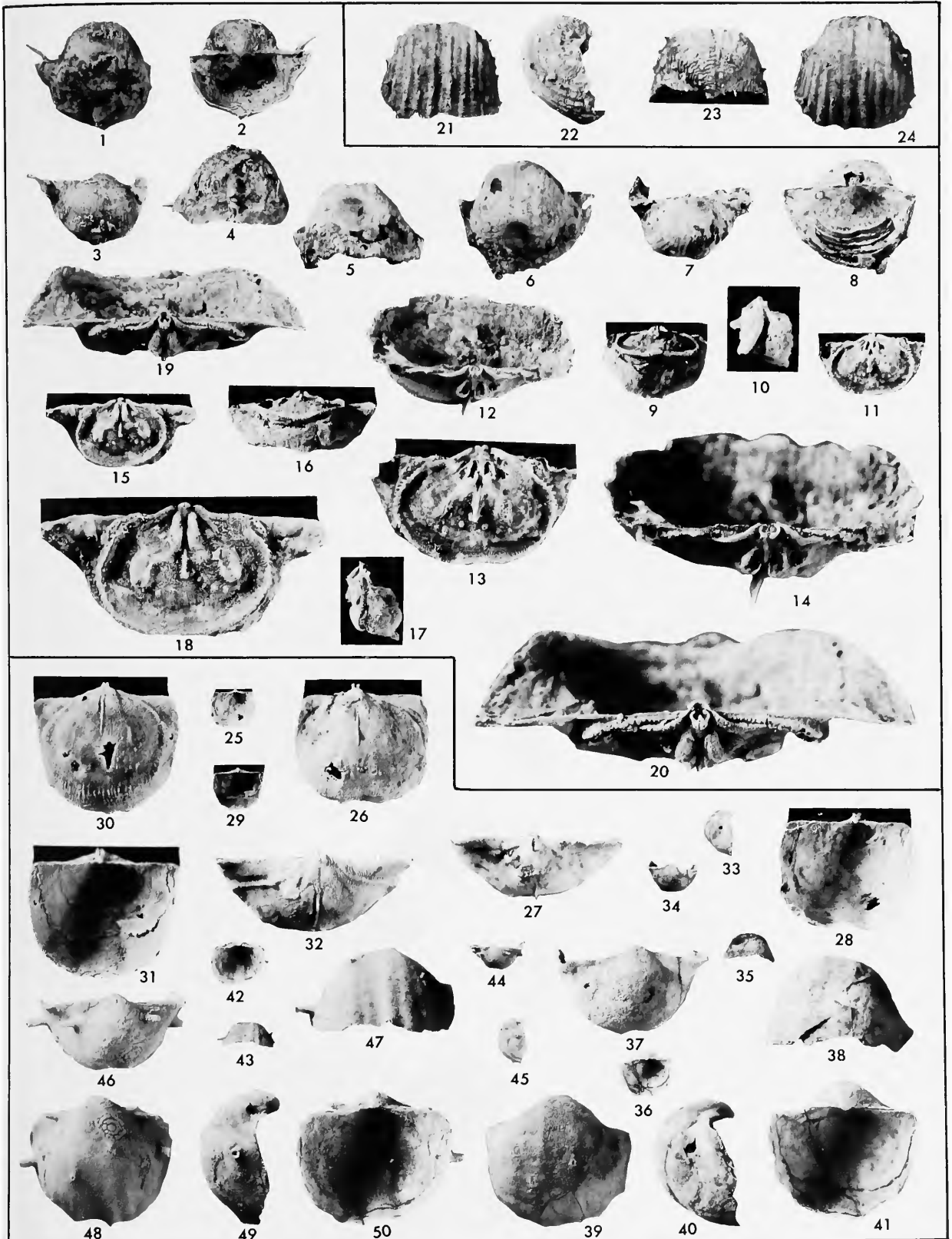


PLATE 313

Kozlowskia

Kozlowskia anterosulcata, new species: 1-4, Anterior, ventral, posterior, and side views of a pedicle valve, $\times 1$, paratype USNM 149795b; 5-8, anterior, ventral, posterior, and side views of another pedicle valve, $\times 1$, paratype USNM 149795a. [Lenox Hills Formation (Ammonite Bed), USNM 715.]

9-12, Ventral, posterior, anterior, and side views of a pedicle valve, $\times 1$, holotype USNM 149793a. [Lenox Hills Formation, USNM 707j.]

Kozlowskia nasuta, new species: 13-16, Side, anterior, posterior, and ventral views, $\times 1$, holotype USNM 149798; 17, 18, ventral and dorsal views of the holotype, $\times 2$, showing the short anterior siphon and concentric trails; 19, 20, exterior and interior of the brachial valve of the holotype, $\times 1$; 21, interior of the holotype, $\times 2$, showing brachial ridges and occasional endospines; 22, 23, interior and posterior of the brachial valve of the holotype, $\times 3$, showing cardinal process and ear baffles. [Neal Ranch Formation (bed 9 of Cooper), USNM 701a.]

Kozlowskia kingi Stehli: 24-27, Ventral anterior, posterior, and side views of a large pedicle valve, $\times 1$, hypotype USNM 149805a (for interior, see plate 314: figure 45); 28-31, posterior, anterior, ventral, and side views of another pedicle valve, $\times 1$, hypotype USNM 149805c. [Bone Spring Formation, USNM 728f.]

32-35, Ventral, side, anterior, and posterior views of a strongly alate pedicle valve, $\times 1$, hypotype USNM 149803d; 36-39, ventral, posterior, interior, and anterior views of a finely costellate specimen, $\times 1$, showing the ear baffles, hypotype USNM 149803g; 40-43, dorsal, anterior, ventral, and posterior views, $\times 1$, showing dorsal trails and a narrow median fold, hypotype USNM 149803a; 44-47, anterior tilted, ventral, posterior, and ventral views of a pedicle valve preserving one of the long halteroid spines, $\times 1$, hypotype USNM 149803h; 48-51, side, anterior, ventral, and posterior views of a completely costellate pedicle valve, $\times 1$, hypotype USNM 149803i; 52-55, anterior, posterior, side, and ventral views of a costellate specimen with some of its spines, $\times 1$, hypotype USNM 149803j; 56-58, ventral, side, and dorsal views of a complete specimen, $\times 1$, showing trails of the brachial valve, hypotype USNM 149803k. [Bone Spring Formation, USNM 728e.]

PLATE 313.—*Kozłowska*

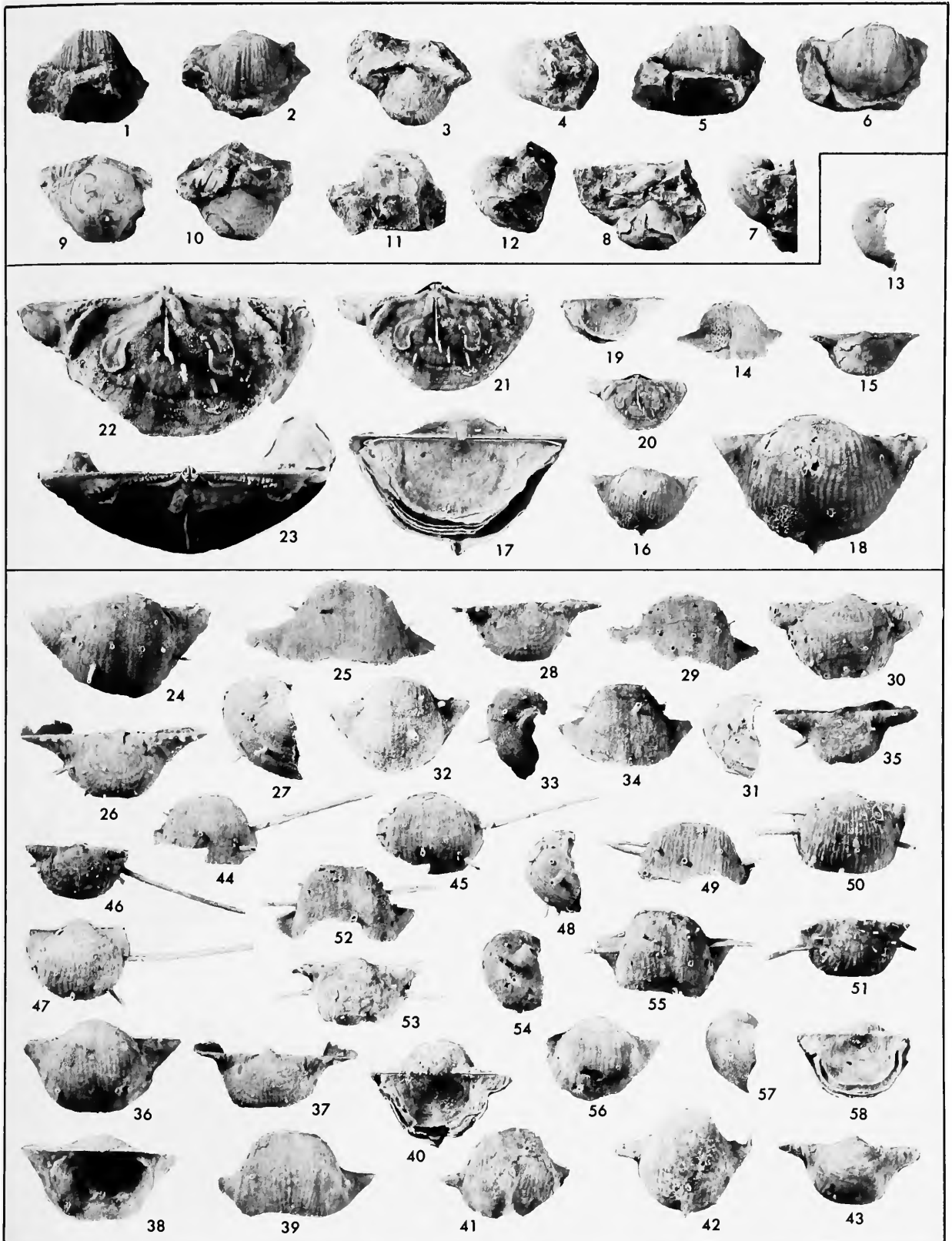


PLATE 314

Kozlowskia

Kozlowskia subsphaeroidalis, new species: 1–4, Anterior, ventral, side, and dorsal view of a pedicle valve, $\times 1$, paratype USNM 149797k; 5–8, side, ventral, anterior, and dorsal views of a complete specimen, $\times 1$, paratype USNM 149797b; 9–12, dorsal, ventral, anterior, and side views of a complete specimen, $\times 1$, holotype USNM 149797a; 13, dorsal view of the holotype, $\times 2$; 14–16, interior, $\times 1$, interior and posterior, $\times 2$, of a small brachial valve, paratype USNM 149797q; 17, interior of another brachial valve, $\times 1$, paratype USNM 149797p; 18, 19, interior and posterodorsal views of the preceding brachial valve, $\times 2$, showing margin, septum and sparse endospines; 20, interior of the preceding, $\times 3$, showing ear baffles and small cardinal process. [Skinner Ranch Formation (base), USNM 711p.]

Kozlowskia kingi Stehli: 21–24, Ventral, posterior, anterior, and side views of a large, costellate pedicle valve, $\times 1$, hypotype USNM 149803f; 25, 26, anterior, and partial side views of a broken specimen, $\times 1$, showing the long endospines, hypotype USNM 149803–1; 27, ventral view of the preceding specimen, showing the large endospines, $\times 2$; 28, another broken specimen, $\times 1$, showing endospines, hypotype USNM 149803n; 29, dorsal view of a complete specimen, $\times 1$, showing dorsal trails, hypotype USNM 149803m; 30–33, anterior, dorsal, interior, and tilted anterior views, $\times 1$, showing the margin and trail, hypotype USNM 149803o; 34, 35, interior and side views of the preceding brachial valve, $\times 2$, showing the marginal ridge, trail, brachial ridges, and ear baffles; 36–38, side, anterior, and interior views of another brachial valve, $\times 1$, showing the trail and marginal rim, hypotype USNM 149803j; 39, 40, interior and posterodorsal views of the preceding brachial valve, $\times 2$, showing the marginal ridge and cardinal process; 41, 42, side and interior views of a brachial valve with strong marginal ridge, $\times 1$, hypotype USNM 149803q; 43, 44, interior and posterior views of the preceding brachial valve, $\times 3$, showing cardinal process, ear baffles, and few endospines. [Bone Spring Formation, USNM 728e.]

45, Interior of the pedicle valve, $\times 2$, showing strong, fluted ear baffles, hypotype USNM 149805a (for exterior, see plate 313: figures 24–27). [Bone Spring Formation, USNM 728f.]

PLATE 314.—*Kozlowskia*

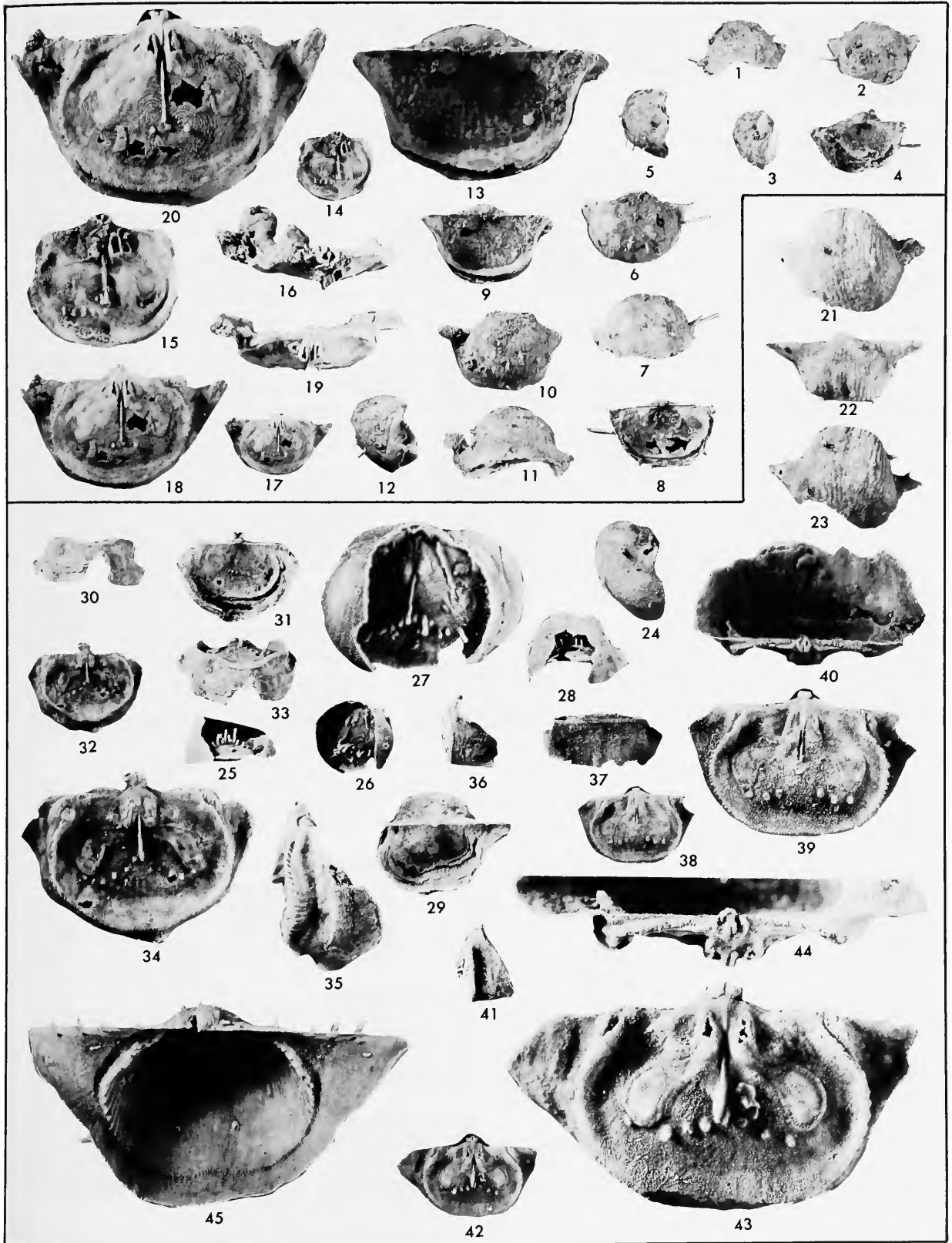


PLATE 315

Hystriculina

Hystriculina minima new species: 1-4, Dorsal, ventral, anterior, and side views of a complete specimen, $\times 1$, holotype USNM 153898a; 5-8, side, posterior, ventral, and anterior views of a pedicle valve preserving one of the long halteroid spines, $\times 1$, paratype USNM 153898b; 9-13, anterior, dorsal, posterior, ventral, and side views of a specimen stripped of its spines, $\times 1$, paratype USNM 149773f; 14-18, ventral, side, anterior, posterior, and dorsal views of another stripped specimen, $\times 1$, paratype USNM 149773d; 19, 20, interior and exterior of a brachial valve, $\times 2$, paratype USNM 153898c; 21, posterior of the preceding specimen, $\times 3$, showing the cardinal process; 22, 23, exterior and interior views of another brachial valve, $\times 2$, paratype USNM 153898d. [Neal Ranch Formation (bed 4), USNM 701d.]

Hystriculina pumila, new species: 24-28, Anterior, ventral, posterior, dorsal, and side views of a complete specimen, $\times 1$, paratype USNM 149759c; 29, dorsal view of the preceding paratype, $\times 2$; 30-34, anterior ventral, dorsal, side, and posterior views of another complete specimen, $\times 1$, holotype USNM 149759b; 35, dorsal view of the holotype, $\times 2$; 36, 37, ventral view of a small pedicle valve preserving many of its body spines, $\times 1$, $\times 2$, paratype USNM 149759j; 38, 39, ventral view of another pedicle valve retaining some of its spines, $\times 1$, $\times 2$, paratype USNM 149759k; 40, 41, ventral view of a third paratype retaining many of its spines, $\times 1$, $\times 2$, USNM 149759-l; 42, 43, interior and exterior of the brachial valve, $\times 2$, paratype USNM 149759m; 44, posterodorsal view of the preceding brachial valve, $\times 3$, showing the cardinal process; 45, 46, interior and exterior of another brachial valve, $\times 2$, paratype USNM 149759n; 47, posterodorsal view of the preceding paratype, $\times 3$, showing the cardinal process. [Skinner Ranch Formation (base), USNM 711p.]

Hystriculina ventroplana, new species: 48-52, Anterior, ventral, side, dorsal, and posterior views of a complete specimen, $\times 1$, paratype USNM 149777a; 53-57, dorsal, posterior, ventral, anterior, and side views of another complete specimen, $\times 1$, holotype USNM 149777b; 66-70, side, ventral, anterior, dorsal, and posterior views of a paratype preserving some of its spines, $\times 1$, USNM 149777c; 71, 72, ventral and dorsal views of the preceding specimen, $\times 2$. [Neal Ranch Formation (upper 15 feet of bed 2 of P. B. King), USNM 701.]

58-61, Posterior, side, anterior and ventral views of a paratype, $\times 1$, USNM 149783b; 62-65, side, posterior, and ventral, anterior views, $\times 1$, of another paratype USNM 149783a. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701q.]

PLATE 315.—*Hystriculina*

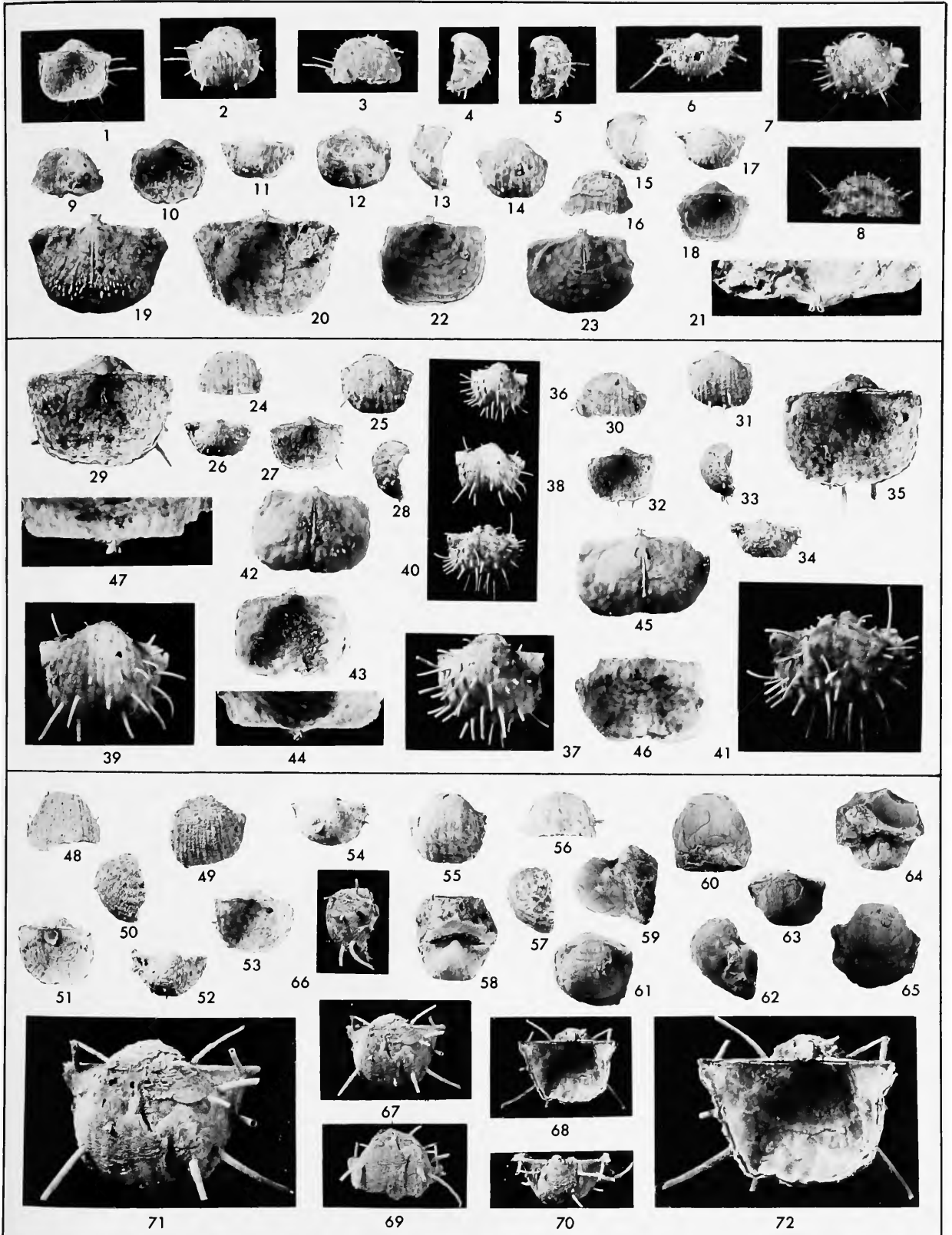


PLATE 316

Bothrionia and Thamnosia

Bothrionia nasuta, new species: 1-4, Ventral, dorsal, anterior, and side views, $\times 1$, of the holotype USNM 149637a; 5, 6, ventral and dorsal views, $\times 2$, of the holotype; 7-9, dorsal, ventral, and anterior views of a small, nonnasute specimen, $\times 1$, paratype USNM 149637f; 10-12, ventral, anterior, and dorsal views of a nasute specimen, $\times 1$, paratype USNM 149637b. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

13-16, Ventral, dorsal, anterior, and side views of a complete specimen, $\times 1$, paratype USNM 153845. [Word Formation (China Tank Member), USNM 726r.]

17-20, Side posterior, anterior, and ventral views of a pedicle valve, $\times 1$, paratype USNM 149639. [Word Formation (China Tank Member), USNM 713.]

21-23, Anterior, posterior, and ventral views of a nasute pedicle valve, $\times 1$, paratype USNM 149635a; 24, 25, interior and exterior of the preceding specimen, $\times 2$, showing strong marginal rim; 26, anterior of a pedicle valve which has not yet developed a nasute projection, $\times 1$, paratype USNM 149635b. [Word Formation (Willis Ranch Member), USNM 706.]

Bothrionia guadalupensis, new species: 27-29, Ventral, anterior, and side views of a nasute pedicle valve, $\times 1$, paratype USNM 149628a; 30-33, anterior, side, dorsal, and ventral views of a complete specimen, $\times 1$, paratype USNM 149628c; 34-37, ventral, dorsal, side, and anterior views of a specimen preserving both valves, $\times 1$, holotype USNM 149628d; 38, 39, interior of the brachial valve of the holotype, $\times 1$, $\times 2$; 40, 41, interior and posterior views of the brachial valve of the holotype, $\times 3$, showing cardinal process, brevisseptum and large endospines; 42-45, ventral, side, anterior, and dorsal views of a paratype with pedicle valve partially broken away, $\times 1$, USNM 149628b; 46, dorsal view, $\times 1.5$, of the preceding specimen; 47, laterally tilted view of the preceding, $\times 2$, showing the brevisseptum and endospines, $\times 2$; 48-50, anterior, ventral, and side views of a pedicle valve, $\times 1$, paratype USNM 149628e; 51, dorsal view, $\times 1$, of a paratype preserving the brachial valve, USNM 149628f. [Cherry Canyon Formation (Getaway Member), USNM 728.]

Thamnosia phragmophora, new species: 52-56, Side, posterior, anterior, dorsal, and ventral views of a complete specimen, $\times 1$, paratype USNM 153847. [Word Formation (Appel Ranch Member), USNM 719z.]

PLATE 316.—*Bothrionia* and *Thamnosia*

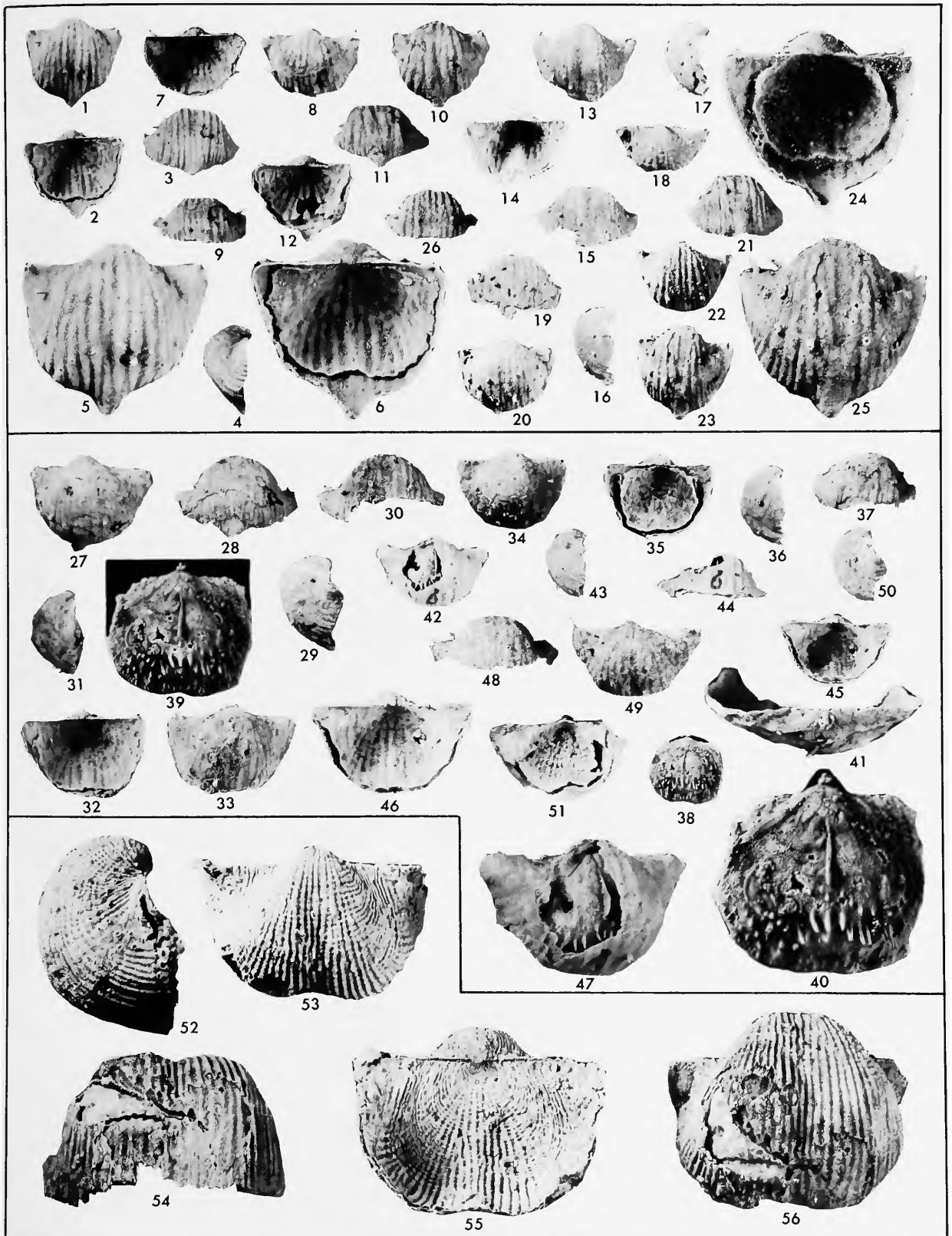


PLATE 317

Bothrionia

Bothrionia nasuta, new species: 1-3, Anterior, posterior, and side views of a pedicle valve, $\times 1$, paratype USNM 149636a; 4, ventral view of the preceding specimen, $\times 2$; 5, interior of the preceding specimen showing the inner margin, $\times 1$; 6, 7, exterior and interior of a brachial valve, $\times 1$, paratype USNM 149636b; 8, interior of the preceding specimen, $\times 2$, showing the large endospines; 9, 10, interior and posterior of the preceding specimen, $\times 3$, showing the cardinal process and brevisseptum, [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706.]

Bothrionia pulchra, new species: 11-14, dorsal, anterior, anterior, and side views, $\times 1$, of the holotype, USNM 149631; 16, 16, ventral and dorsal views of the holotype, $\times 2$, [Cherry Canyon Formation (Getaway Member), USNM 732.]

17, 18, Side and interior views of a pedicle valve, $\times 1$, paratype USNM 149630. [Cherry Canyon Formation (Getaway Member), USNM 730.]

Bothrionia transversa, new species: 19-22, Interior, side, anterior, and posterior views of a pedicle valve, $\times 1$, paratype USNM 149646h; 23-26, anterior, dorsal, side, and posterior views of a complete specimen, $\times 1$, paratype USNM 149646e; 27-30, dorsal, posterior, anterior, and side views of another complete specimen, $\times 1$, paratype USNM 149646b; 31-33, ventral, dorsal, and pedicle valve interior, $\times 1$, of the holotype USNM 149643; 34, interior of the pedicle valve of the holotype, $\times 2$, showing peripheral rim; 35, interior of the brachial valve of the holotype, $\times 1$; 36, 37, interior and posterior of the brachial valve of the holotype, $\times 3$, showing brevisseptum, endospines and cardinal process. [Word Formation (Appel Ranch Member), USNM 715i.]

38-41, Side, posterior, anterior, and ventral views of a pedicle valve, $\times 1$, paratype USNM 149641a; 42, interior of the preceding pedicle valve, $\times 1$; 43-46, dorsal, side, anterior, and posterior views of a complete specimen, $\times 1$, paratype USNM 149641c; 47, dorsal view of the preceding paratype, $\times 2$. [Word Formation (Appel Ranch Member), USNM 706b.]

48-50, Ventral, side, and posterior views of a pedicle valve, $\times 1$, paratype USNM 153846. [Word Formation (Appel Ranch Member), USNM 719z.]

Bothrionia transversa, new species: 51-54, Anterior, side, ventral, and posterior views of a poorly preserved specimen, $\times 1$, figured specimen YPM 11733. [Word Formation (Appel Ranch Member), R. E. King locality 247.]

PLATE 317.—*Bothrionia*

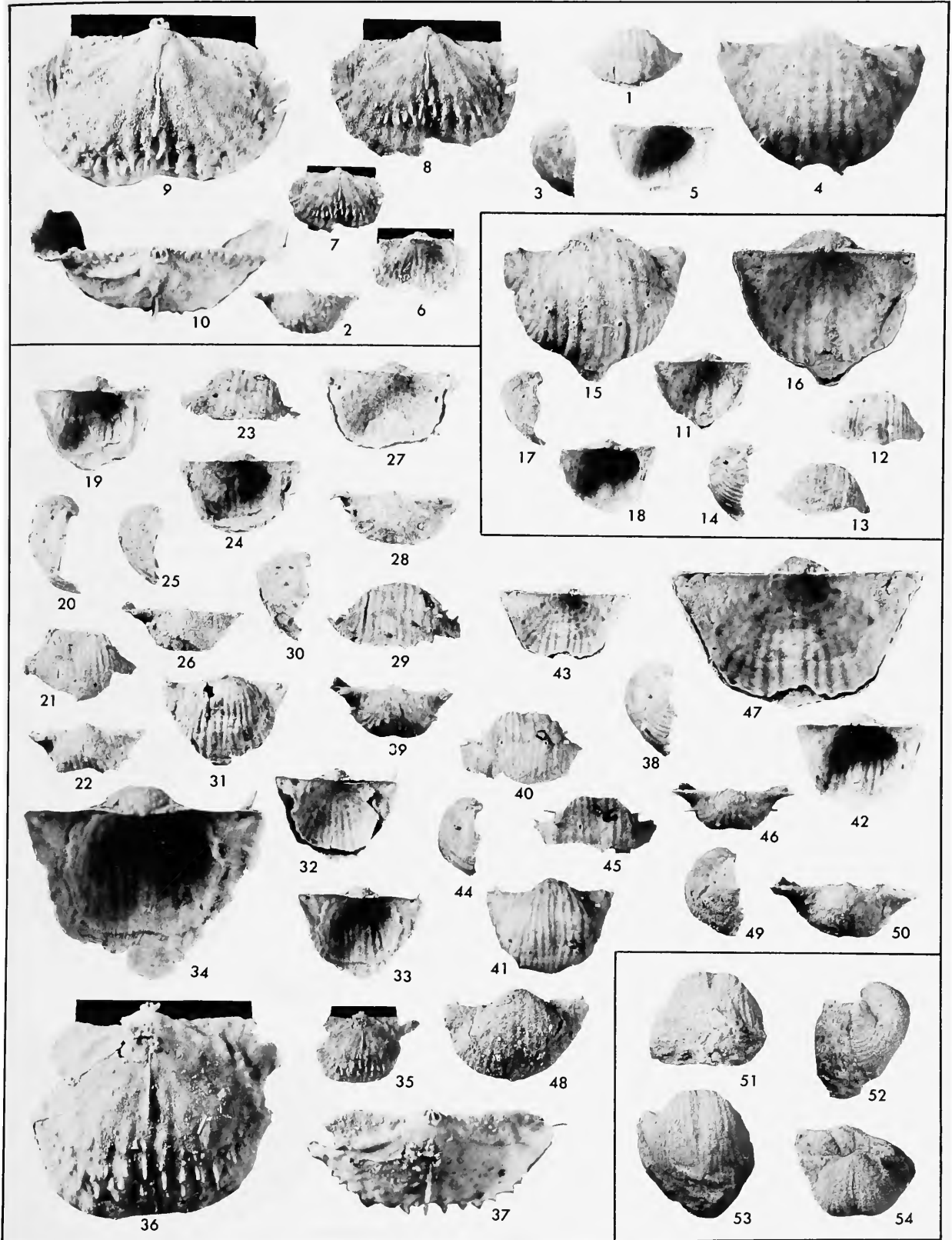


PLATE 318

Oncosarina and *Bothrionia*

Oncosarina rotunda new species: 1–4, Dorsal, side, ventral and anterior views, $\times 1$, of the holotype USNM 149819d; 5, dorsal view of the holotype, $\times 2$; 6–8, ventral, side, and posterior views of a well preserved pedicle valve, $\times 1$, paratype USNM 149819a; 9, ventral view of the preceding paratype, $\times 2$; 10–13, dorsal, ventral, side, and posterior of another complete specimen, $\times 1$, paratype USNM 149819b; 14, dorsal view of the preceding specimen, $\times 2$; 15–18, ventral, anterior, side, and dorsal views of a young specimen, $\times 1$, paratype USNM 149819j; 19, dorsal view of the preceding paratype, $\times 2$, showing the strong concentric wrinkles on the dorsal valve; 20–23, posterior, side, dorsal, and ventral views of another young paratype, $\times 1$, USNM 149819g; 24, dorsal view of the preceding specimen, $\times 2$; 25, 26, dorsal view of a specimen, $\times 1$, $\times 2$, showing the large cardinal process, paratype USNM 149819p. [Skinner Ranch Formation (Decie Ranch Member), USNM 714t.]

Bothrionia transversa, new species: 27–30, Side, anterior, ventral, and posterior views of a pedicle valve, $\times 1$, paratype USNM 153848a; 31–34, side, posterior, anterior, and ventral views of another large pedicle valve, $\times 1$, paratype USNM 153848b; 35, 36, interior and posterior views of a brachial valve, $\times 2$, showing the brachial ridges and endospines, paratype USNM 153848c; 37, 38, posterior and interior views of another brachial valve, $\times 2$, showing the same features as the preceding specimen, paratype USNM 153848d; 39, 40, interior, $\times 2$, and posterior, $\times 3$, of a brachial valve, showing the cardinal process, paratype USNM 153848e. [Word Formation (Appel Ranch Member, USNM 722t.)]

41–44, Posterior, ventral, side, and anterior views of a pedicle valve, $\times 1$, paratype USNM 153849a; 45, interior of a brachial valve, $\times 1$, paratype USNM 153849b; 46, 47, interior and posterior of the preceding specimen, $\times 2$, showing endospines; 48, posterior view of the preceding paratype, $\times 3$, showing the cardinal process; 49, 50, interior of another brachial valve showing brevisseptum and endospines, $\times 1$, $\times 2$, paratype USNM 153849c; 51, posterior view of the preceding paratype, $\times 3$, showing the cardinal process. [Word Formation (Appel Ranch Member), USNM 719z.]

52–54, Posterior, ventral, and side views of a complete specimen, $\times 1$, paratype USNM 153850a; 55, dorsal view of the preceding specimen, $\times 2$, showing the brachial valve in place; 56, 57, interior of a brachial valve, $\times 2$, $\times 3$, showing features of the interior much thickened, paratype USNM 153850b. [Word Formation (Appel Ranch Member), USNM 715i.]

PLATE 318.—*Oncosarina* and *Bothrionia*

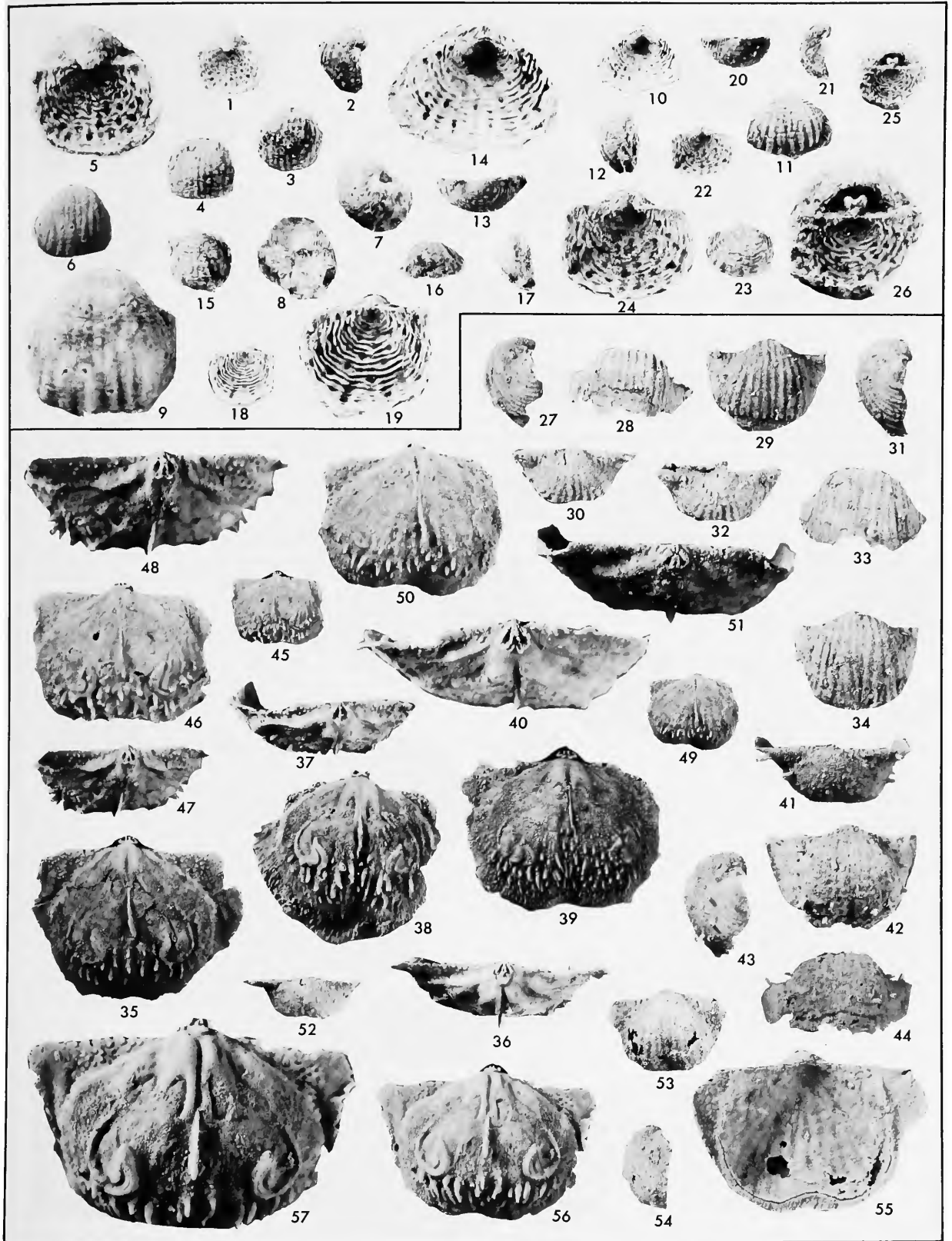


PLATE 319

Costispinifera

Costispinifera rugatula (Girty): 1, Ventral view of a large pedicle valve with some of its body spines, $\times 1$, hypotype USNM 149708b; 2, ventral view of another pedicle valve, $\times 1$, preserving halteroid and body spines, hypotype USNM 149708a; 3-7, ventral, dorsal, side, posterior, and anterior views of a young adult preserving many of its halteroid spines, $\times 1$, hypotype USNM 149708c; 8, 9, dorsal and ventral views of an immature specimen, $\times 1$, paratype USNM 149715j; 10-13, dorsal, ventral, side, and posterior views of another young specimen, $\times 1$, hypotype USNM 149715h; 14-17, ventral, dorsal, posterior, and side views of a young specimen, $\times 1$, showing strong concentric wrinkles, hypotype USNM 149715g; 18-20, side, posterior, and dorsal views of another young adult, $\times 1$, hypotype USNM 149715f; 21-23, ventral, dorsal and posterior views of a young adult, $\times 1$, hypotype USNM 149715e; 24-27, posterior, side, dorsal, and ventral views of a full grown adult, $\times 1$, hypotype USNM 149715c; 28-31, anterior, dorsal, ventral, and side views of a large adult, $\times 1$, hypotype USNM 149715a; 32-35, dorsal, side, ventral, and posterior views of small adult, $\times 1$, hypotype USNM 153862a; 36-39, posterior, ventral, side, and dorsal views of an average adult, $\times 1$, hypotype USNM 153862c; 40-43, ventral, posterior, side, and dorsal views of an adult, $\times 1$, hypotype USNM 153862b; 44, ventral view of a young specimen with strong concentric wrinkles, $\times 2$, hypotype USNM 153863d; 45, ventral view of another young specimen, $\times 2$, showing the strong concentric wrinkles, hypotype USNM 153863b; 46, ventral view of another youthful specimen, $\times 2$, hypotype USNM 153863c; 47, young specimen, ventral view preserving most of its body spines, $\times 2$, hypotype USNM 153863a; 48-50, interior, $\times 1$, $\times 2$, and side view, $\times 2$, of a brachial valve with long endospines, hypotype USNM 153863f; 51-53, exterior $\times 1$, $\times 2$, and posterior, $\times 2$, of a brachial valve, showing the numerous protective spines, hypotype USNM 149708d; 54-56, interior, $\times 1$, posterior, $\times 2$, and interior, $\times 2$, of a brachial valve with thickened interior details, hypotype USNM 149708e. [Word Formation (China Tank Member), USNM 706c.]

PLATE 319.—*Costispinifera*

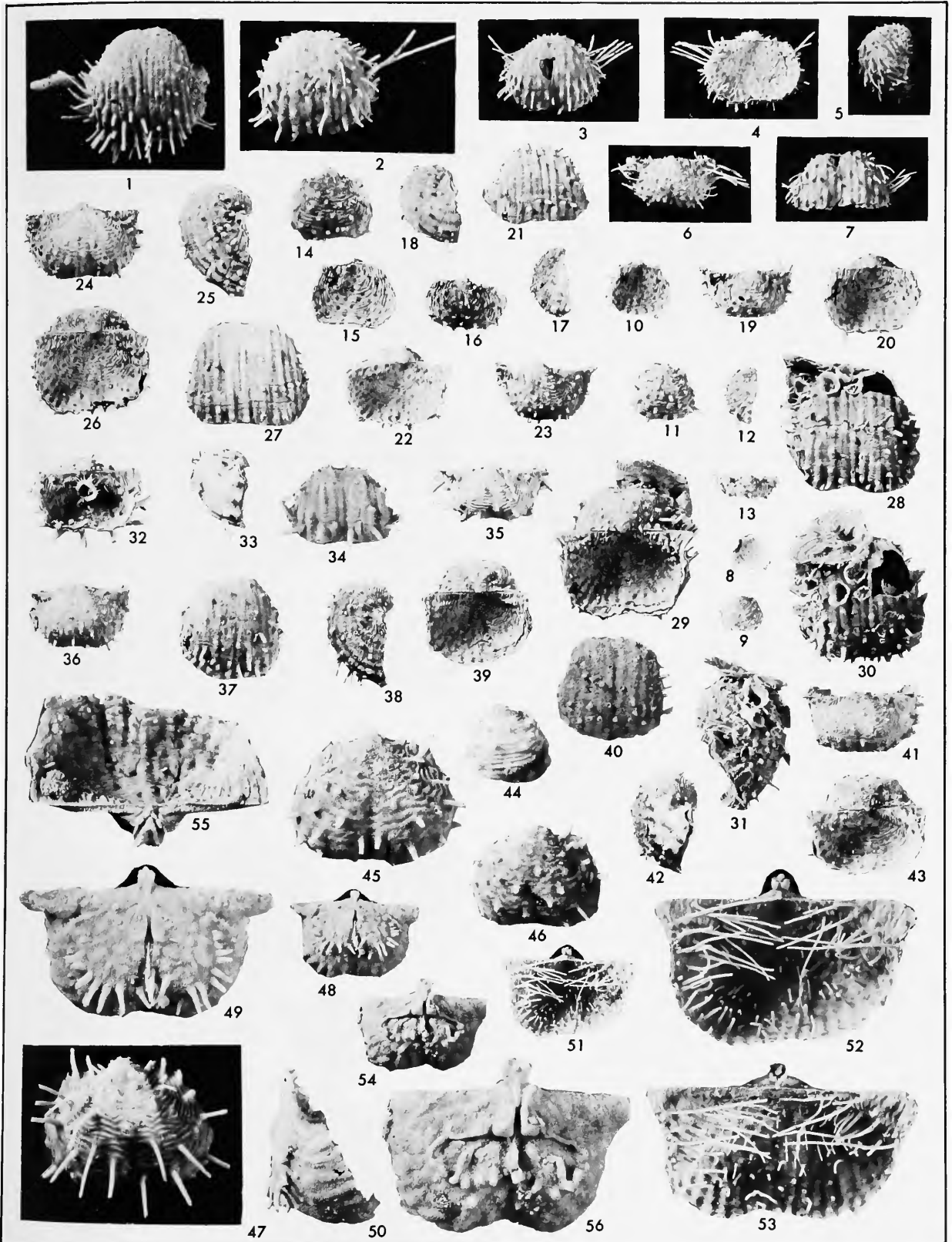


PLATE 320

Costispinifera

Costispinifera costata (R. E. King): 1, Ventral view of a large pedicle valve preserving some of its halteroid and body spines, $\times 1$, hypotype USNM 149702a; 2, ventral view of another pedicle valve with some of the body spines preserved, $\times 1$, hypotype USNM 149702b; 3, ventral view of a small pedicle valve, $\times 1$, hypotype USNM 149702c; 4, ventral view of a pedicle valve preserving many of its body spines, $\times 1$, hypotype USNM 149702d; 5, ventral view of a young pedicle valve with initial spine ring, $\times 1$, hypotype USNM 149702e; 6–10, dorsal, side, ventral, posterior, and anterior views of an adult, $\times 1$, hypotype USNM 149703a; 11, dorsal view of another complete specimen, $\times 1$, hypotype USNM 149703a; 12–16, posterior, anterior, side, ventral, and dorsal views of a complete specimen, $\times 1$, hypotype USNM 149703i; 17–21, anterior, ventral, dorsal, side, and posterior views of a small adult, $\times 1$, hypotype USNM 149703b; 22–26, posterior, ventral, anterior, dorsal, and side views of a large adult, $\times 1$, hypotype USNM 149703d; 27–29, posterior, interior, and side views of a dorsal valve, $\times 1$, hypotype USNM 153864a; 30, interior of the preceding brachial valve, $\times 2$, showing the long endospines; 31–33, posterior, side, and interior views of another brachial valve, $\times 1$, showing long endospines, hypotype USNM 153864c; 34, interior of the preceding specimen, $\times 2$; 35, 36, dorsal view of a brachial valve, $\times 1$, $\times 2$, showing numerous spines, hypotype USNM 153864d; 37, 38, exterior of another brachial valve preserving the protective spines, $\times 1$, $\times 2$, hypotype USNM 153864e; 39, 40, exterior of an alate brachial valve preserving the protective spines, $\times 1$, $\times 2$, hypotype USNM 153864f; 41, dorsal view of another alate brachial valve, $\times 1$, showing protective spines, hypotype USNM 153864g. [Word Formation (Willis Ranch Member), USNM 706.]

42–44, Posterior, side, and ventral views of a large pedicle valve, $\times 1$, figured specimen, USNM 153865. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

Costispinifera cf. *C. costata* (R. E. King): 45–48, Side, dorsal, ventral, and posterior views of a large adult, $\times 1$, figured specimen USNM 153866. [Road Canyon Formation, USNM 721j.]

49–51, Ventral, side, and posterior views of an unusually large pedicle valve, $\times 1$, figured specimen, USNM 153867. [Word Formation (Willis Ranch Member), USNM 731m.]

PLATE 320.—*Costispinifera*

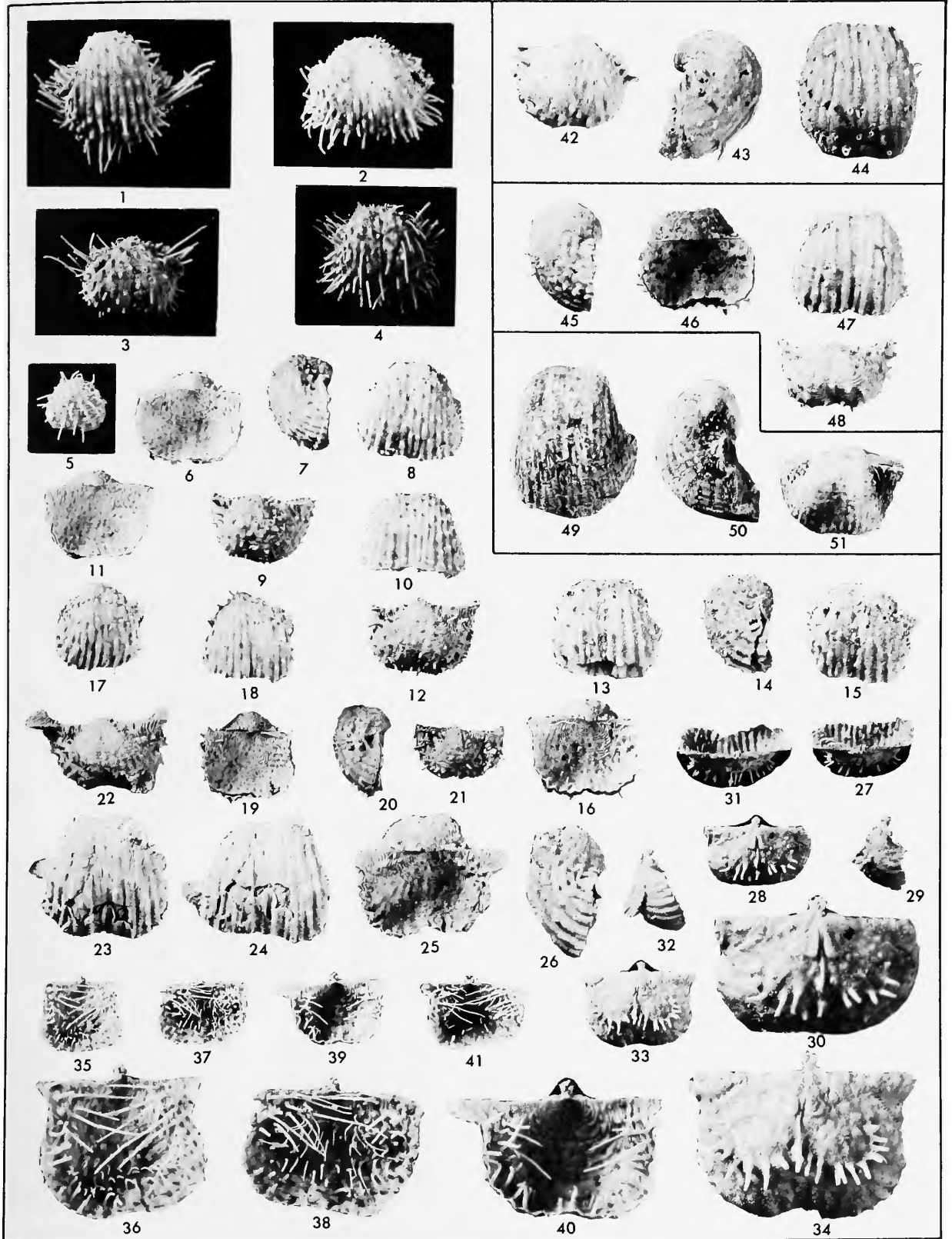


PLATE 321

Costispinifera

Costispinifera rugatula (Girty): 1, Interior of a well developed brachial valve, $\times 1$, hypotype USNM 153868g; 2, interior of another well developed brachial valve, $\times 4$, showing endospines, brevisseptum, and cardinal process, hypotype USNM 153868d; 3, side views of the preceding specimen, $\times 2$, showing cardinal process and endospines; 4, dorsal view of the cardinal process of the preceding specimen, $\times 4$; 5, 6, ventral view of an immature specimen, $\times 1$, $\times 2$, showing the initial attachment rings, hypotype USNM 153869. [Word Formation (China Tank Member), USNM 706c.]

7, 8, Ventral view of two pedicle valves, $\times 1$, hypotypes USNM 153870b, c; 9, interior of the brachial valve, $\times 1$, hypotype USNM 153870a. [Word Formation (China Tank Member), USNM 732s.]

Costispinifera costata (R. E. King): 10-13, Side, ventral, anterior, and dorsal views, $\times 1$, hypotype USNM 124150a; 14, dorsal view, showing the beak and ear baffles of the pedicle valve, $\times 2$, hypotype USNM 124150b; 15-17, side, interior, and anterior views of a brachial valve, $\times 2$, hypotype USNM 124151b; 18, exterior of a brachial valve, showing numerous spines and their bases, $\times 2$, hypotype USNM 153871c; 19, ventral view of a small individual, $\times 1$, showing the halteroid spines, hypotype USNM 153871a; 20, ventral view of another pedicle valve, $\times 1$, showing body spines, hypotype USNM 153871b; 21, 22, ventral view of an immature specimen, $\times 1$, $\times 2$, showing attachment rings, hypotype USNM 153872a; 23, 24, ventral view of another immature pedicle valve, $\times 1$, $\times 2$, hypotype USNM 153872b; 25, 26, ventral view of an immature pedicle valve larger than the preceding but still retaining the attachment ring, $\times 1$, $\times 2$, hypotype USNM 153872c; 27, ventral view of a very young specimen, $\times 2$, showing attachment rings, hypotype USNM 153872d; 28, same view of another immature pedicle valve, $\times 2$, hypotype USNM 153872e; 29, ventral view of a pedicle valve, immature but larger than the preceding and showing development of halteroid spines, $\times 2$, hypotype USNM 153872f. [Word Formation (Willis Ranch Member), USNM 706.]

PLATE 321.—*Costispinifera*

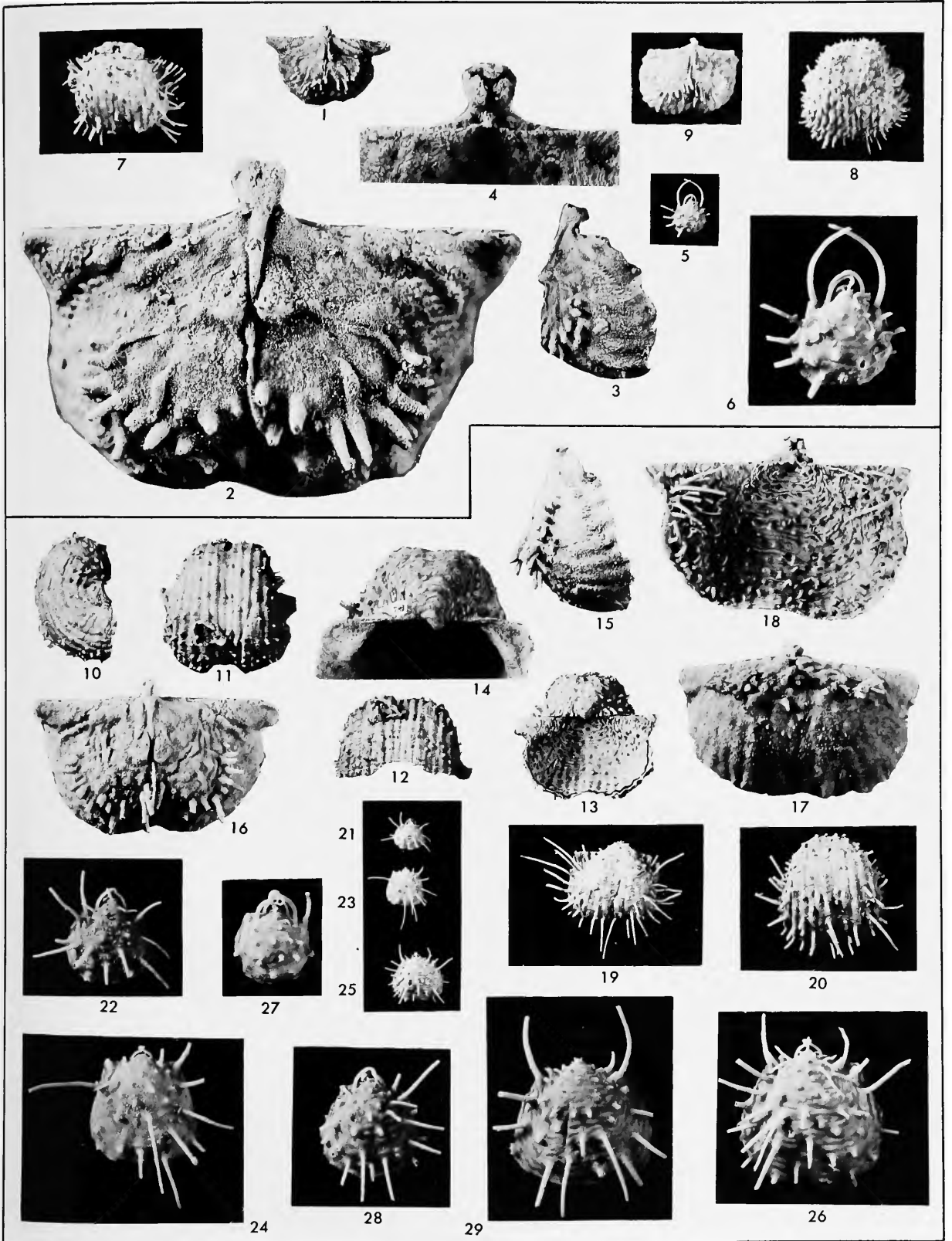


PLATE 322

Elliottella

Elliottella transversalis (Stehli): 1-4, Interior, $\times 1$, and side, interior, and posterior views, $\times 2$, showing brachial ridges, hypotype USNM 153883e; 5, 6, interior of a brachial valve, $\times 1$, $\times 2$, showing the brevisseptum and endospines, hypotype USNM 153883b; 7-10, interior, $\times 1$, side, interior, and posterior views, $\times 2$, of another brachial valve, showing brevisseptum and endospines, hypotype USNM 153883a; 11-14, interior, $\times 1$, interior, side, and posterior views, $\times 2$, showing details of the interior, hypotype USNM 153883c; 15, posterior of a brachial valve, $\times 2$, showing the cardinal process, hypotype USNM 153883d; 16, 17, ventral view of two pedicle valves preserving some of their spines, $\times 1$, hypotypes USNM 153883f, g; 18, ventral view of an exceptionally well preserved pedicle valve, showing halteroid and body spines, $\times 1$, hypotype USNM 153883j; 19, 20, ventral view of an immature specimen preserving the initial attachment rings, $\times 1$, $\times 2$, hypotype USNM 153883k; 21, 22, ventral view of another immature specimen with attachment rings, $\times 1$, $\times 2$, hypotype 153883-l; 23, 24, ventral view, of an immature specimen, $\times 1$, $\times 2$, larger than the preceding and showing early body spines, hypotype USNM 153883m; 25, 26, ventral view of two immature pedicle valves with long spines, $\times 1$, hypotypes USNM 153883h, i; 27-31, dorsal, anterior side, posterior, and ventral views of a complete specimen shorn of its spines, $\times 1$, hypotype USNM 153883n; 32-36, side, anterior, posterior, dorsal, and ventral views of a complete specimen, $\times 1$, hypotype USNM 153883p; 37-39, ventral, side, and posterior views, $\times 2$, of the preceding hypotype; 40-43, side, ventral, posterior, and anterior views of a pedicle valve, $\times 1$, hypotype USNM 153883o. [Bone Spring Formation, USNM 728f.]

PLATE 322.—*Elliottella*

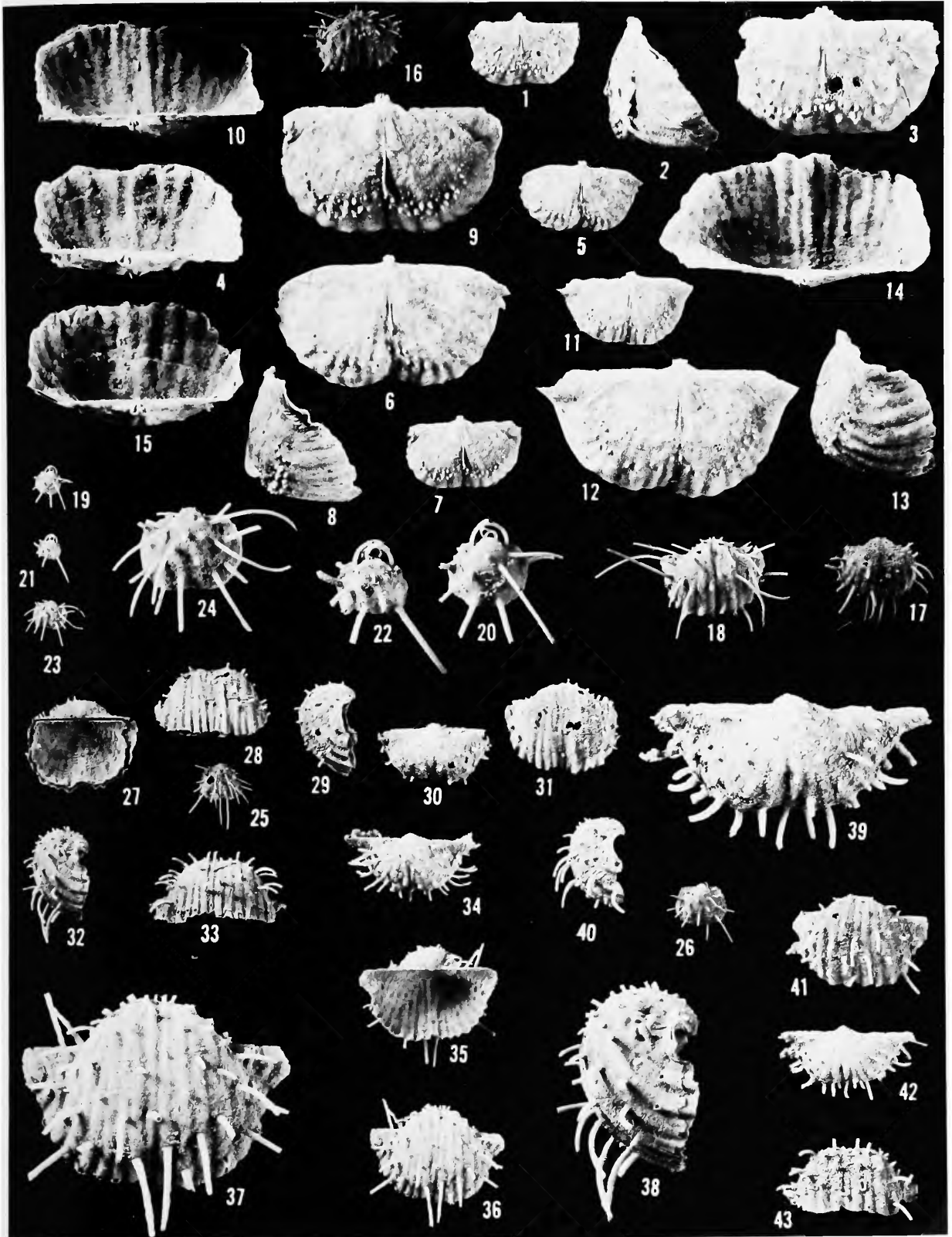


PLATE 323

Elliottella

Elliottella minima (Stehli) : 1-5, Ventral, posterior, anterior, dorsal and side views, $\times 1$, hypotype USNM 152707b; 6-10, posterior, ventral, side, dorsal, and anterior views of a complete specimen, $\times 1$, hypotype USNM 152707d; 11-13, ventral, side, and posterior views of a pedicle valve having some of its spines, $\times 1$, hypotype USNM 152707j; 14-17, ventral, anterior, side, and posterior views of another specimen with some of its spines, $\times 1$, hypotype USNM 152707k; 18, 19, interior of the brachial valve, $\times 1$, $\times 2$, hypotype USNM 152707-1; 20, posterior of the preceding specimen, $\times 3$, showing the cardinal process; 21, 22, interior of the brachial valve, $\times 1$, $\times 2$, hypotype USNM 152707m; 23, 24, interior, $\times 2$, and posterior, $\times 3$, showing the cardinal process, hypotype USNM 152707n. [Bone Spring Formation, USNM 728e.]

Elliottella multcostata, new species: 25-27, Posterior, ventral, and anterior views of a specimen with spines, $\times 1$, paratype USNM 153882a; 28-30, anterior, posterior, and ventral views of another spiny specimen, $\times 1$, holotype USNM 153882d; 31-33, anterior, ventral, and posterior views of a spiny paratype, $\times 1$, USNM 153882c; 34-36, anterior, ventral, and posterior views of a small, spiny pedicle valve, $\times 1$, paratype USNM 153882b; 37-39, posterior, ventral, and anterior views of a small spiny specimen, $\times 1$, paratype USNM 153882e; 40, 41, ventral view of an immature specimen, $\times 1$, $\times 2$, paratype USNM 153882f; 42, 43, ventral view of another immature pedicle valve, $\times 1$, $\times 2$, paratype USNM 153882h; 44, ventral view of an immature pedicle valve, $\times 1$, paratype USNM 153882g; 45, 46, ventral view of two immature specimens, $\times 2$, showing initial attachment ring and early body spines, paratypes USNM 151589a, b; 47-50, interior $\times 1$, $\times 2$, and side and posterior, $\times 2$, views of the brachial valve, paratype USNM 153882k; 51-54, interior, $\times 1$, $\times 2$, and side and posterior views, $\times 2$, of another brachial valve, showing the cardinal process and scattered endospines, paratype USNM 153882j; 55-58, interior, $\times 1$, $\times 2$, and side and posterior views, $\times 2$, showing endospines and cardinal process, paratype USNM 153882i. [Bone Spring Formation, USNM 728h.]

PLATE 323.—*Elliottella*

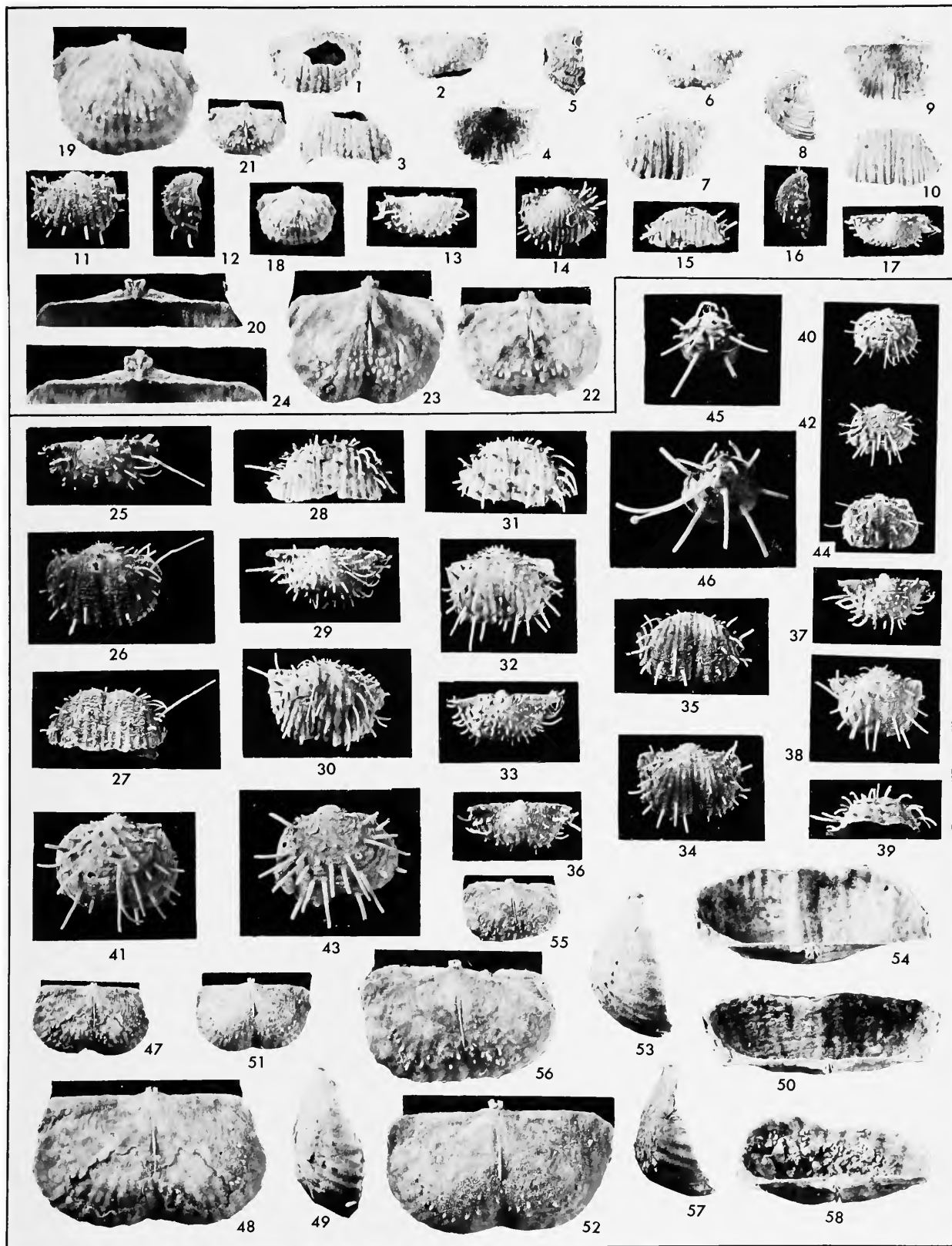


PLATE 324

Oncosarina

Oncosarina spinicostata Cooper and Grant: 1-3, Interior, $\times 1$, $\times 2$, and posterior, $\times 2$, views of a brachial valve, showing cardinal process and adductor platform, hypotype USNM 153884a; 4-6, interior, $\times 1$, $\times 2$, and posterior, $\times 2$, views showing adductor platform, brevisseptum and endospines, hypotype USNM 153884c; 7-9, interior, $\times 1$, $\times 2$, and posterior, $\times 2$, views, showing cardinal process, hypotype USNM 153884b; 10-14, posterior, side, ventral, and anterior views, $\times 1$, and ventral view $\times 2$, showing halteroid spines, hypotype USNM 153884d; 15-18, side, anterior, and ventral views, $\times 1$, and ventral view, $\times 2$, of another spiny pedicle valve, hypotype USNM 153884e; 19-22, side, ventral, and anterior views, $\times 1$, and ventral view, $\times 2$, of a pedicle valve with well preserved spines, holotype USNM 149824 (= 153884f); 23-27, side, ventral, anterior, posterior, and dorsal views of a complete specimen with halteroid spines, $\times 1$, hypotype USNM 153884h; 28-32, side, posterior, anterior, dorsal, and ventral views of the preceding hypotype, $\times 2$; 33-36, anterior, side, ventral, and posterior views of a specimen shorn of its spines, $\times 1$, hypotype USNM 149825a. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

37-40, Dorsal, ventral, posterior, and side views of a complete specimen from which the spines have been stripped, $\times 1$, hypotype USNM 149823b; 41, interior of a brachial valve, $\times 2$, hypotype USNM 153885a; 42, interior of another specimen preserving part of the pedicle valve and the brachial valve interior, $\times 2$, hypotype USNM 153885b. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707-1.]

PLATE 324.—*Oncosarina*

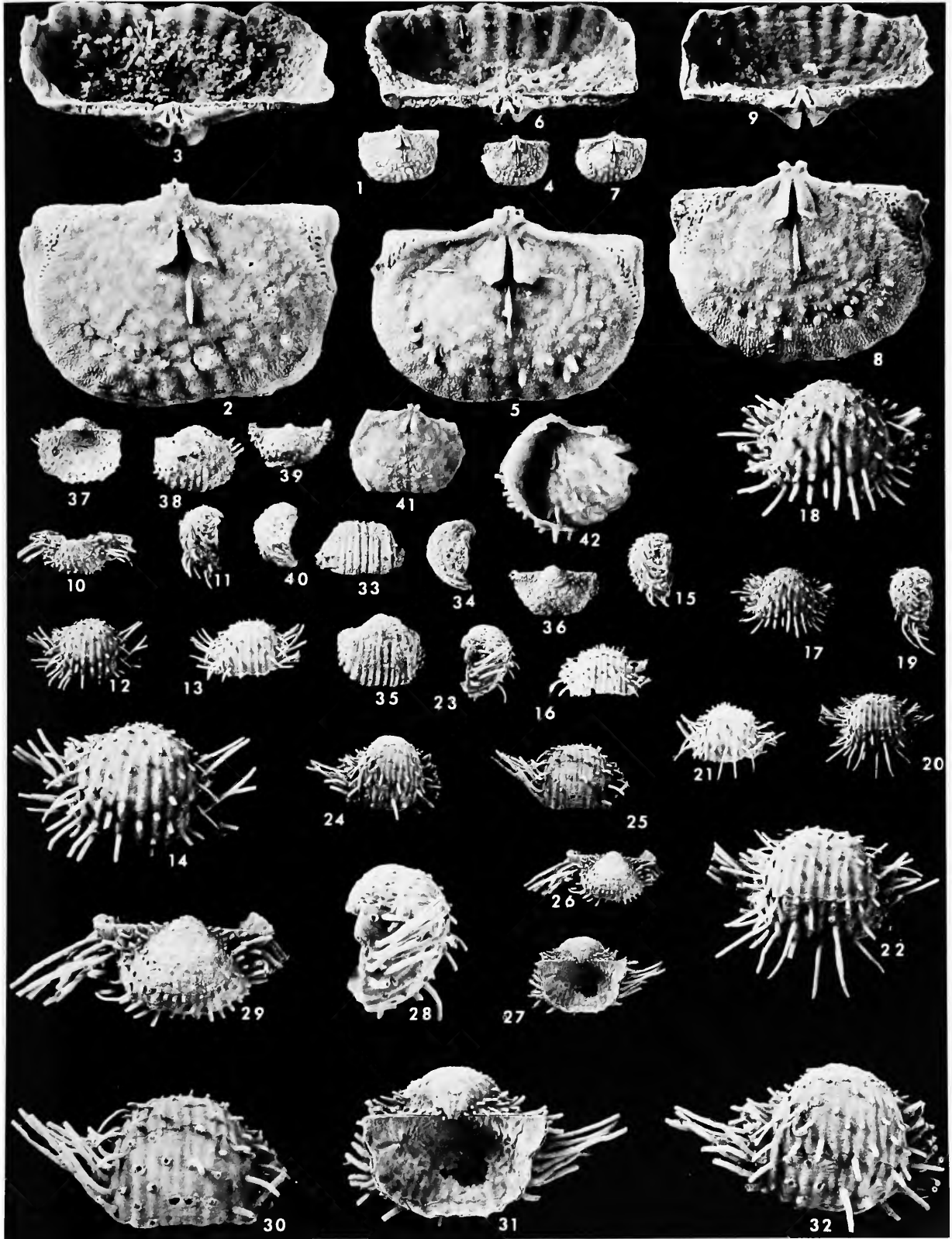


PLATE 325

Hystriculina and *Elliottella*

Hystriculina convexa, new species: 1-5, Anterior, side, ventral, dorsal, and posterior views of a complete specimen, × 1, holotype USNM 149764a; 6-8, ventral, side, and dorsal views of the holotype, × 2; 9-13, ventral, side, posterior, anterior, and dorsal views of another complete specimen, × 1, paratype USNM 149764b; 14-17, ventral, dorsal, posterior, and side views of a complete specimen, × 1, paratype USNM 149765d; 18, 19, dorsal and ventral views of the preceding specimen, × 2; 20, dorsal view of a complete specimen shorn of its spines, × 2, paratype USNM 149765e; 21, 22, interior, × 2, and posterior, × 3, views of the brachial valve, showing cardinal process, ear baffles, and endospines, paratype USNM 149764c; 23, 24, interior, × 2, and posterior, × 3, views of another brachial valve, paratype USNM 149764d. [Neal Ranch Formation (bed 4), USNM 701d.]

Elliottella varicostata, new species: 25-29, Dorsal, anterior, ventral, side, and posterior of a complete specimen, × 1, paratype USNM 152706c; 30-33, side, ventral, anterior, and posterior views of a pedicle valve, × 1, paratype USNM 152706c; 34-37, side, posterior, anterior, and ventral views of a large pedicle valve, × 1, paratype USNM 152706a; 38-42, posterior, dorsal, side, ventral, and anterior views, × 1, holotype USNM 152706n; 43, 44, ventral view of a specimen preserving some of its spines, × 1, × 2, paratype USNM 152706o; 45, interior of a mold of the brachial valve, showing muscle scars, brachial ridges and endospines, × 2, paratype USNM 152706q; 46, 47, interior of two brachial valves, × 2, showing brachial ridges and muscle scars, paratypes USNM 152706r, s. [Skinner Ranch Formation (base), USNM 705a.]

48-52, Posterior, ventral, dorsal, anterior, and side views of a complete specimen, × 1, paratype USNM 153881a; 53-57, side, posterior, anterior, pedicle, and dorsal views of a specimen, showing some of its spines, × 1, paratype USNM 153881b; 58-60, ventral, dorsal and side views of the preceding paratype, × 2. [Skinner Ranch Formation (base), USNM 724p.]

PLATE 325.—*Hystriculina* and *Elliottella*

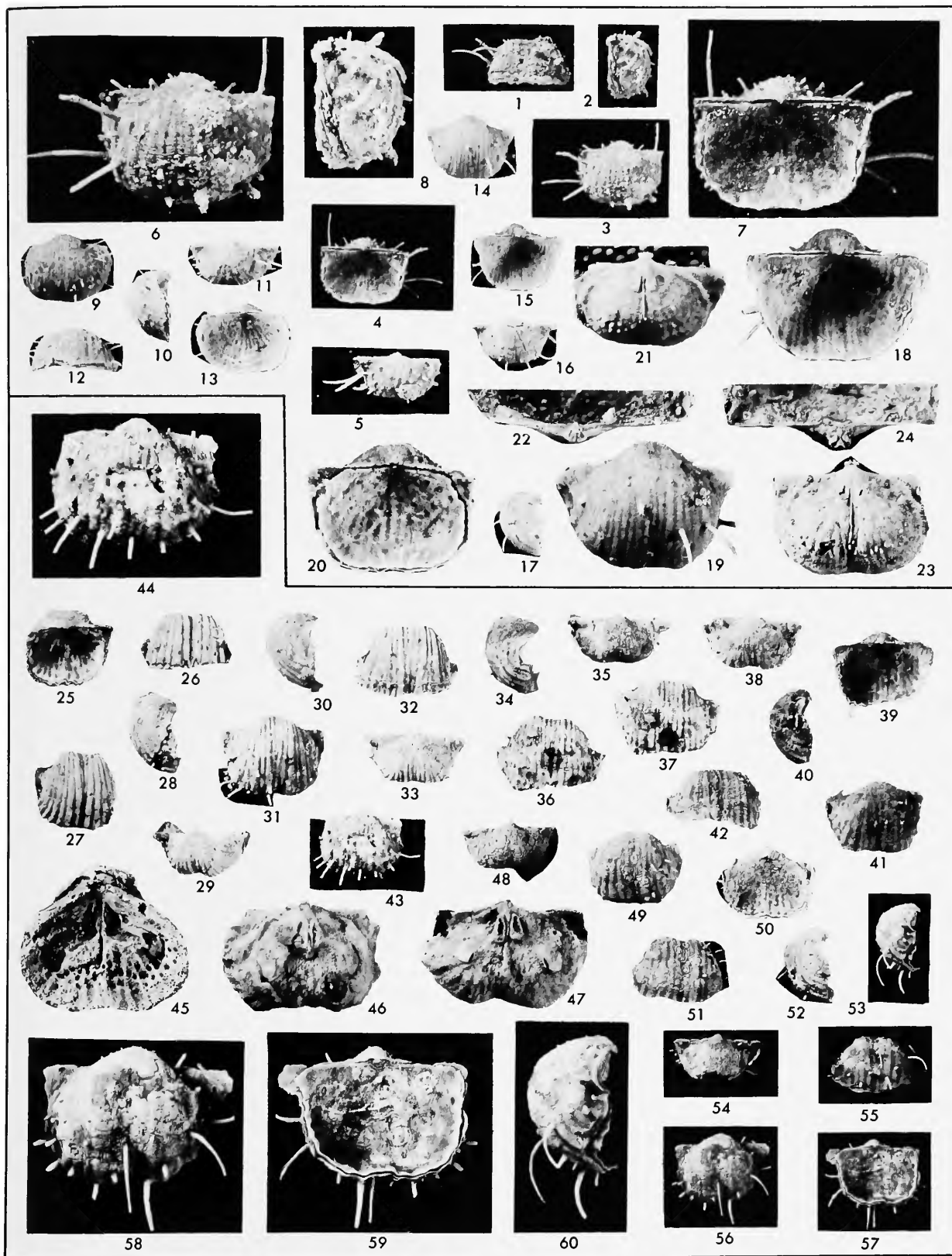


PLATE 326

Echinauris

Echinauris bella, new species: 1-4, Exterior, interior, anterior, and posterior views, $\times 2$, small dorsal valve, paratype USNM 149621v; 5, dorsal view, $\times 2$, small shell, paratype USNM 149621w; 6, dorsal view, $\times 2$, small shell with spines, paratype USNM 149621x; 7-9, ventral and dorsal views, $\times 2$, and dorsal view, $\times 1$, juvenile paratype with long spines, USNM 149621y; 10-13, side, exterior, interior, and posterior views, $\times 2$, dorsal valve with cardinal process and median septum, paratype USNM 149621z; 14-15, dorsal views, $\times 1$, $\times 2$, small paratype with long divergent lateral spines, paratype USNM 149621a'; 16-19, exterior, interior, side, and posterior views, $\times 2$, small dorsal valve, paratype USNM 149621b'; 20-22, stereo-pair, $\times 2$, of dorsal view (figure 20), dorsal view $\times 1$, and side view, $\times 2$, small complete shell, paratype USNM 149621c'; 23-25, dorsal views, $\times 1$, $\times 2$, and ventral view, $\times 3$, complete shell, paratype USNM 149621d'; 26-27, dorsal views of ventral valve, $\times 2$, $\times 1$, showing interior, paratype USNM 149621e'; 28-30, dorsal views, $\times 3$, $\times 1$, and ventral view, $\times 2$, shell with spines and attached epifauna, paratype USNM 149621f'; 47-50, exterior, interior, posterior, and side views, $\times 2$, dorsal valve paratype USNM 149621g'; 51-54, exterior, interior, posterior, and side views, $\times 2$, dorsal valve, paratype USNM 149621h'. 55-58, exterior, interior, side, and posterior views, $\times 2$, dorsal valve, paratype USNM 149621i'. [Road Canyon Formation, USNM 707c.]

31-34, Interior and ventral, $\times 1$, $\times 3$, ventral exterior, $\times 1$, $\times 3$, and side views, $\times 3$, paratype USNM 154772a; 45-46, interior and exterior views, $\times 3$, dorsal valve, paratype USNM 154772b. [Cathedral Mountain Formation, USNM 702.]

35-36, Ventral views, $\times 3$, $\times 1$, ventral valve, paratype USNM 154773a; 37-41, dorsal views, $\times 3$, $\times 1$, ventral views, $\times 3$, $\times 1$, and side view, $\times 3$, holotype USNM 154773b; 42-44, ventral view, $\times 2$, interior views, $\times 3$, $\times 1$, ventral valve, paratype USNM 154773c. [Road Canyon Formation, USNM 702c.]

PLATE 326.—*Echinauris*

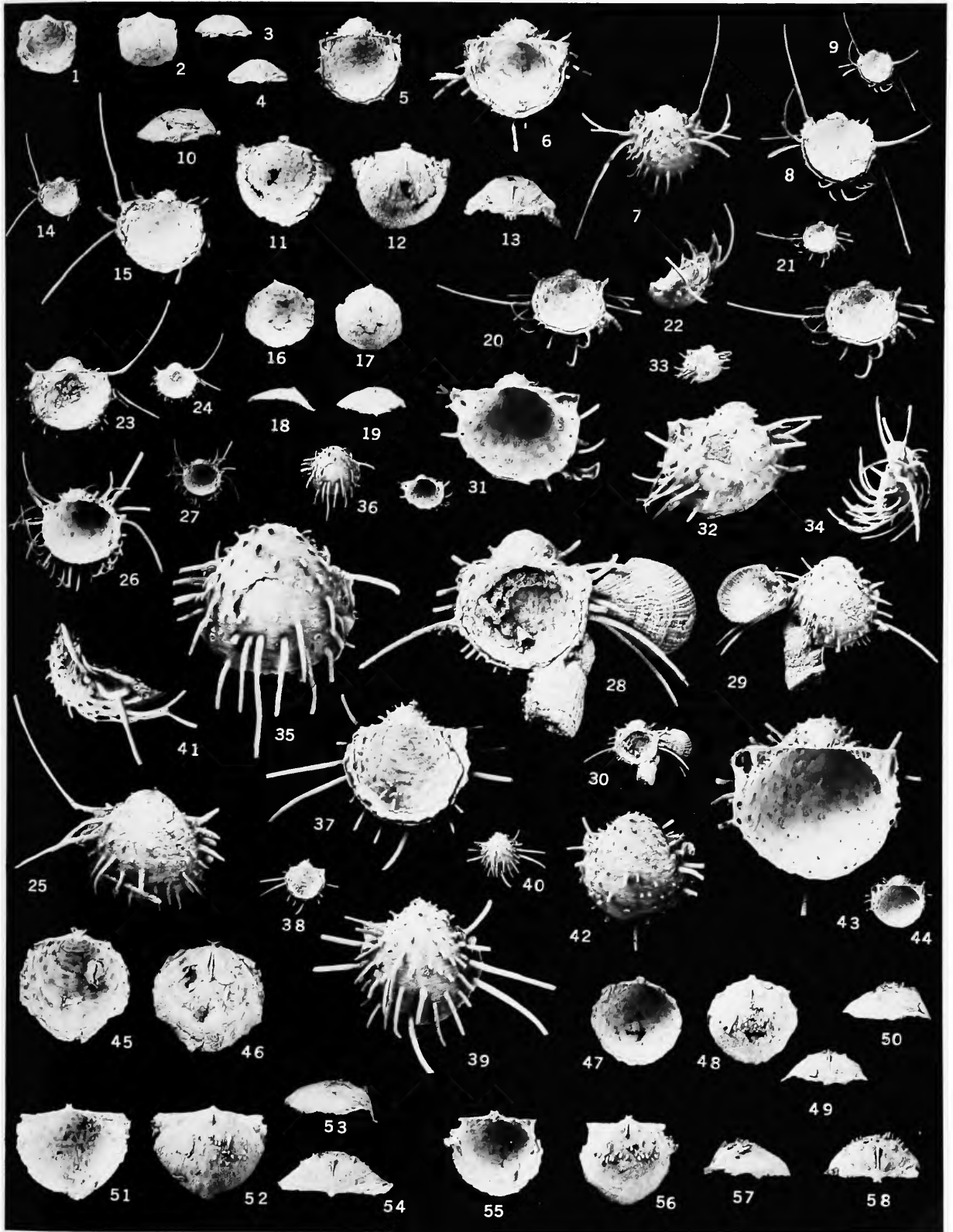


PLATE 327*Echinauris*

Echinauris crassa, new species: 1-4, Interior views, $\times 1$, $\times 3$, and ventral views, $\times 2$, $\times 3$, nepionic ventral valve, paratype USNM 154774a; 5-9, dorsal and anterodorsal views, $\times 1$, $\times 2$, and ventral views, $\times 2$, $\times 3$, small gaping shell, paratype USNM 154774b. [Cathedral Mountain Formation (Wedin Member), USNM 723v.]

10-13, Dorsal views, $\times 2$, $\times 1$, and ventral and side views, $\times 2$, paratype USNM 152708b; 14-18, ventral, dorsal, and side views, $\times 1$, $\times 2$, paratype shell USNM 152708d; 19-21, dorsal and ventral views, $\times 1$, $\times 2$, paratype shell with broken spines, USNM 152708c; 22-28, ventral, interior, dorsal, side, and dorsal interior views, $\times 1$, $\times 2$, adult holotype shell, USNM 152708a; 29, dorsal view, $\times 2$, shell with two crinkled spines, paratype USNM 152708f; 30-32, interior and ventral views, $\times 2$, ventral valve, paratype USNM 152708e. [Road Canyon Formation (base), USNM 703a.]

33-36, Ventral and side views, $\times 1$, $\times 2.25$, ventral valve with long spines, paratype USNM 154775a. [Road Canyon Formation, USNM 721y.]

PLATE 327.—*Echinauris*

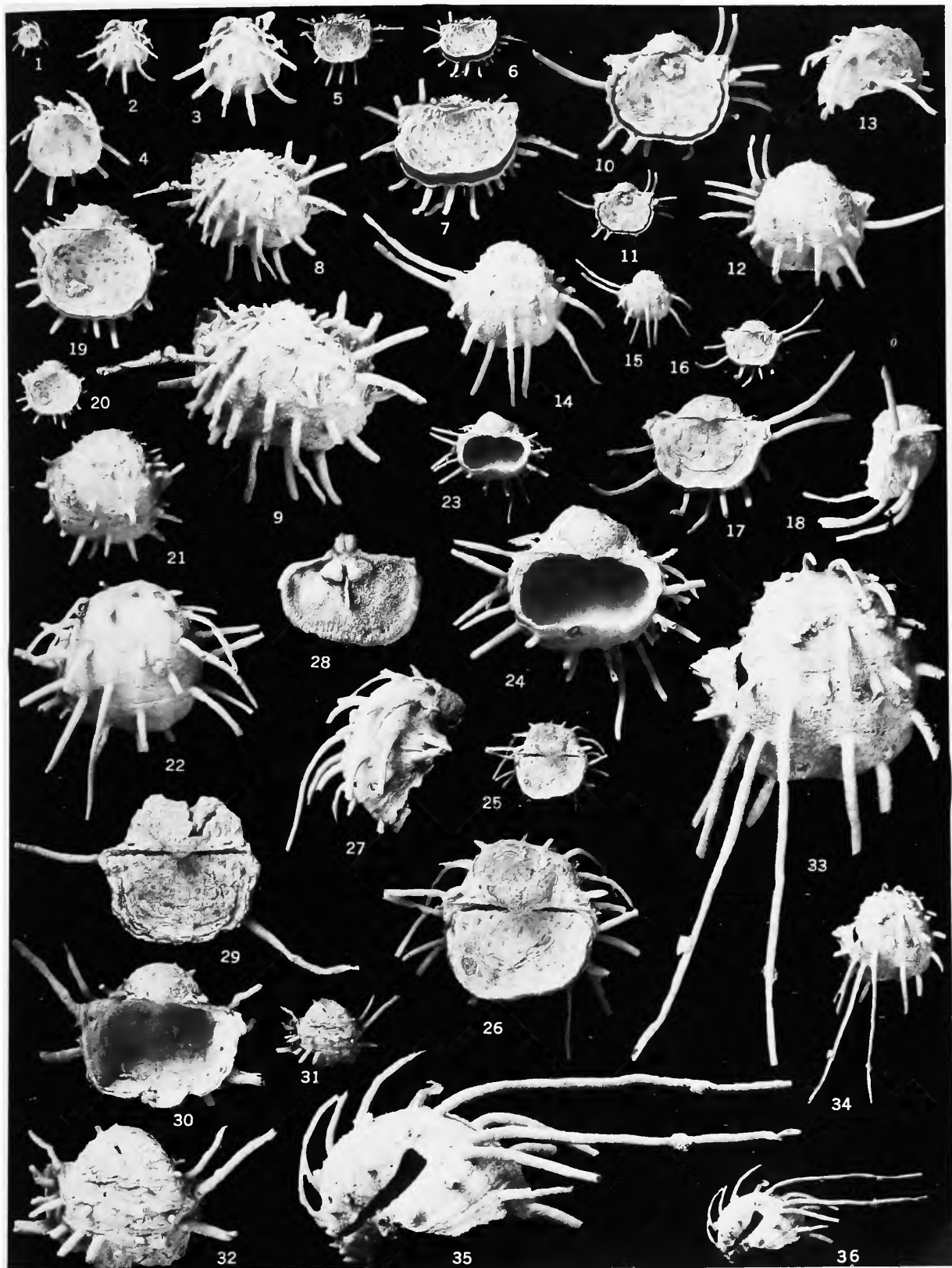


PLATE 328*Echinauris*

Echinauris interrupta, new species: 1-3, Ventral views, $\times 1$, $\times 2$, $\times 3$, nepionic ventral valve, paratype USNM 152710j; 4-9, interior and exterior views, $\times 1$, $\times 2$, $\times 3$, nepionic ventral valve with attachment ring, paratype USNM 152710k; 10-12, interior views, $\times 1$, $\times 2$, $\times 3$, nepionic ventral valve with remnants of attachment ring, paratype USNM 152710i; 13-16, ventral views, $\times 1$, $\times 2$, $\times 3$, side view, $\times 3$, small ventral valve with very long spines, paratype USNM 152710-l; 17-22, ventral, dorsal, and side views, $\times 1$, $\times 3$, adult paratype shell, USNM 152710a; 25-28, ventral, dorsal and side views, $\times 1$, $\times 2$, adult paratype with attached coral, USNM 152710b; 29-33, dorsal, ventral and side views, $\times 1$, $\times 2$, adult holotype USNM 152710e. [Neal Ranch Formation, USNM 701d.]

23-24, Ventral and side views, $\times 2$, calcareous paratype without spines, USNM 152709a. [Lenox Hills Formation, USNM 715.]

PLATE 328.—*Echinauris*

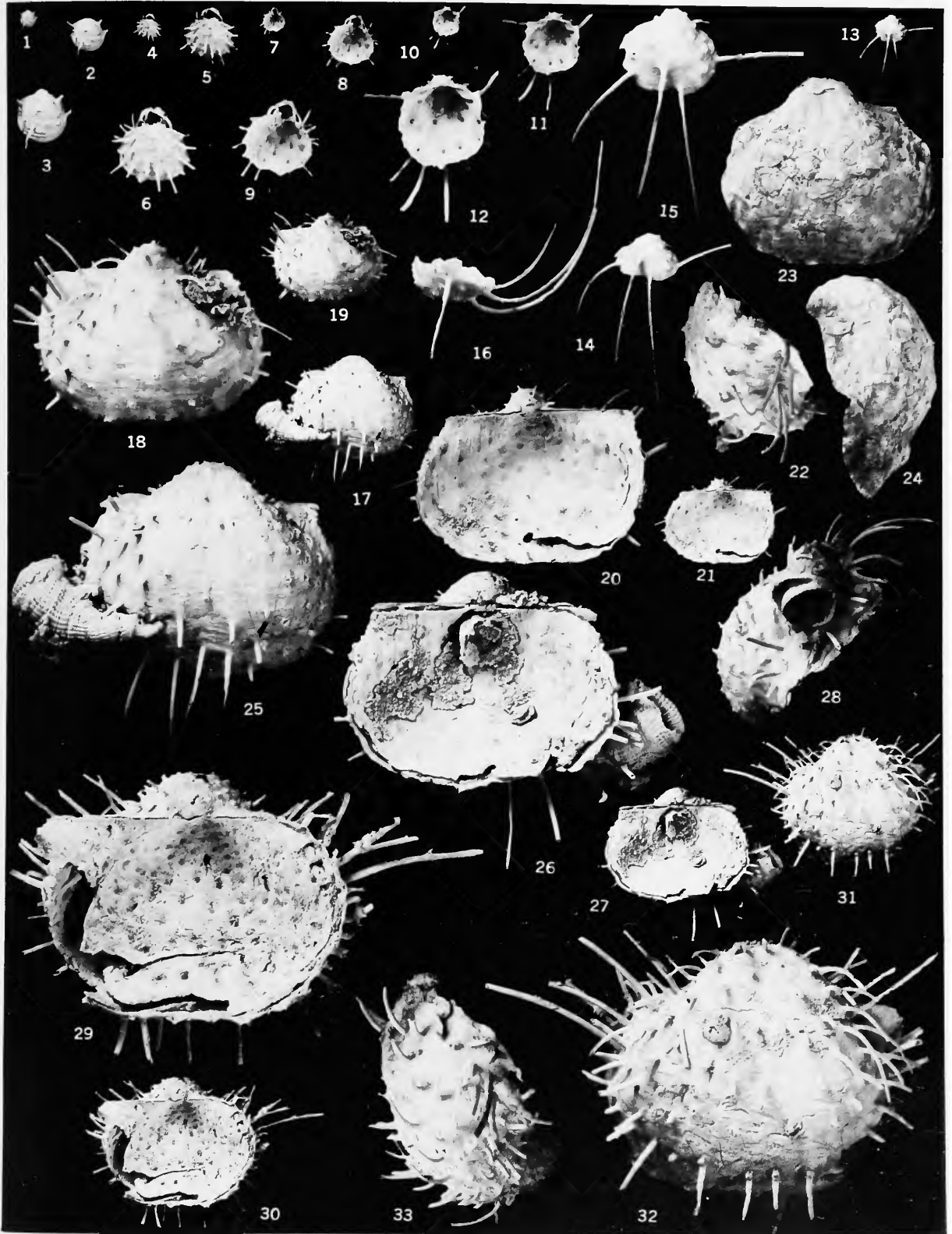


PLATE 329*Echinauris*

Echinauris irregularis, new species: 1-6, Ventral views in stereo, $\times 1$, posterior, side, dorsal, and ventral views, $\times 2$, dorsal views in stereo, $\times 1$, adult holotype, USNM 154776a. [Cathedral Mountain Formation (base), USNM 702b.]

7-11, Dorsal views, $\times 2$, $\times 1$, posterior, anterior, and side views, $\times 2$, adult paratype USNM 154788a. [Road Canyon Formation (base), USNM 703a.]

12-18, Ventral and interior views, $\times 1$, $\times 2$, posterior, anterior, and side views, $\times 2$, ventral valve, paratype USNM 154779c. [Cathedral Mountain Formation, USNM 721u.]

19-24, Interior views, $\times 2$, $\times 1$, dorsal, posterior, side, and interior views, $\times 2$, ventral valve, paratype USNM 154786a. [Cathedral Mountain Formation (base), USNM 702.]

PLATE 329.—*Echinauris*

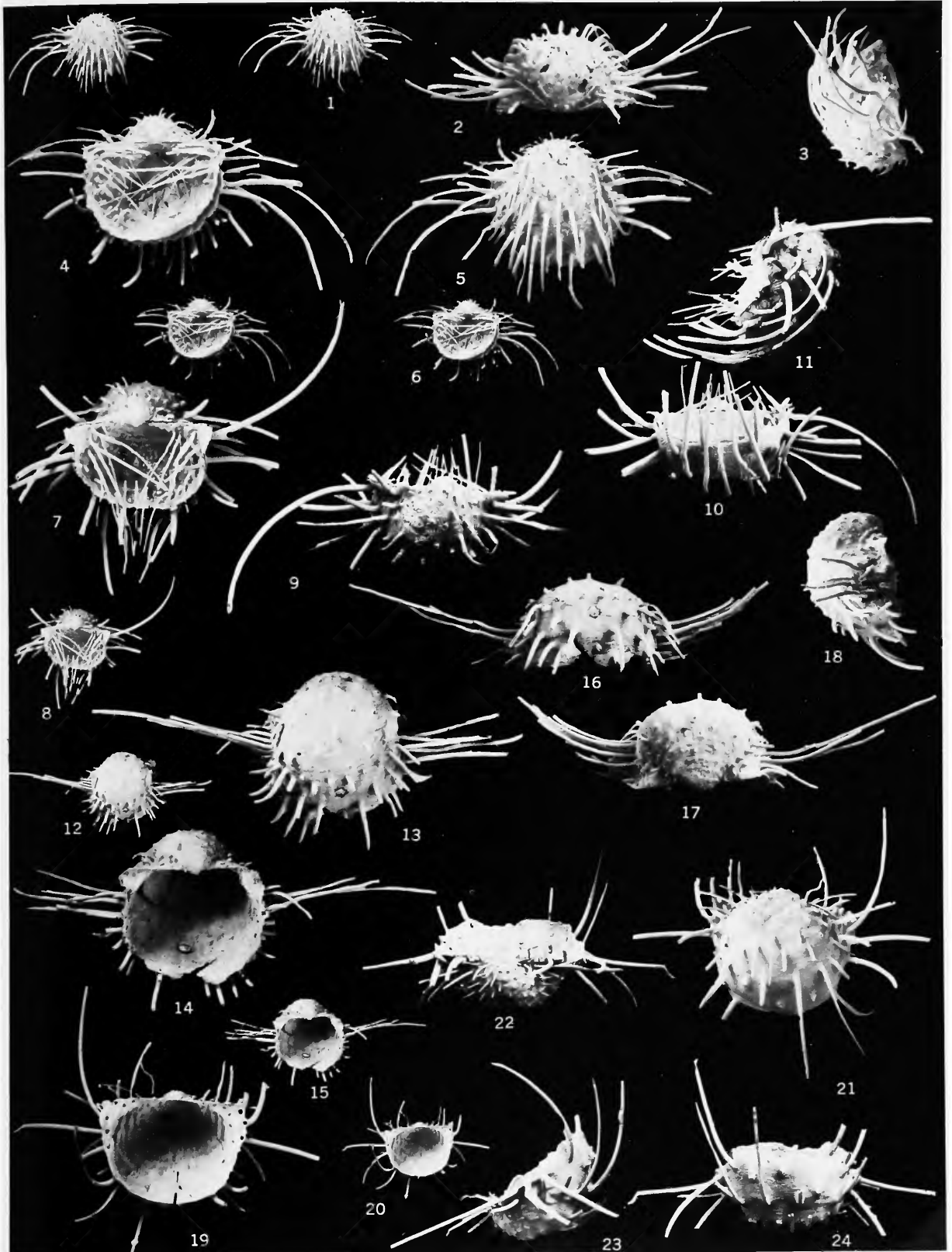


PLATE 330

Echinauris

Echinauris irregularis, new species: 1-2, Ventral views, $\times 2$, $\times 4$, nepionic ventral valve with attachment ring, paratype USNM 154786c; 5, ventral view, $\times 4$, nepionic ventral valve with attachment ring and open umbo, paratype USNM 154786d; 18, ventral view, $\times 4$, spiny nepionic ventral valve with attachment ring, paratype USNM 154786f; 22-24, ventral view, $\times 4$, interior views, $\times 2$, $\times 4$, nepionic ventral valve with attachment ring, paratype USNM 154786c; 30-31, stereo-pair, $\times 1$, spiny juvenile ventral valve, side view, $\times 3$, paratype USNM 154786g. [Cathedral Mountain Formation (base), USNM 702.]

3-4, Interior views, $\times 2$, $\times 4$, nepionic ventral valve with attachment ring, paratype USNM 154776b. [Cathedral Mountain Formation (base), USNM 702b.]

6-9, Ventral and interior views, $\times 2$, $\times 4$, nepionic ventral valve, paratype USNM 154787a; 17, dorsal view, $\times 2$, nepionic shell with long spines, paratype USNM 154787b; 25, dorsal view, $\times 1$, adult paratype shell, USNM 154787c; 34-36, dorsal views, $\times 2$, $\times 1$, ventral view, $\times 2$, adult shell with dorsal spines, paratype USNM 154787d. [Road Canyon Formation, USNM 702c.]

10, Ventral view, $\times 1$, juvenile ventral valve, paratype USNM 154777f; 32, 33, dorsal views, $\times 1$, $\times 3$, spiny shell with dorsal spines, paratype USNM 154777g; 39-43, posterior, ventral, side, and interior views, $\times 2$, $\times 1$, ventral valve paratype USNM 154777h. [Cathedral Mountain Formation (base), USNM 702un.]

11-12, Ventral views, $\times 1$, $\times 3$, nepionic ventral valve, paratype USNM 154778a; 13-14, nepionic ventral valve, $\times 1$, $\times 3$, paratype USNM 154778b; 15-16, ventral views, $\times 1$, $\times 3$, nepionic ventral valve with attachment ring, paratype USNM 154778c. [Road Canyon Formation, USNM 703d.]

19, Interior view, $\times 2$, juvenile ventral valve with attachment ring, paratype USNM 154779a; 20, dorsal view, $\times 1$, young adult shell, paratype USNM 154779j; 21, interior view, $\times 1$, young adult ventral valve, paratype USNM 154779k. [Cathedral Mountain Formation, USNM 721u.]

26-27, Dorsal views, $\times 2$, $\times 1$, young adult shell, paratype USNM 154788b; 28-29, interior views, $\times 1$, $\times 2$, spiny ventral valve, paratype USNM 154788c. [Road Canyon Formation (base), USNM 703a.]

37-38, Ventral and side views, $\times 2$, adult ventral valve with crinkly spine, paratype USNM 154780a. [Road Canyon Formation, USNM 724b.]

PLATE 330.—*Echinauris*

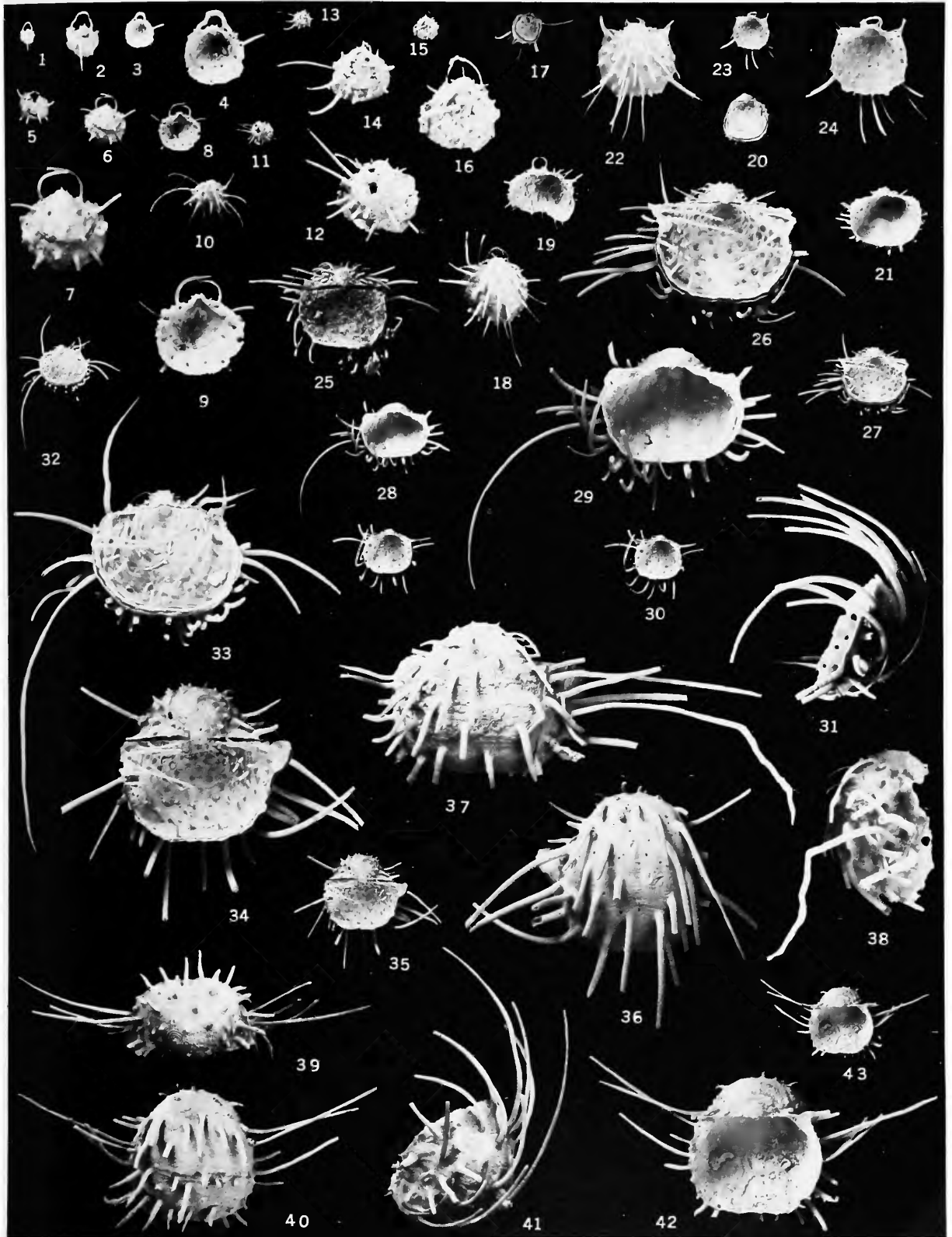


PLATE 331

Echinauris

Echinauris irregularis, new species: 1-3, Interior views, $\times 1$, $\times 2$, and posterior view, $\times 2$, nepionic ventral valve with attachment ring, paratype USNM 154777a; 4, ventral view, $\times 2$, juvenile ventral valve, paratype USNM 154777b; 5-7, ventral view, $\times 2$, interior views, $\times 1$, $\times 2$, juvenile paratype ventral valve, USNM 154777c; 8-9 interior views, $\times 1$, $\times 2$, juvenile ventral valve, paratype USNM 154777d; 12-13, ventral and posterior views, $\times 2$, juvenile ventral valve with long lateral spines, paratype USNM 154777e. [Cathedral Mountain Formation, USNM 702un.]

10, Ventral view, $\times 2$, juvenile ventral valve with attachment spines, paratype USNM 154779d; 11, dorsal view, $\times 1$, adult shell, paratype USNM 154779f; 29, interior view, $\times 2$, of the dorsal valve of a young individual, showing adductor platform, paratype USNM 154779e; 30, exterior view, $\times 2$, dorsal valve tilted posteriorly to show end of cardinal process, paratype USNM 154779g; 31, interior view, $\times 2$, dorsal valve with muscle platforms, median septum, and cardinal process, paratype USNM 154779h; 32, interior views, $\times 2$, dorsal valve showing muscle platforms, brachial ridges, endospines, taleolae and bifid cardinal process, paratype USNM 154779i. [Cathedral Mountain Formation, USNM 721u.]

14-17, Ventral view, $\times 4$ (stereo-pair), dorsal view, $\times 2$, $\times 4$ (stereo-pair), and side view, $\times 4$, juvenile shell with attachment ring, paratype USNM 154786b. [Cathedral Mountain Formation (base), USNM 702.]

18-22, Dorsal and ventral views, $\times 3$, $\times 1$, and side view, $\times 3$, juvenile shell with healed interruption in growth and with remnant of attachment object at beak, paratype USNM 154781a. [Cathedral Mountain Formation (base), USNM 702a.]

23-27, Ventral, posterior, and side views, $\times 2$, and interior view, $\times 1$, $\times 2$, ventral valve, paratype USNM 154787e. [Road Canyon Formation, USNM 702c.]

28, Interior view, $\times 2$, spiny ventral valve with silicified sediment attached to spines, paratype USNM 154782a. [Road Canyon Formation, USNM 726z.]

33, 34, Interior and exterior views, $\times 2$, dorsal valve with endospines and exospines, paratype USNM 154789a. [Cathedral Mountain Formation (base) USNM 703b.]

PLATE 331.—*Echinauris*

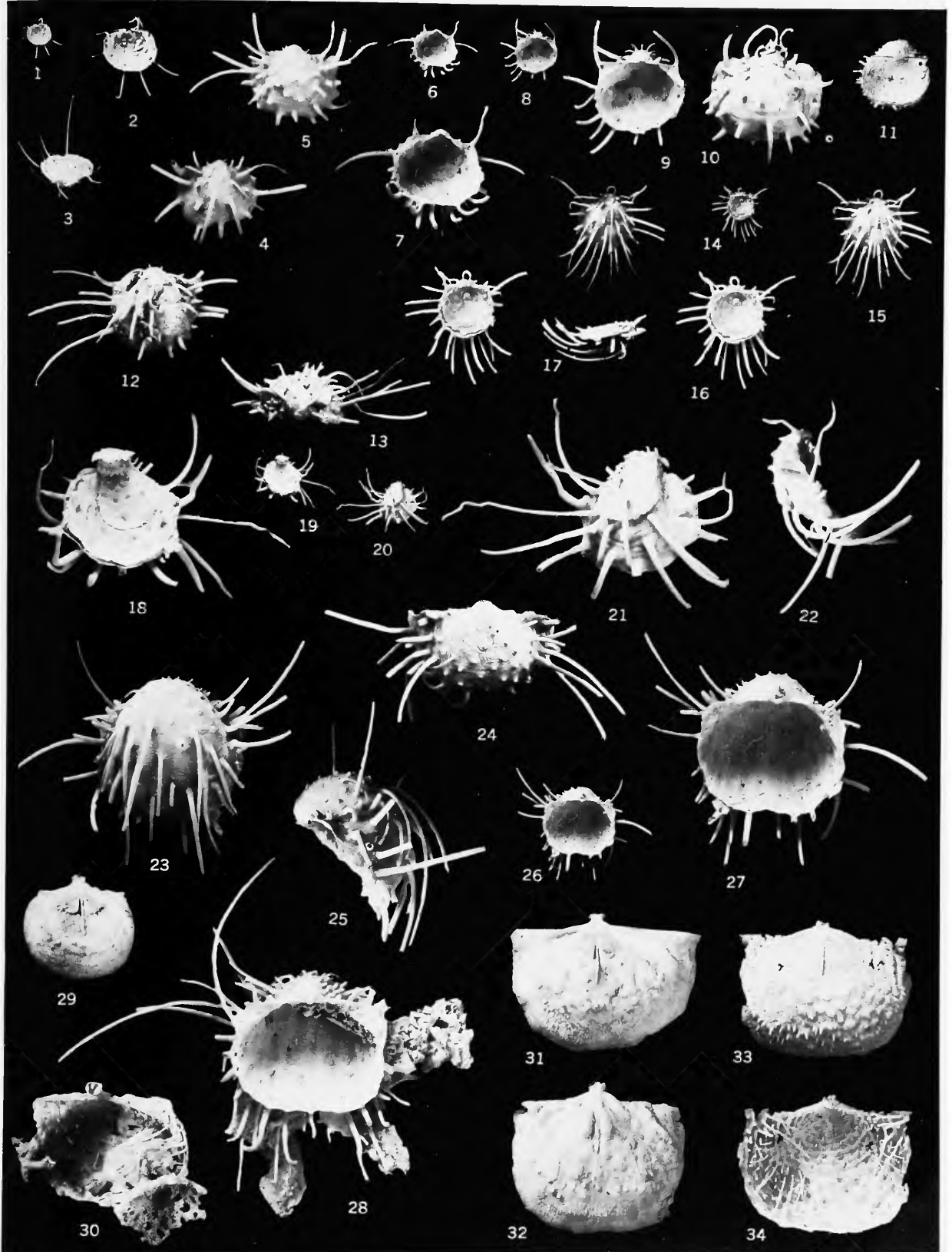


PLATE 332*Echinauris*

Echinauris parva, new species: 1–3, Dorsal views, $\times 1$, $\times 2$, and ventral view, $\times 2$, juvenile paratype, USNM 152718e; 4, interior view, $\times 2$, dorsal valve, paratype USNM 154834a; 5–11, dorsal and ventral views, $\times 1$, $\times 2$, and posterior, side, and posteroventral views, $\times 2$, adult paratype USNM 154834b; 12–16, dorsal views, $\times 2$, $\times 1$, and ventral, side, and posterior views, $\times 2$, adult paratype USNM 154834c; 17, ventral view, $\times 2$, young paratype USNM 154834d; 18–19, dorsal and ventral views, $\times 2$, young adult paratype USNM 154834e; 20–24, ventral view in stereo, $\times 2$, dorsal views, $\times 1$ and $\times 2$, side and posterior views, $\times 2$, adult holotype USNM 154834f. [Road Canyon Formation, USNM 716x.]

Echinauris irregularis, new species: 25–29, Interior, $\times 2$, $\times 1$, and posterior, side, and anterior, $\times 2$, views, ventral valve with long spines, paratype USNM 154777i. [Cathedral Mountain Formation (base) USNM 702un.]

30, Interior view, $\times 2$, small dorsal valve, paratype USNM 154779b. [Cathedral Mountain Formation, USNM 721u.]

31–32, Posterior and side views, $\times 2$, dorsal valve, paratype USNM 154781b. [Cathedral Mountain Formation, USNM 702a.]

PLATE 332.—*Echinauris*

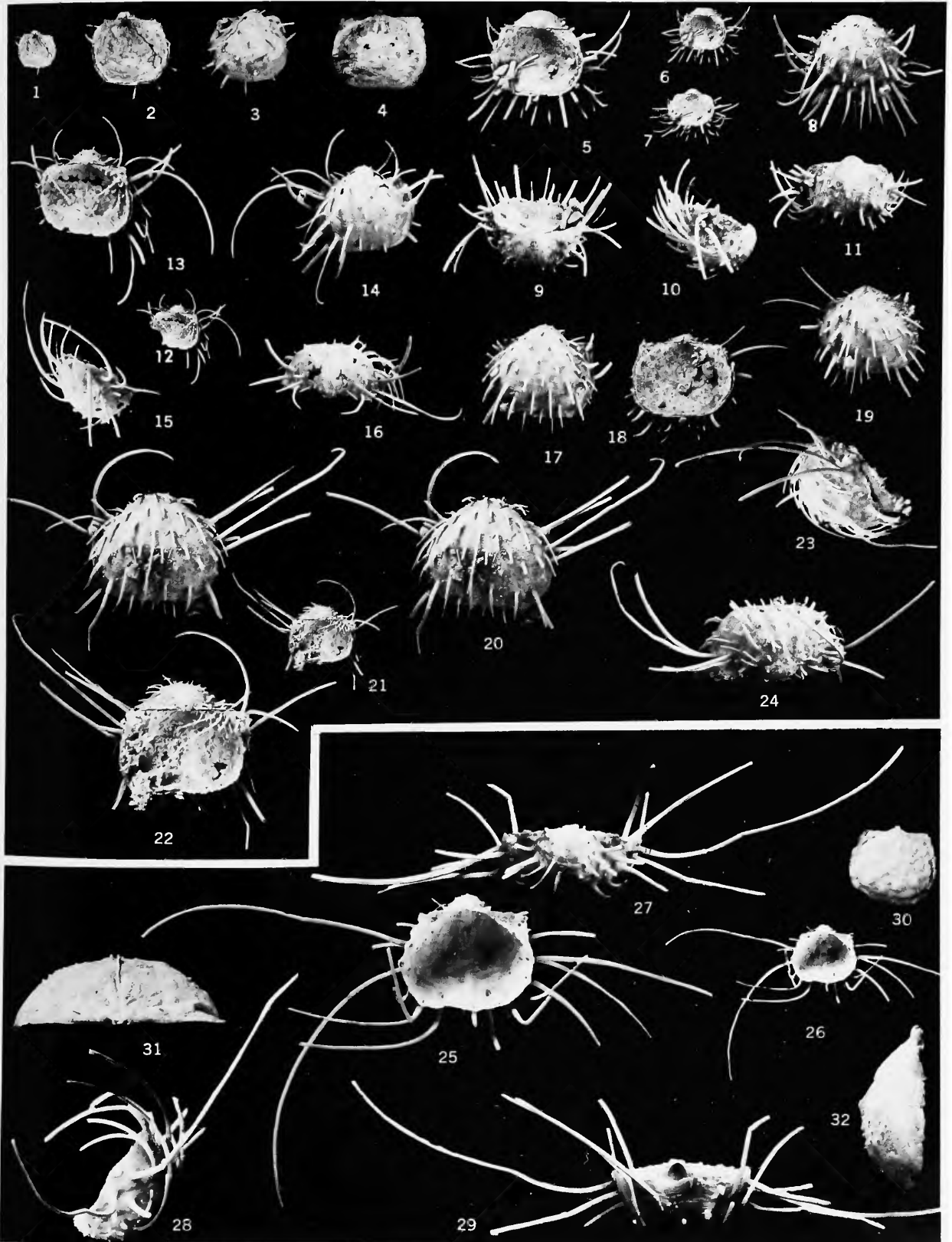


PLATE 333

Echinauris

(All hypotypes unless otherwise stated)

Echinauris lateralis Muir-Wood and Cooper: 1, Interior view, $\times 2$, nepionic pedicle valve, USNM 149697f; 2, ventral view, $\times 4$, nepionic pedicle valve with attachment ring, USNM 149697g; 3-4, ventral views, $\times 4$, $\times 2$, pedicle valve with attachment ring, USNM 149697n; 5-6, interior views, $\times 2$, $\times 4$, nepionic pedicle valve USNM 149697o; 7, interior view, $\times 4$, nepionic ventral valve with attachment ring, USNM 149697p; 8, exterior view, $\times 4$, nepionic pedicle valve with attachment ring, USNM 149697w; 9-10, ventral views, $\times 1$, $\times 2$, pedicle valve with convergent cardinal spines, USNM 124052d; 11, ventral view, $\times 4$, nepionic pedicle valve with attachment ring, USNM 149697q; 12, ventral view, $\times 2$, juvenile pedicle valve USNM 149697r; 13-14, ventral views, $\times 2$, $\times 1$, spiny, pedicle valve, USNM 149697s; 15, dorsal view, $\times 2$, brachial valve with epifaunal spat, USNM 149697t; 16-19, ventral, side, posterior, and interior views, $\times 1$, pedicle valve, holotype USNM 124052a; 29, interior view, $\times 2$, brachial valve with ear baffles, USNM 149697u; 30-34, interior views, $\times 2$, $\times 1$, posterior interior view, $\times 2$, side interior views, $\times 1$, $\times 2$, brachial valve with large cardinal process, strong endospines, well defined septum and muscle areas, USNM 149697v. [Word Formation (Willis Ranch Member), USNM 706e.]

20-23, Dorsal view, $\times 1.5$, posterior, side, and ventral views, $\times 1$, shell encrusted by small bryozoan colonies, USNM 149696b; 24-28, dorsal view, $\times 1.5$, side, anterior, posteroventral, and ventral views, $\times 1$, adult shell with long straight lateral spines, USNM 149696c. [Word Formation (lens between Willis Ranch and Appel Ranch members) USNM 706b.]

PLATE 333.—*Echinauris*

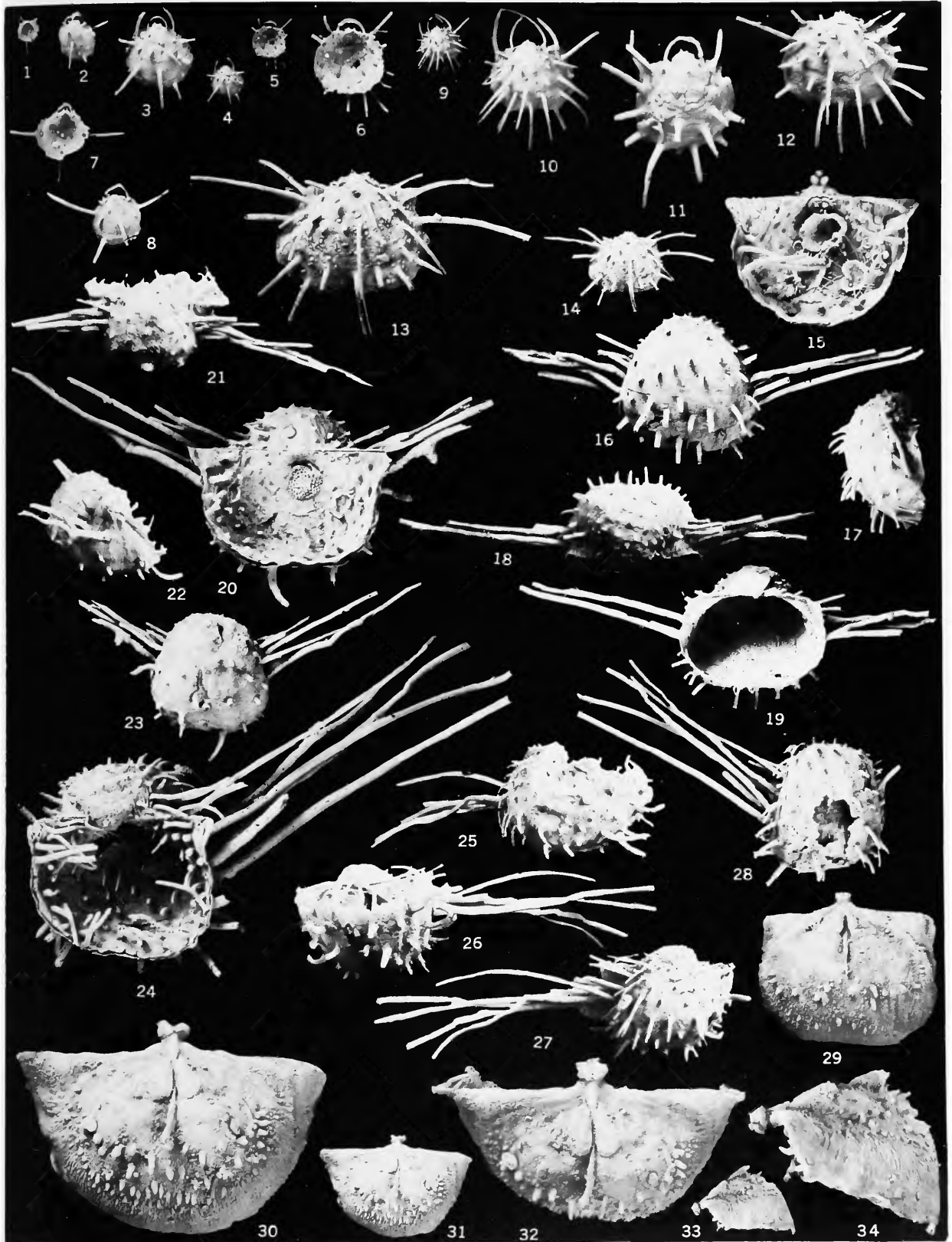


PLATE 334*Echinauris*

(All hypotypes unless otherwise stated)

Echinauris lateralis Muir-Wood and Cooper: 1, Ventral view, $\times 1$, ventral valve, USNM 149697a; 2-3, ventral views, $\times 1$, $\times 1.5$, ventral valve with attached spat of orthotetaceans, USNM 149697b; 4, ventral view, $\times 1$, ventral valve with long lateral spine, USNM 149697c; 5, ventral view, $\times 1$, ventral valve with circular borings, USNM 149697d; 6, interior view, $\times 1$, ventral valve, USNM 149697e; 7-8, ventral and interior views, $\times 1$, ventral valve with orthotetacean attached to lateral spines, USNM 149697f; 9-10, side and ventral views, $\times 1$, ventral valve, USNM 149699 (see also plate 335: figure 36), 11, interior of a large pedicle valve, showing ear baffles, $\times 1$, USNM 149697g; 14-15, interior views, $\times 2$, $\times 1$, articulated adult shell broken to show relationships of internal features, USNM 149698h; 16-21, interior views $\times 1$, $\times 2$, of dorsal valve (16, 17, facing; 18, 19, tilted posteriorly; 20, 21, side), USNM 149697j; 22-25, interior and side views, $\times 1$, $\times 2$, dorsal valve USNM 149697k; 26-31, interior, tilted, and side views, $\times 1$, $\times 2$, interior of dorsal valve, USNM 149697-l; 32-33, interior views, $\times 1$ and $\times 2$, small dorsal valve USNM 149697m. [Word Formation (Willis Ranch Member), USNM 706e.]

12-13, Interior views, $\times 2$, $\times 1$, articulated shell broken to show interior features, USNM 149696a. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 334.—*Echinauris*

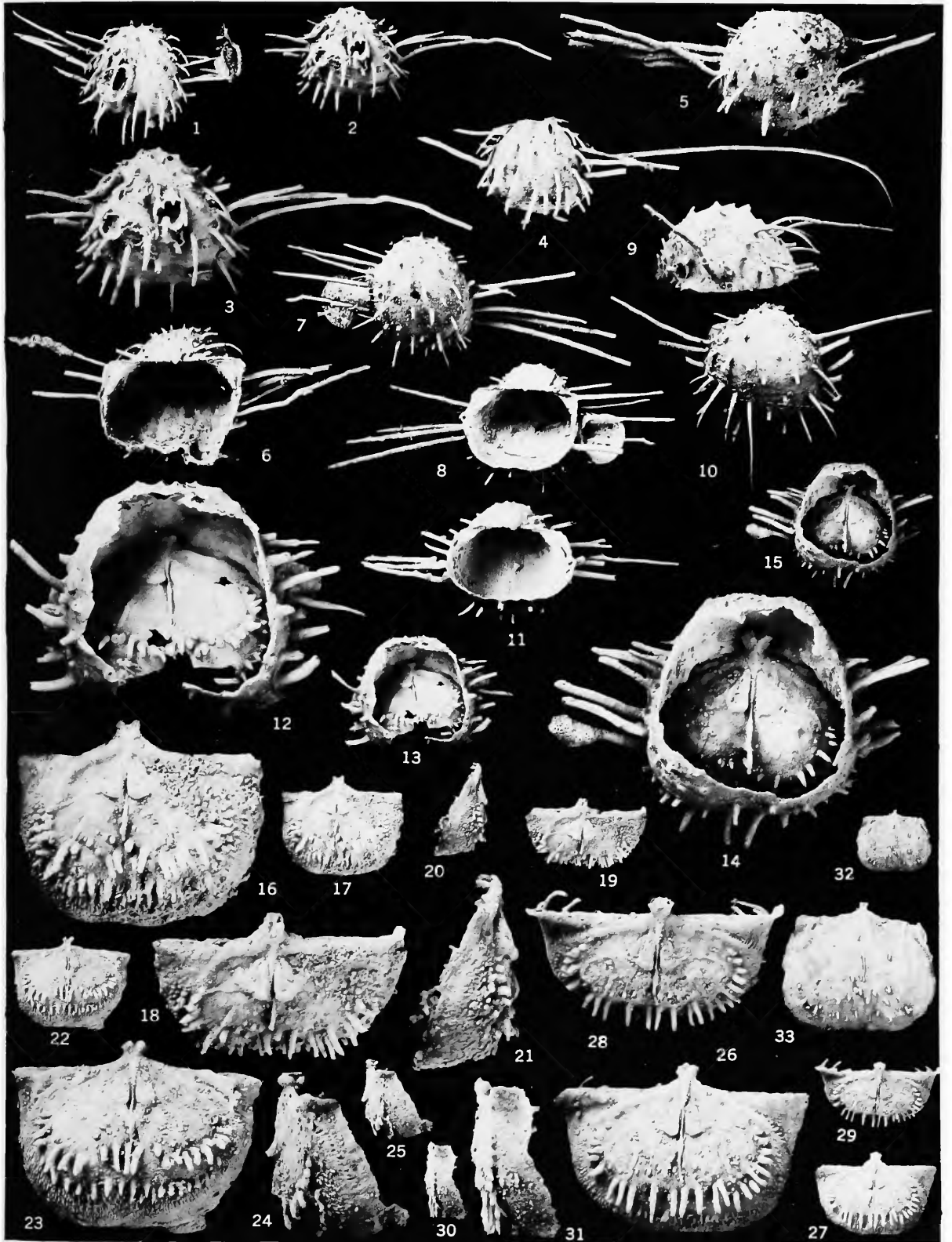


PLATE 335

Echinauris

Echinauris circularis, new species: 1–6 Ventral views, $\times 1$, $\times 2$, $\times 3$, interior views, $\times 1$, $\times 2$, and side view, $\times 2$, ventral valve, paratype USNM 152725c; 7–11, ventral, $\times 3$, $\times 2$, interior, $\times 1$, $\times 2$, and side, $\times 2$, views, adult ventral valve, holotype USNM 152725b; 12–16, exterior, $\times 1$, $\times 2$, interior, $\times 3$, and side, $\times 2$, views, dorsal valve, paratype USNM 152725d; 17–21, interior, $\times 1$, $\times 2$, ventral, $\times 2$, $\times 3$, and side, $\times 2$, views, ventral valve paratype USNM 152725e; 22–26, exterior, $\times 1$, $\times 2$, interior, $\times 3$, $\times 2$, and side, $\times 2$, paratype USNM 152725f; 27–31, interior views, $\times 1$, $\times 2$, side, $\times 2$, and exterior, $\times 2$, $\times 3$, views, ventral valve, paratype USNM 152725g; 32–35, exterior, interior, and side, $\times 2$, and interior, $\times 3$, views, dorsal valve, paratype USNM 152725a. [Cathedral Mountain Formation, USNM 721u.]

Echinauris lateralis Muir-Wood and Cooper (all hypotypes unless otherwise stated): 36, Dorsal view, $\times 1$ (ventral valve also shown on plate 334: figure 11), USNM 149699; 37–38, ventral view, $\times 1$, and side view, $\times 1.5$, ventral valve with strong lateral spines, USNM 149697x; 39, interior view, $\times 1$, dorsal valve, USNM 149697y; 40, interior view, $\times 2$, dorsal valve tilted to show endospines, USNM 149697i; 42, anterodorsal view, $\times 2$, dorsal valve with strong spines, paratype USNM 124052e; 43, exterior view, $\times 1$, small dorsal valve, USNM 149697a'; 44, exterior view, $\times 1$, small dorsal valve with attached spat of orthotetacean, USNM 149697b'; 45, exterior view, $\times 2$, dorsal valve with convergent spines, USNM 149697c'; 46–47, interior views, $\times 2$, $\times 1$, dorsal valve with healed injury at anterior margin, USNM 149697d'; 50, exterior view, $\times 1$, dorsal valve with slender spines, USNM 149697e'; 51, exterior view, $\times 1$, dorsal valve, USNM 149697z. [Word Formation (Willis Ranch Member), USNM 706e.]

41, Interior view, $\times 1$, brachial valve tilted to show cardinal process, USNM 149696d; 48–49, exterior views, $\times 1$, $\times 2$, dorsal valve with convergent lateral spines and attached small shells, USNM 149696e. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 335.—*Echinauris*

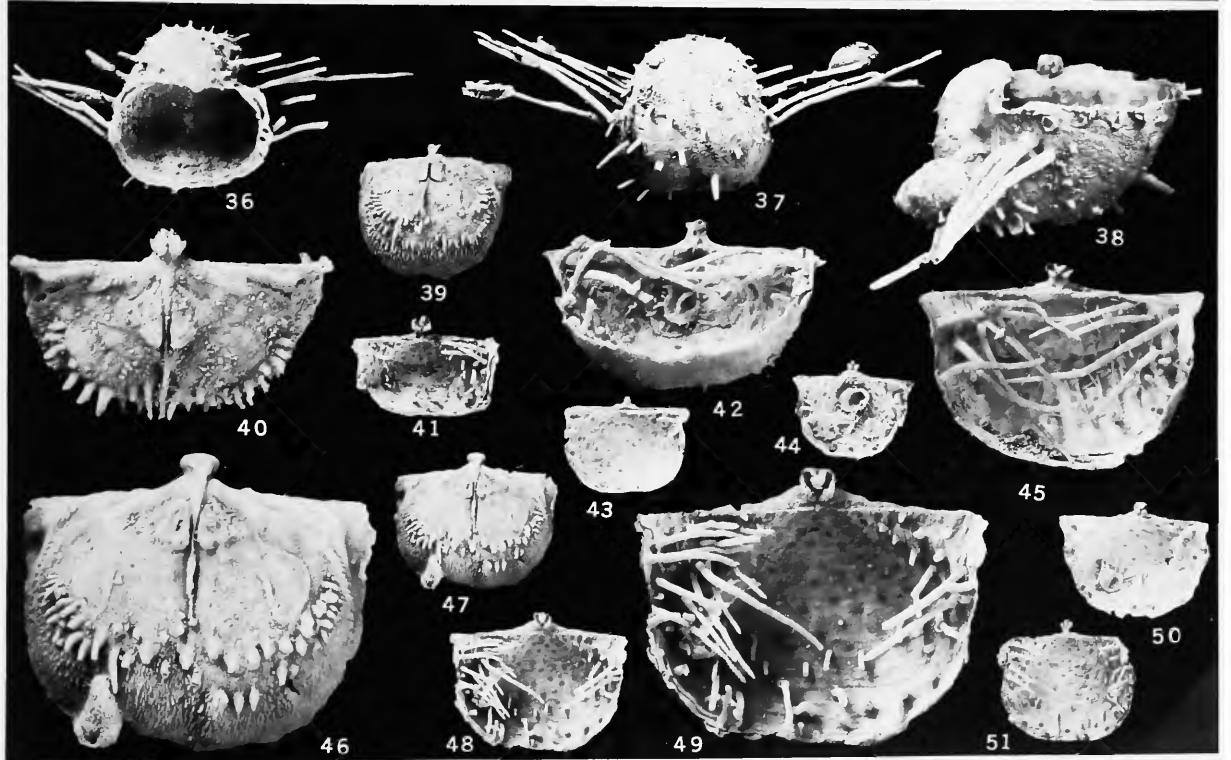
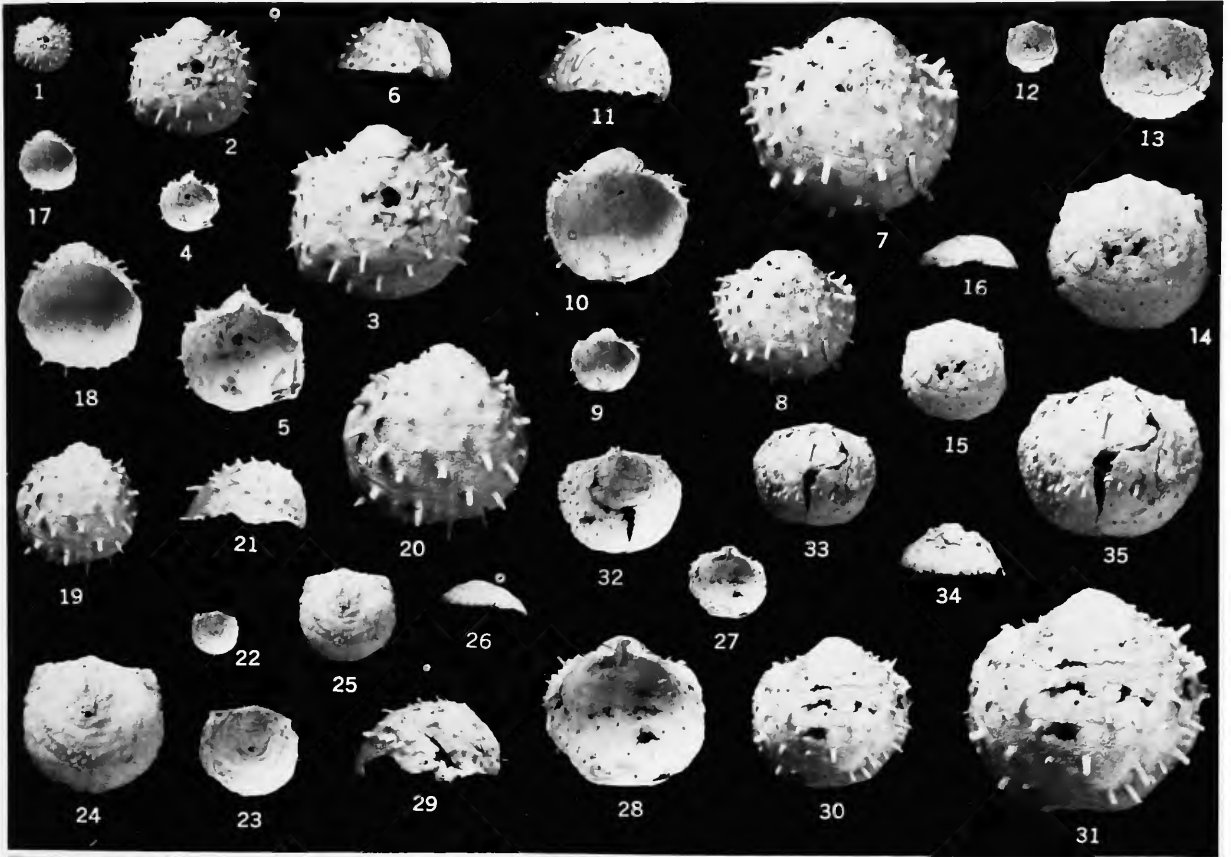


PLATE 336*Echinauris*

Echinauris lappacea, new species: 1-3, Interior views, $\times 2$, $\times 4$, ventral view $\times 2$, ventral valve, nepionic paratype USNM 154821a. [Road Canyon Formation, USNM 721j.]

4-5, Ventral views, $\times 2$, and $\times 1$, ventral valve, juvenile paratype USNM 154823a; 6 ventral view, $\times 2$, ventral valve, paratype USNM 154823b; 7, ventral view, $\times 2$, ventral valve, paratype USNM 154823c; 11, ventral view, $\times 4$, juvenile ventral valve, paratype USNM 154823d; 22-25, side and ventral views, $\times 2$, dorsal views, $\times 2$, $\times 1$, adult paratype USNM 154823e. [Road Canyon Formation, USNM 703d.]

8-10, Ventral view, $\times 2$, and dorsal views, $\times 1$, $\times 2$, small shell, paratype USNM 154824a. [Cathedral Mountain Formation, USNM 726o.]

12, Interior view, $\times 2$, dorsal valve, paratype USNM 154822a; 13-14, interior and side views, $\times 2$, dorsal valve, paratype USNM 154822b; 15, interior view, $\times 2$, dorsal valve with well defined brachial ridges and endospines, paratype USNM 154822c; 16-17, dorsal views, $\times 1$, $\times 2$, shell with robust and convergent dorsal spines, paratype USNM 152715c; 26-31, ventral, side, interior, posterior, anterior views, $\times 2$, and interior view, $\times 1$, ventral valve, holotype USNM 154822d. [Road Canyon Formation, USNM 707e.]

18-21, Ventral, side, and interior views, $\times 2$, and interior view, $\times 1$, ventral valve, paratype USNM 154825a. [Bone Spring Formation (Cutoff Shale Member), AMNH 678.]

PLATE 336.—*Echinauris*

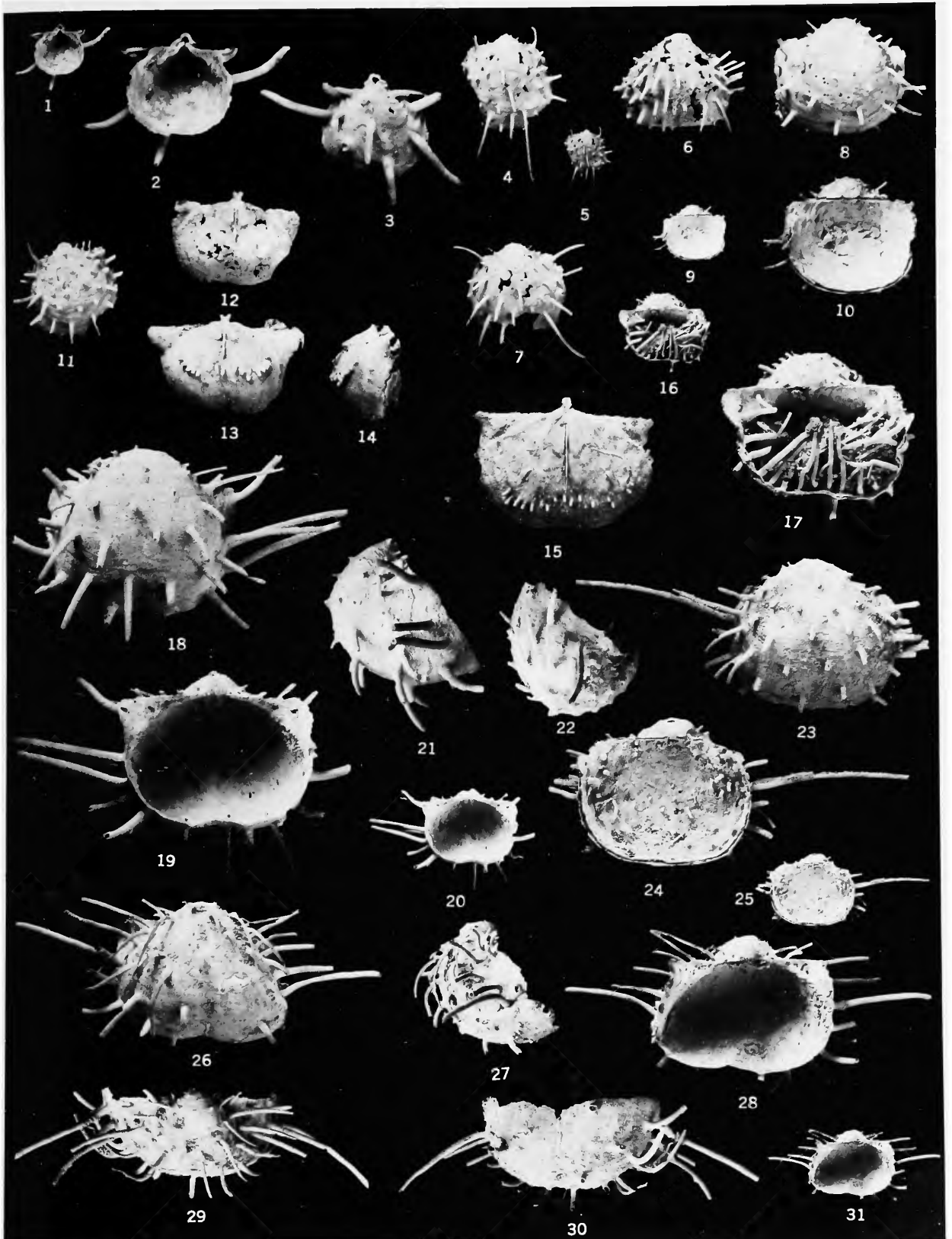


PLATE 337*Echinauris*

Echinauris liumbona, new species: 1-5, Interior and ventral views, $\times 1$, $\times 2$, and side view, $\times 2$, pedicle valve with remnant of attachment ring, paratype USNM 154826a; 6-10, exterior and interior views, $\times 1$, $\times 2$, and side view, $\times 2$, pedicle valve with convergent cardinal spines, paratype USNM 154826b; 11, interior view, $\times 2$, pedicle valve showing internal spine openings, USNM 154826c; 12-17, posterior view, $\times 2$, interior views, $\times 1$, $\times 2$, and side, anterior, and ventral views, $\times 2$, pedicle valve, paratype USNM 154826d; 18-21, ventral views, $\times 2$, $\times 1$, and interior and side views, $\times 2$, pedicle valve holotype USNM 152716o; 25-30, ventral and interior views, $\times 1$, $\times 2$, and posterior and side views, $\times 2$, pedicle valve, paratype USNM 152716-l; 31-36, dorsal views, $\times 1$, $\times 2$, and ventral, side, posterior, and anterior views, $\times 2$, paratype shell, USNM 154826e. [Road Canyon Formation, USNM 703d.]

22-24, Interior views, $\times 1$, $\times 2$, facing and tilted to side, brachial valve showing cardinal process and muscle areas, paratype USNM 154827a. [Road Canyon Formation, USNM 721z.]

PLATE 337.—*Echinauris*

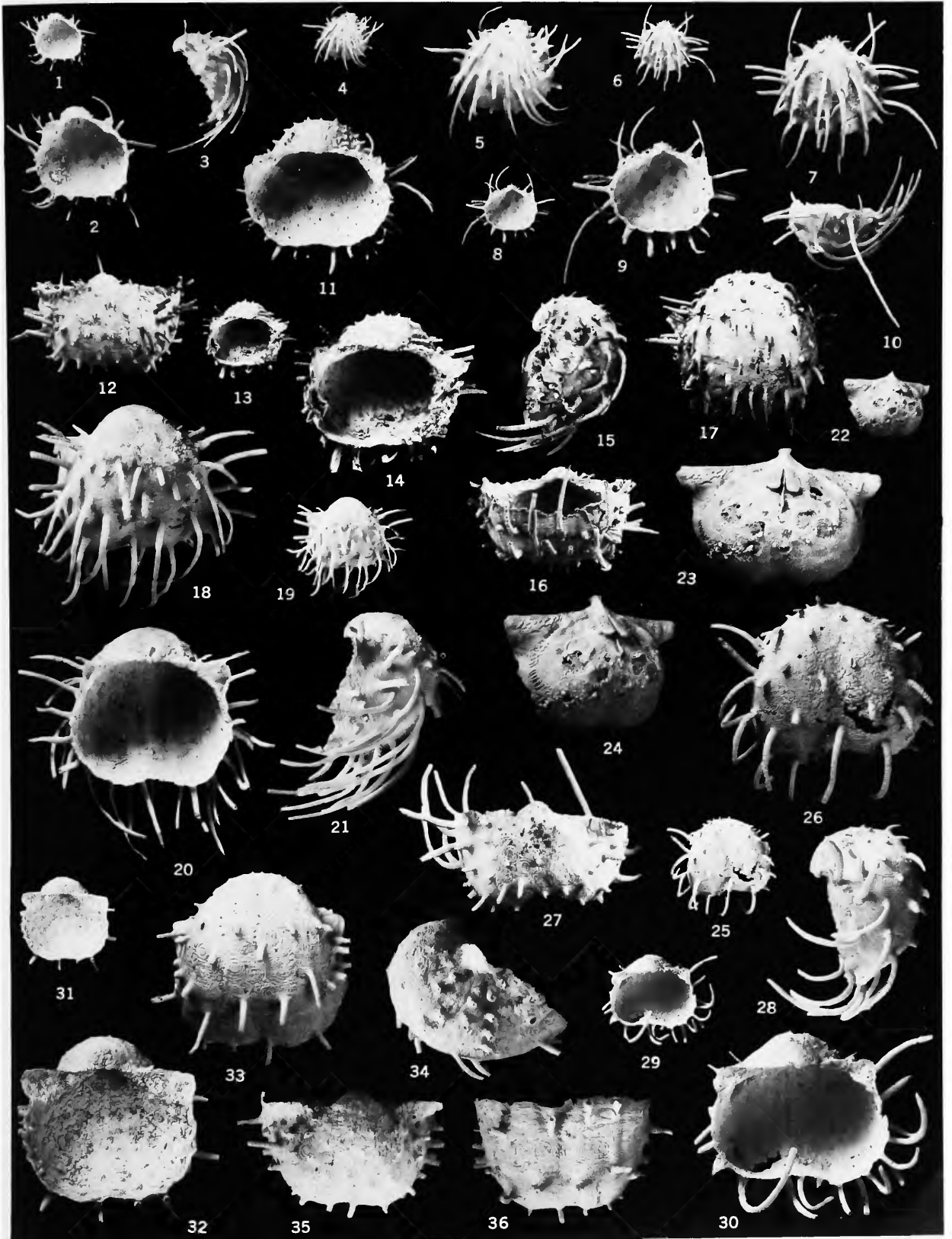


PLATE 338

Echinauris

Echinauris magna, new species: 1-2, Ventral views, $\times 1$, $\times 2$, nepionic pedicle valve, paratype USNM 154828a; 3-4, interior views, $\times 1$, $\times 2$, nepionic brachial valve, paratype USNM 154828b; 5, ventral view, $\times 1$, juvenile pedicle valve, paratype USNM 154828c; 9-14, interior views, $\times 1.5$, $\times 1$, and ventral view, $\times 1.5$, posterior view, $\times 1$, and side views, $\times 1$, $\times 1.5$, adult pedicle valve, paratype USNM 154828d; 22-23, interior and side views, $\times 2$, brachial valve, paratype USNM 154828e; 24-26, interior views, $\times 1.5$, $\times 1$, and side view, $\times 1.5$, brachial valve paratype USNM 154828f; 27, exterior view, $\times 1$, brachial valve with numerous convergent spines, paratype USNM 154828g. [Park City Formation (upper Franson Member), USNM 760.]

6-8, Dorsal and ventral views, $\times 1$, and side view, $\times 1.5$, adult holotype shell, USNM 152717b; 15-18, ventral view, $\times 1.5$, dorsal view, $\times 1$, $\times 1.5$, and side view, $\times 1.5$, adult paratype shell, USNM 152717d; 19, interior view, $\times 2$, pedicle valve, paratype USNM 152717i. [Park City Formation (Franson Member), USNM 762.]

20-21, Ventral and side views, $\times 1.5$, abraded adult shell, paratype USNM 154829a. [Phosphoria Formation, USNM 722a.]

PLATE 338.—*Echinauris*

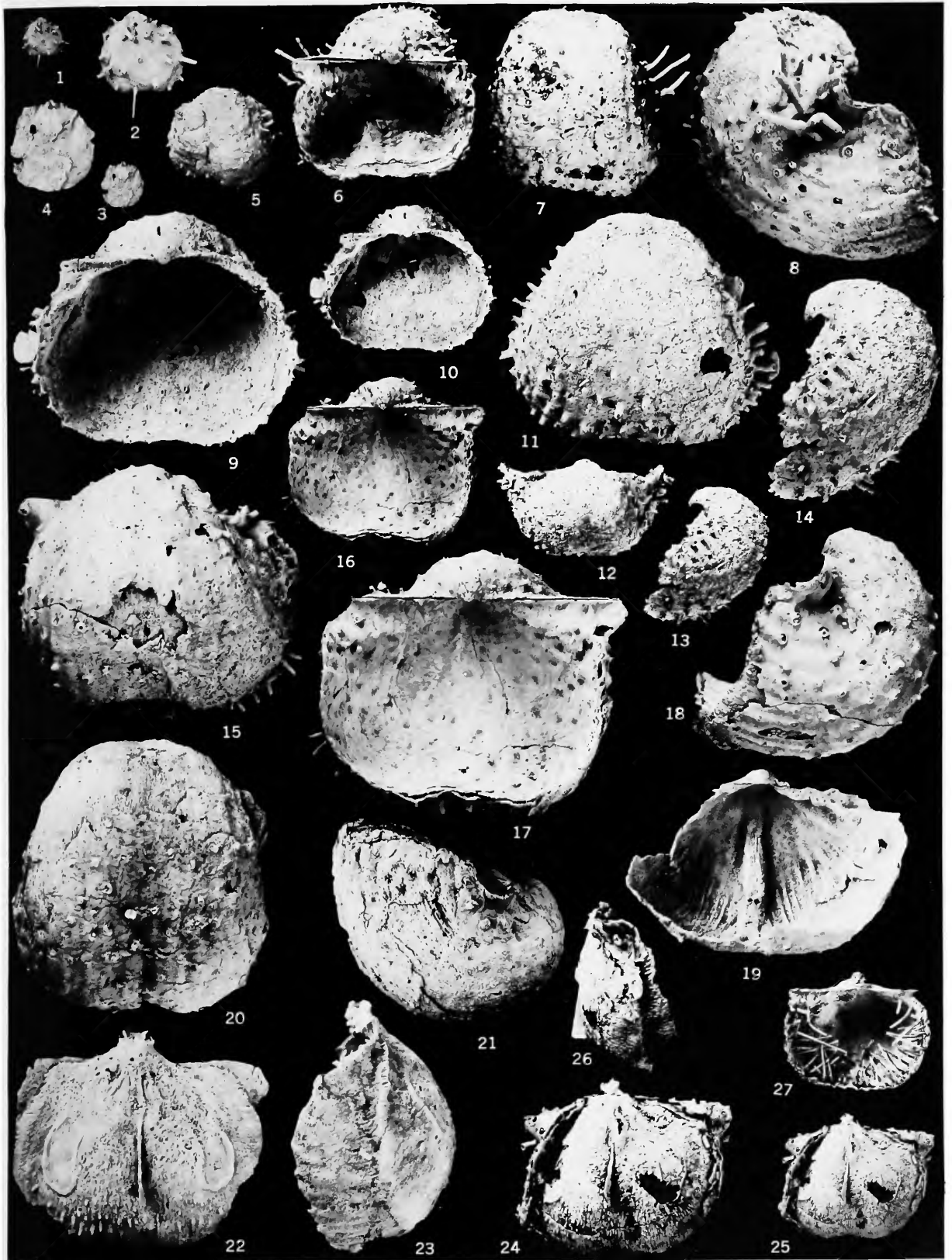


PLATE 339

Echinauris

Echinauris productelloides, new species: 1-5, Exterior and interior views, $\times 1$, $\times 2$, and side view, $\times 2$, juvenile pedicle valve, paratype USNM 152719e; 6-8, exterior views, $\times 1$, $\times 2$, and side view, $\times 2$, juvenile pedicle valve, paratype USNM 152719i; 11-15, ventral, posterior, side, and interior views, $\times 2$, interior view, $\times 1$, adult pedicle valve, paratype USNM 152719h; 16-17, exterior and interior views, $\times 2$, brachial valve, paratype USNM 152719j; 22-24, exterior, interior, and side views, $\times 2$, brachial valve, paratype USNM 152719k; 25-28, ventral and side views, $\times 2$, and interior views, $\times 1$, $\times 2$, pedicle valve, paratype USNM 152719-l; 29-33, ventral, posterior, and side views, $\times 2$, and interior views $\times 1$, $\times 2$, pedicle valve, holotype USNM 152719g. [Cherry Canyon Formation (Getaway Member), USNM 732.]

9, Interior view, $\times 2$, brachial valve, paratype USNM 154830a. [Cherry Canyon Formation (Getaway Member), AMNH 21.]

10, Interior view, $\times 2$, brachial valve, paratype USNM 154831a; 18-21, ventral and interior views, $\times 1$, $\times 2$, and side view, $\times 2$, pedicle valve, paratype USNM 154831b. [Cherry Canyon Formation (Getaway Member), Moore 31.]

34-35, Dorsal views, $\times 1$, $\times 2$, paratype shell, USNM 154832a. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 339.—*Echinauris*

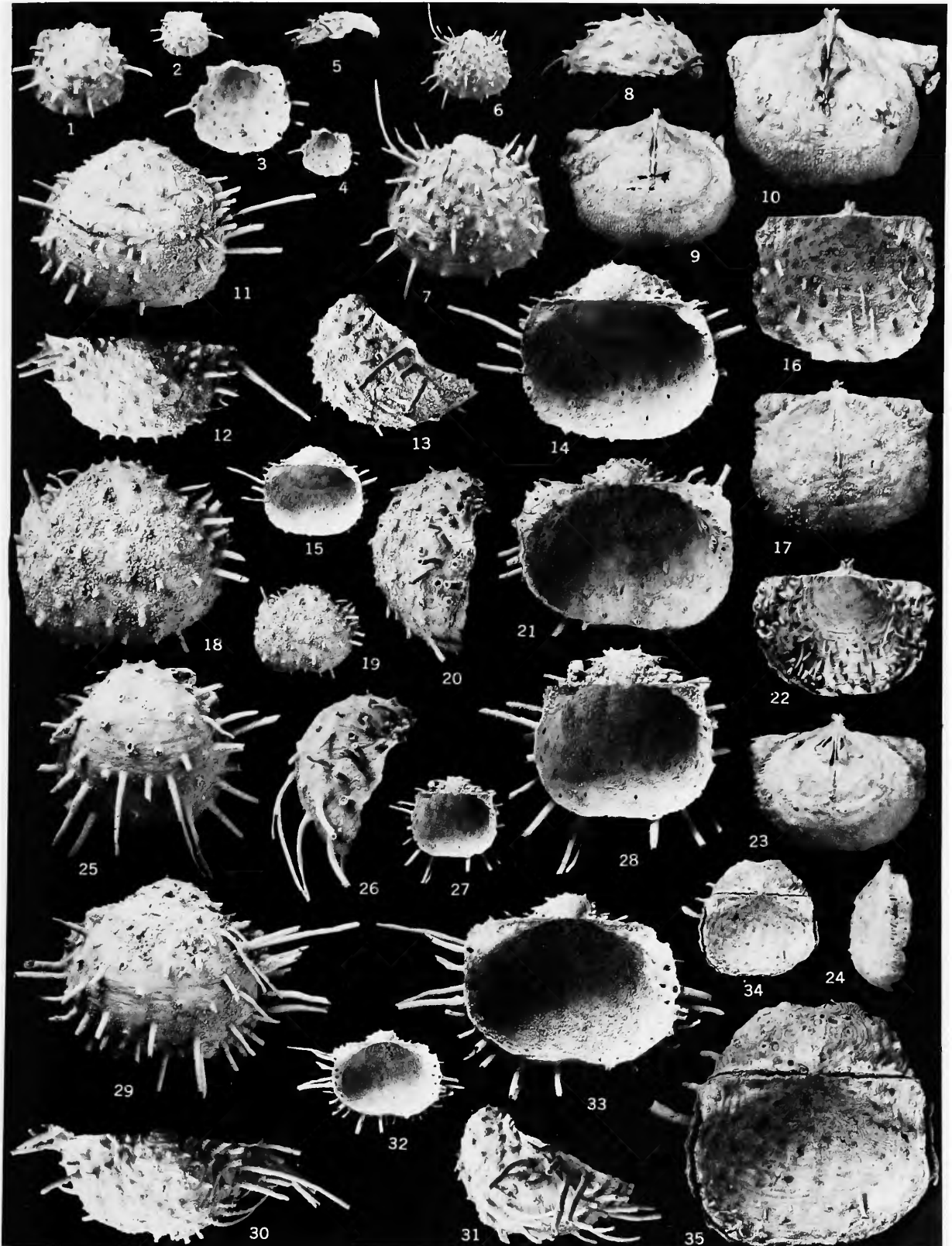


PLATE 340*Echinauris*

Echinauris subquadrata, new species: 1-6, Ventral and interior views, $\times 1$, $\times 1.5$, and side and posterior views, $\times 1.5$, silicified pedicle valve, holotype USNM 152722. [Neal Ranch Formation, USNM 701c.]

7-10, Ventral and side views, $\times 1$, $\times 2$, calcareous pedicle valve, paratype USNM 152720. [Gaptank Formation, USNM 705h.]

11-14, Ventral and side views, $\times 1$, $\times 2$, calcareous pedicle valve, paratype USNM 154833a. [Gaptank Formation, USNM 701u.]

15-16, Ventral and side views, $\times 2$, calcareous pedicle valve, paratype USNM 152721a; 17-22, dorsal and side views, $\times 2$, and ventral and posterior views, $\times 1$, $\times 2$, calcareous natural shell cast, paratype USNM 152721b. [Gaptank Formation, USNM 701f.]

PLATE 340.—*Echinauris*

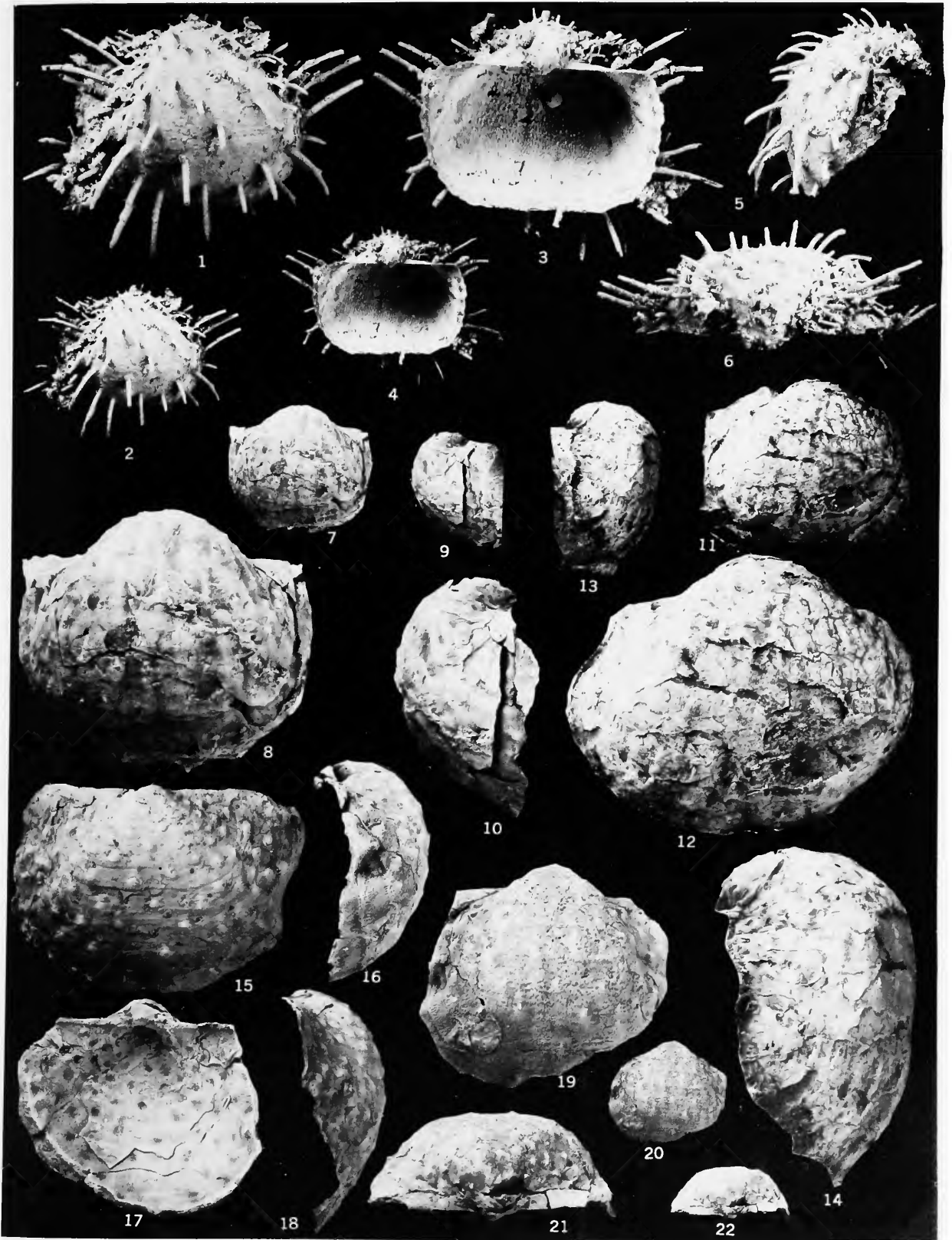


PLATE 341*Echinauris*

Echinauris venustula, new species: 1-2, Ventral views, $\times 1$, $\times 2$, nepionic pedicle valve, paratype USNM 154867a; 3-4, ventral views, $\times 1$, $\times 2$, nepionic pedicle valve, paratype USNM 154867c; 5-8, ventral views, $\times 1$, $\times 2$, dorsal and side views, $\times 2$, nepionic shell with convergent cardinal spines, paratype USNM 154867b; 9-12, ventral views, $\times 1$, $\times 2$, side and posterior views, $\times 2$, juvenile shell, paratype USNM 154867d; 13-15, ventral views, $\times 1$, $\times 2$, side, $\times 2$, juvenile pedicle valve, paratype USNM 154867e; 16-21, ventral views, $\times 1$, $\times 2$, side, dorsal, anterior, and posterior views, $\times 2$, paratype shell, USNM 152723m; 22-27, ventral and interior views, $\times 1$, $\times 2$, side and posterior views, $\times 2$, spinose pedicle valve, paratype USNM 154867f; 28-33, ventral and interior views, $\times 1$, $\times 2$, posterior and anterior views, $\times 2$, pedicle valve with attached small shells, paratype USNM 154867g; 34-39, ventral views, $\times 1$, $\times 2$, dorsal, side, posterior, and anterior views, $\times 2$, holotype shell, USNM 152723d; 40-45, ventral and interior views, $\times 1$, $\times 2$, side and anterior views, $\times 2$, pedicle valve, paratype USNM 152723c; 46, interior view, $\times 3$, pedicle valve tilted back to show visceral region, paratype USNM 154867h; 47-48, interior and side views, $\times 3$, small brachial valve, paratype USNM 154867i; 49-52, interior, side, and posterior views, $\times 3$, brachial valve, paratype USNM 154867j; 53-56, interior, visceral, posterior, and side views, $\times 3$, brachial valve, paratype USNM 154867k. [Cathedral Mountain Formation, USNM 726o.]

PLATE 341.—*Echinauris*

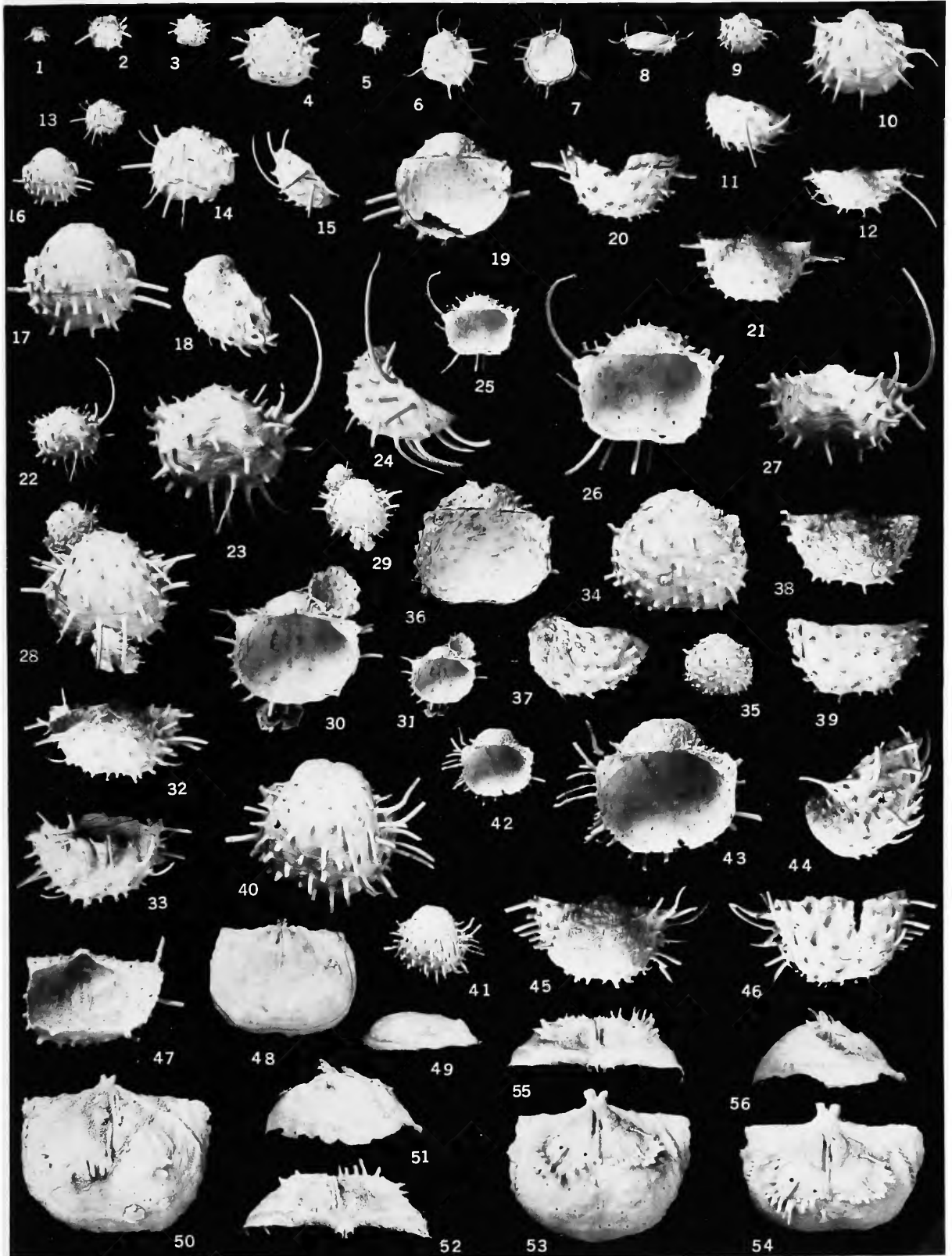


PLATE 342*Kutorginella*

Kutorginella sullivanensis (R. E. King): 1-3, Dorsal, ventral, and side views of a siphonate specimen, $\times 1$, hypotype USNM 149872-l; 4-6, ventral, side, and dorsal views of another siphonate specimen, $\times 1$, hypotype USNM 149872c; 7-9, interior, exterior, and side views of a brachial valve, $\times 1$, hypotype USNM 149872m; 10, 11, posterodorsal and interior views of the preceding brachial valve, $\times 2$, showing cardinal process and marginal rim; 12-14, interior, exterior, and side views of another brachial valve, $\times 1$, hypotype USNM 149872n; 15, 16, posterodorsal and interior views, $\times 2$, of the preceding specimen, showing the marginal rim; 17, 18, interior and side views of another brachial valve, $\times 1$, showing marginal rim and anterior trail, hypotype USNM 149872o; 19, 20, posterodorsal and interior views of the preceding brachial valve, $\times 2$, showing dendritic adductor scars, brachial ridges, and cardinal process; 21, 22, ventral and dorsal views of a specimen preserving its long halteroid spines, $\times 1$, hypotype USNM 149871a; 23, 24, dorsal and ventral views of another specimen preserving its long halteroid spines, $\times 1$, hypotype USNM 149871b; 25, 26, dorsal and ventral views of a siphonate specimen, $\times 1$, hypotype USNM 149871c; 27-30, ventral, side, interior, and anterior views of a siphonate specimen, $\times 1$, showing ear baffles and inner margin, hypotype USNM 149872h; 31, 32, dorsal and ventral views of a siphonate specimen preserving one of its long halteroid spines, $\times 1$, hypotype USNM 149871d; 33, 34, side and ventral views of a strongly siphonate specimen preserving one of its long halteroid spines, $\times 1$, hypotype USNM 149871e. [Road Canyon Formation, USNM 707e.]

PLATE 342.—*Kutorginella*

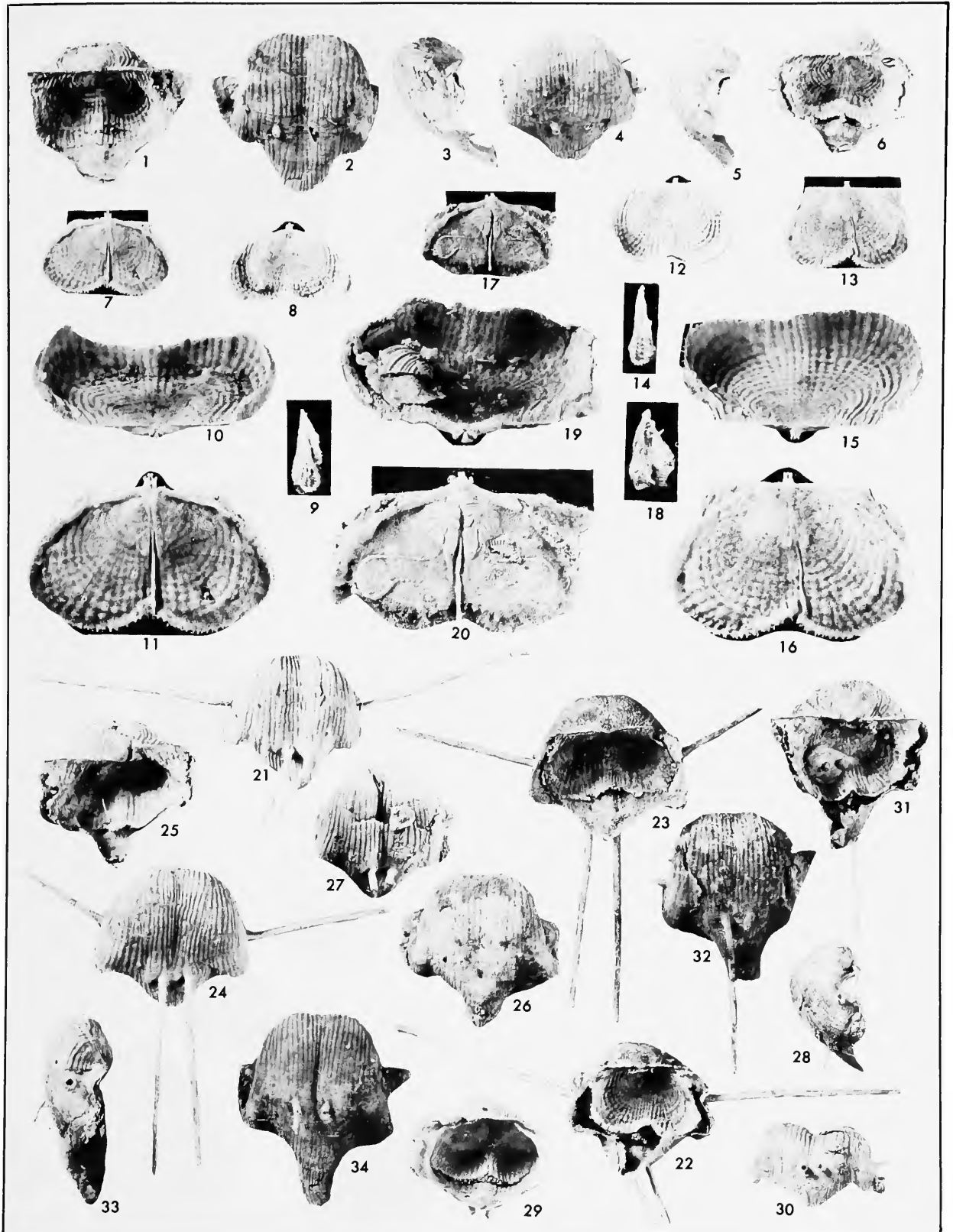


PLATE 343

Kutorginella

Kutorginella uddeni, new species: 1-4, Anterior, ventral, posterior, and side views of a large pedicle valve, $\times 1$, paratype USNM 149866a. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701q.]

5-8, Anterior, side, posterior, and ventral views of a large pedicle valve, $\times 1$, paratype USNM 149857a. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701e.]

9-11, Anterior, ventral, and side views of a pedicle valve, $\times 1$, paratype USNM 153906a; 12, Exterior of a brachial valve, $\times 1$, showing the cardinal process, paratype USNM 153906b. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 721h.]

13-17, Side, dorsal, posterior, and ventral views of a complete specimen, $\times 1$, holotype USNM 149855a. [Neal Ranch Formation (upper 15 feet of bed 2 of P. B. King), USNM 701.]

Kutorginella umbonata (Muir-Wood and Cooper): 18-22, Side, posterior, dorsal, ventral, and anterior views, $\times 1$, of the holotype USNM 124044b; 23-26, ventral, side, dorsal, and posterior views of a large specimen preserving parts of its halteroid spines, $\times 1$, hypotype USNM 153907a; 27-29, dorsal, side, and ventral views of an immature specimen, showing flattened form, $\times 1$, hypotype USNM 153907c; 30-33, anterior, posterior, dorsal, and side views of a complete specimen, $\times 1$, showing some of the spines on the brachial valve, paratype USNM 124044c. [Road Canyon Formation, USNM 702c.]

PLATE 343.—*Kutorginella*

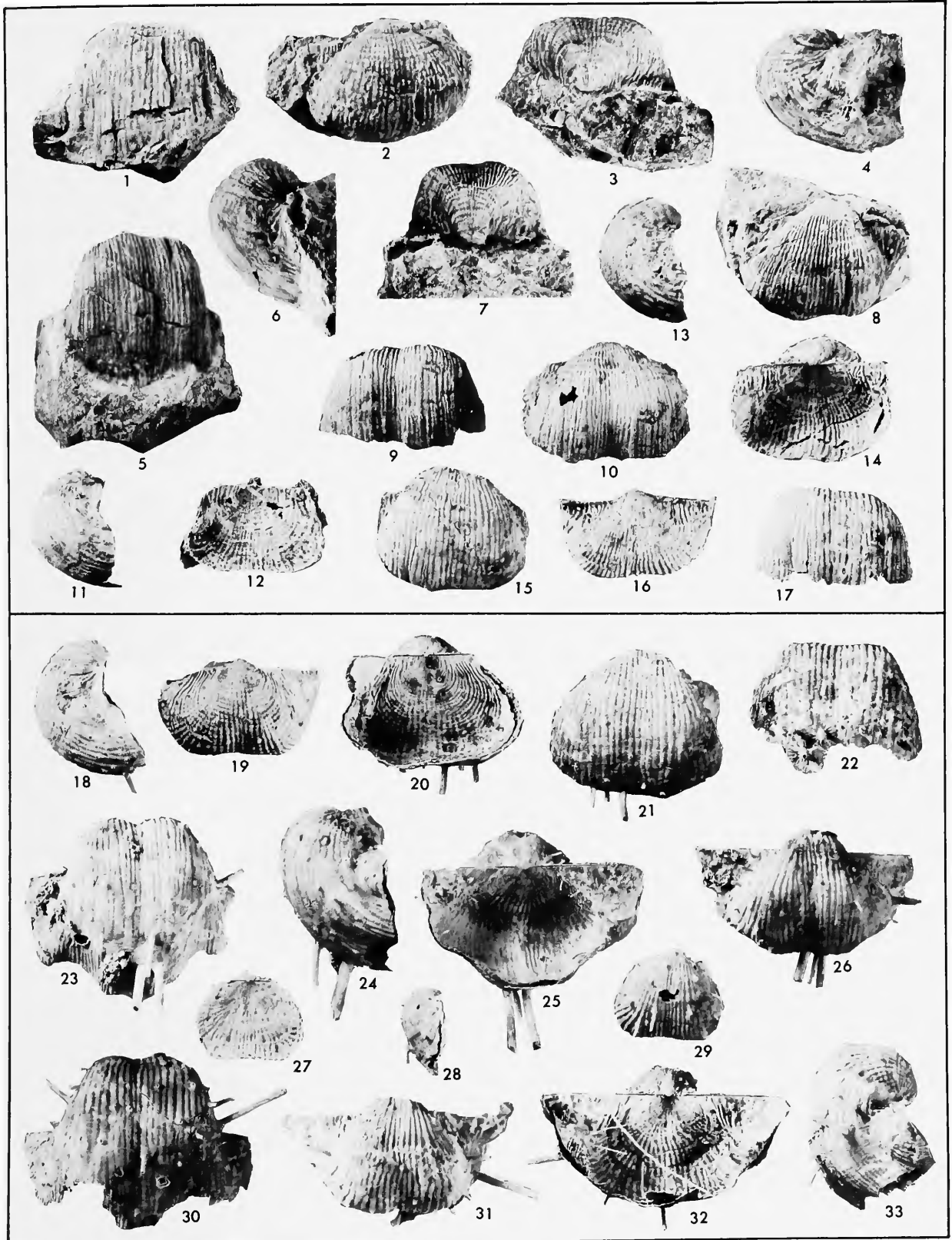


PLATE 344

Kutorginella

Kutorginella umbonata (Muir-Wood and Cooper): 1-3, Ventral, dorsal, and side views of a specimen preserving the long, anterior halteroid spines, $\times 1$, hypotype USNM 149879a; 4-6, side, ventral, and dorsal views of an immature specimen, $\times 1$, showing flattened form, hypotype USNM 153907d; 7, dorsal view of a specimen larger than the preceding but still in the flattened form of immaturity, $\times 1$, hypotype USNM 153907b; 8, ventral view of a pedicle valve, $\times 1$, showing some of the body spines, paratype USNM 124044d; 9, dorsal view of a complete specimen, $\times 1$, paratype USNM 124044e; 10, anterior view of a large broken specimen, $\times 1$, showing the anterior marginal rim in the brachial valve, hypotype USNM 153907e; 11-13, posterior, interior, and side views of a brachial valve, showing the marginal rim and ear baffles, $\times 2$, paratype USNM 124044h; 14, 15, posterodorsal and dorsal views of the cardinal process of the preceding paratype, $\times 3$; 16, interior of another brachial valve, $\times 2$, showing the spiny marginal rim and ear baffles, paratype USNM 124044m; 17-20, interior, exterior, anterior, and side views of a brachial valve, $\times 1$, showing the marginal rim, ear baffles, and anterior trail, hypotype USNM 153907f; 21, 22, posterodorsal and interior views of the preceding specimen, $\times 2$, showing the strong ear baffles and cardinal process; 23-26, interior, anterior, side and dorsal views, $\times 1$, of another brachial valve, hypotype USNM 153907g; 27, 28, interior and posterodorsal views of the preceding brachial valve, $\times 2$; 29, 30, ventral and side views of a somewhat siphonate, large individual with long anterior halteroid spines, $\times 1$, hypotype USNM 149879b. [Road Canyon Formation (base), USNM 702c.]

PLATE 344.—*Kutorginella*

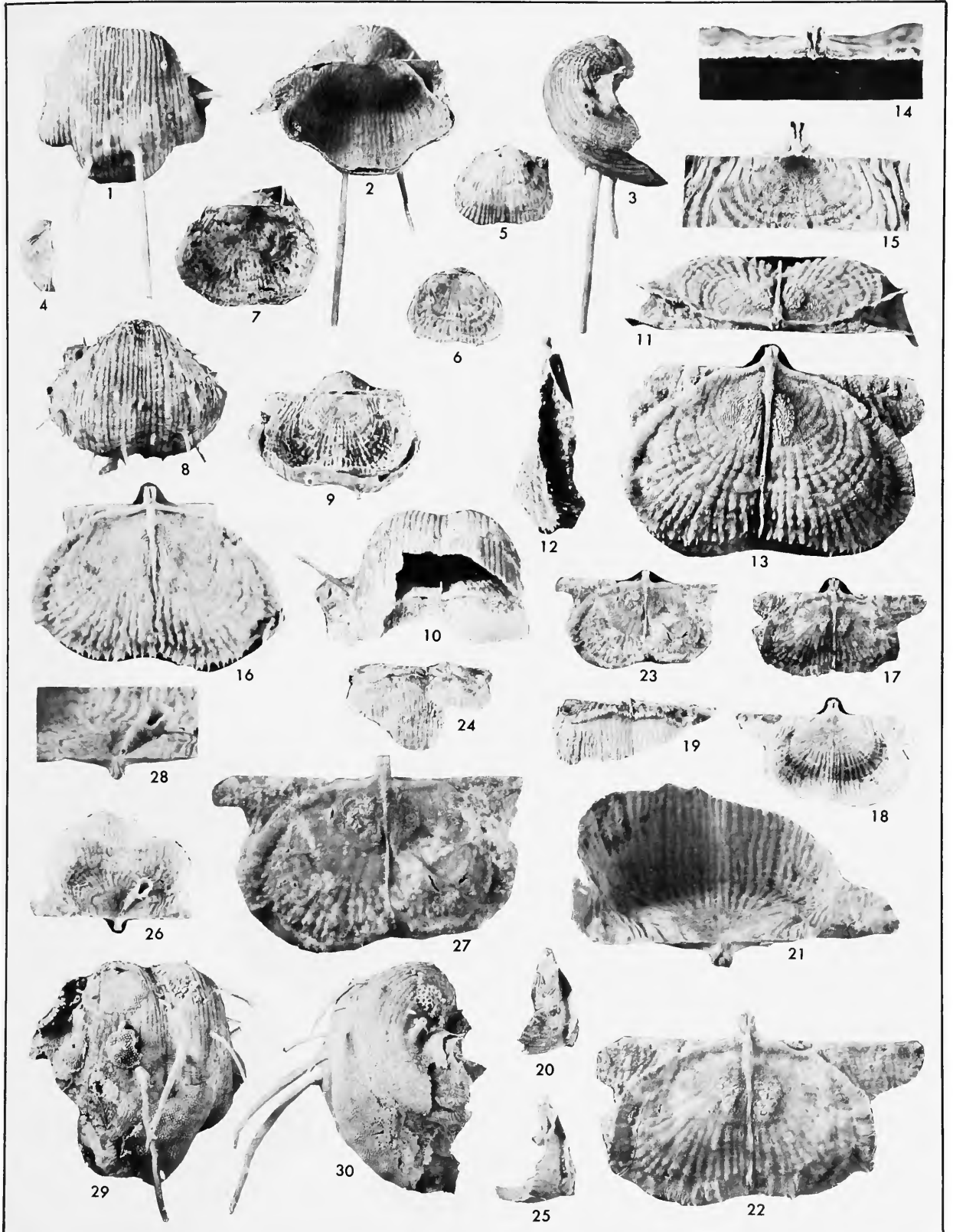


PLATE 345*Thamnosia*

Thamnosia capitanensis (Girty): 1, 2, Interior and exterior of a brachial valve, showing the large, elevated ear baffles, $\times 1$, hypotype USNM 154017a; 3, 4, posterior and interior of the preceding, $\times 2$. [Capitan Formation, USNM 725f.]

5-8, ventral, anterior, side, and posterior views of a pedicle valve, showing the long trail, $\times 1$, hypotype USNM 151478b. [Capitan Formation, USNM 738a.]

9-10, Impression of the brachial valve, and ventral view of the pedicle valve of the same specimen, $\times 1$, showing the long and nasute trail, hypotype USNM 151474b; 11, 12, ventral and anterior views of another nasute pedicle valve, showing also a cincture at the anterior of the visceral region, $\times 1$, hypotype USNM 151474a. [Capitan Formation, USNM 750a.]

13-17, Ventral, side, anterior, posterior, and dorsal views of a complete specimen with nasute trail, $\times 1$, hypotype USNM 151481. [Capitan Formation, AMNH 475.]

PLATE 345.—*Thamnosia*

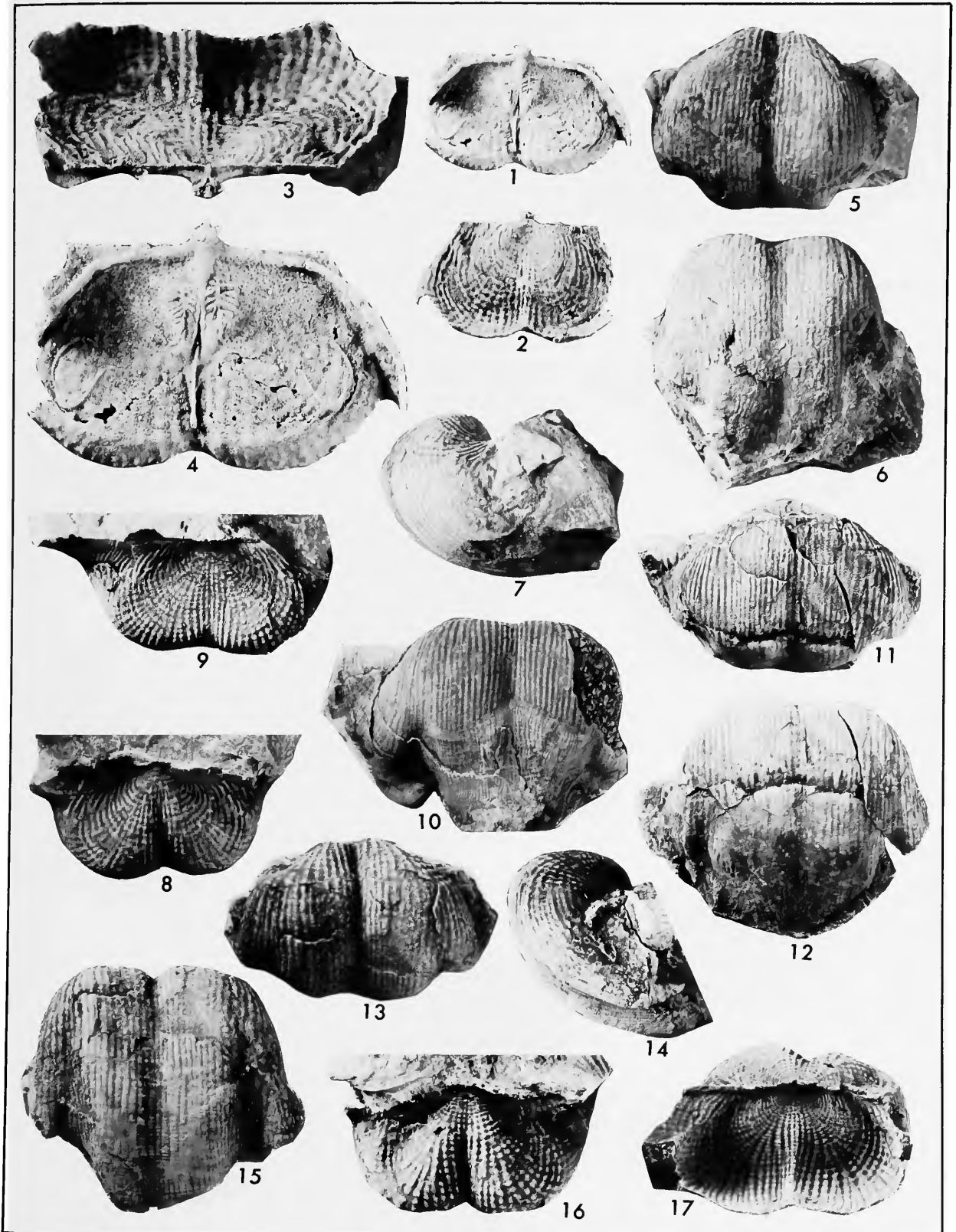


PLATE 346*Thamnosia*

Thamnosia parvispinosa (Stehli): 1, 2, Interior and side, $\times 1$, of a brachial valve, $\times 1$, hypotype USNM 149890a; 3, 4, interior and posterior views of the preceding brachial valve, $\times 2$, showing high ear baffles and endospines. [Bone Spring Formation, AMNH 625.]

5, 6, Exterior and interior of a deformed brachial valve, $\times 1$, hypotype USNM 154018b. [Bone Spring Formation, USNM 728e.]

Thamnosia phragmophora, new species: 7–10, Side, dorsal, posterior, and anterior views of a complete specimen, $\times 1$, holotype USNM 151462b; 11–14, partial side, interior, posterior, and tilted interior views of brachial valve, showing high ear baffles, $\times 1$, paratype USNM 151462d; 15, 16, posterior and dorsal views of another complete specimen, $\times 1$, paratype USNM 151462c; 17–19, anterior, posterior, and side views of another complete specimen with long trail, $\times 1$, paratype USNM 151462a. [Word Formation (Appel Ranch Member), USNM 706d.]

PLATE 346.—*Thamnosia*

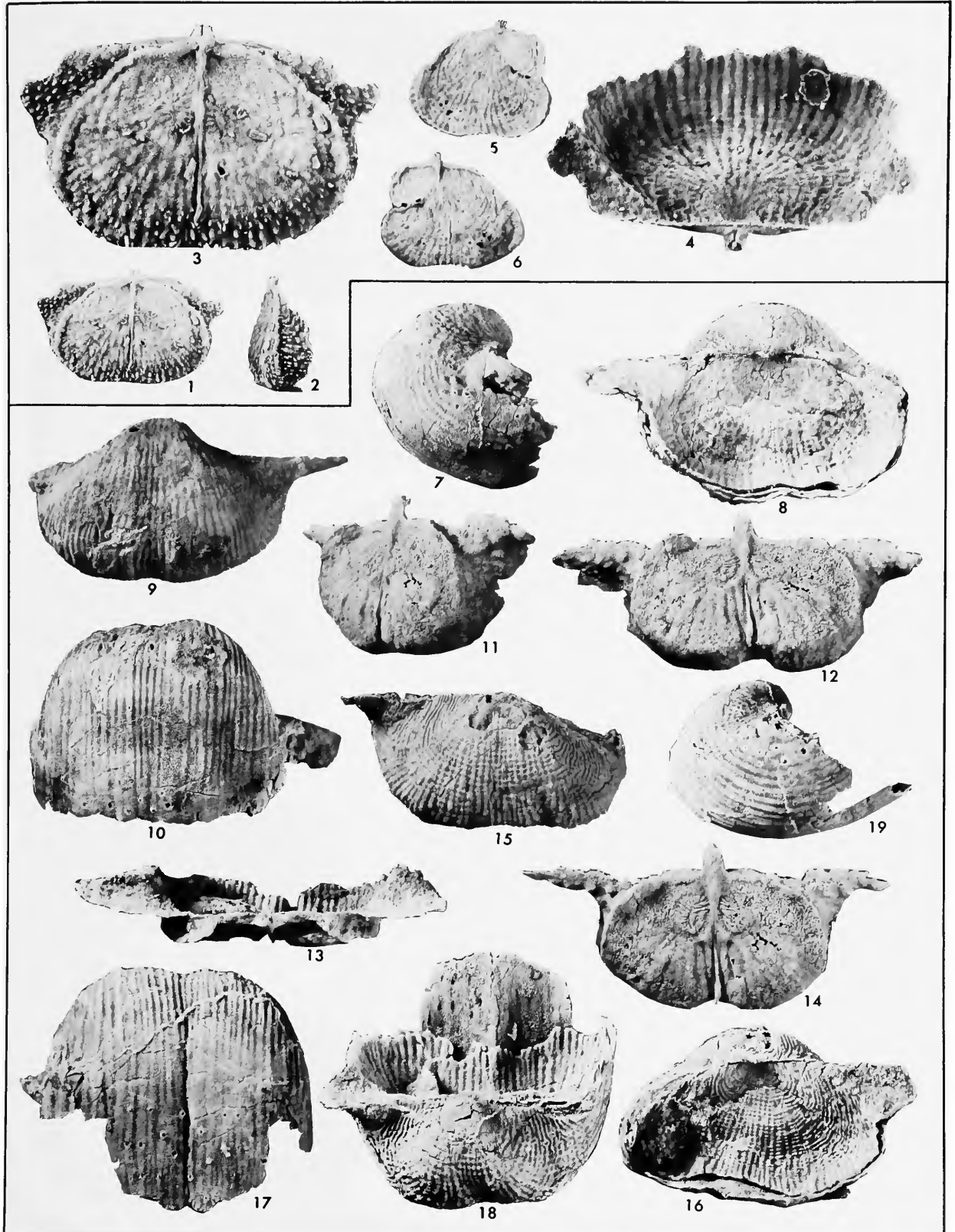


PLATE 347*Thamnosia*

Thamnosia parvispinosa (Stehli): 1-4, Anterior, posterior, ventral, and side views of a pedicle valve, \times 1, hypotype USNM 152726b; 6-10, posterior, dorsal, anterior, side, and ventral views of a complete specimen, \times 1, hypotype USNM 152726a; 14-18, anterior, dorsal, side, posterior, and ventral views of another complete individual, \times 1, hypotype USNM 154018a; 24-26, side, exterior, and interior views of a brachial valve, \times 1, hypotype USNM 154020; 27, 28, interior and posterior views of the preceding specimen, \times 2, showing ear baffles and cardinal process. [Bone Spring Formation, USNM 728e.]

5, Fragment of the exterior of a brachial valve, showing the spines, \times 1, hypotype USNM 154019d; 19-21, exterior, \times 1, and posterior and interior of a brachial valve having a distorted cardinal process, \times 2, hypotype USNM 154019c; 22, 23, exterior and side views of a brachial valve having spines, \times 1, hypotype USNM 154019b; 29, 30, posterior and interior views of a brachial valve, showing bulbous cardinal process, brevisseptum, fine endospines and ear baffles, \times 2, hypotype USNM 154019a. [Bone Spring Formation, USNM 728f.]

11-13, Ventral, anterior, and posterior views of a specimen with fine spines, \times 1, hypotype USNM 149893. [Bone Spring Formation, USNM 728h.]

PLATE 347.—*Thamnosia*

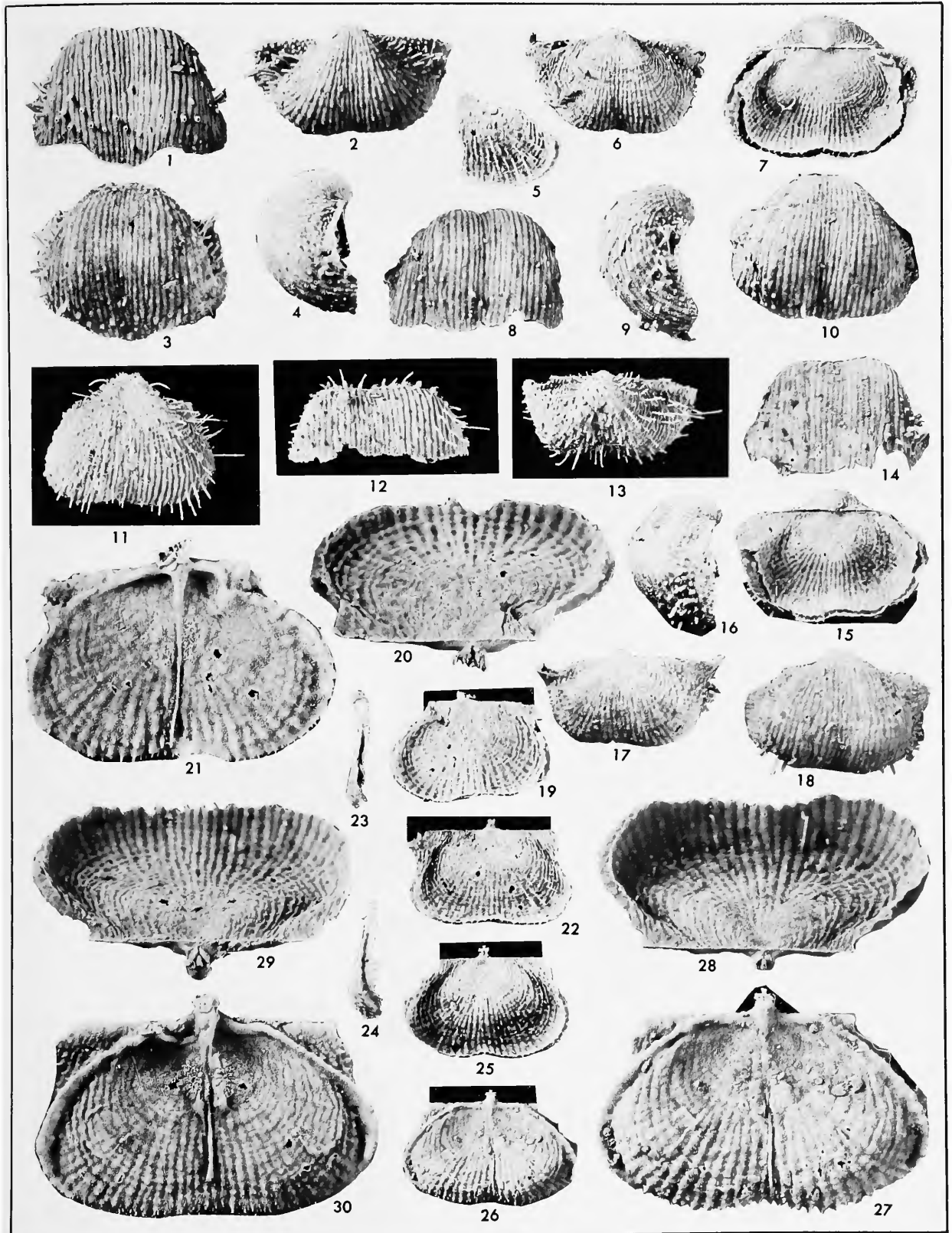


PLATE 348*Thamnosia*

Thamnosia anterospinosa Cooper and Grant: 1-4, Dorsal, ventral, posterior, and side views of a specimen with both valves and having spines on the brachial valve, $\times 1$, hypotype USNM 155131b; 5-7, side, dorsal, and ventral views of another complete specimen with a thick brush of spines on the trail, $\times 1$, holotype USNM 149852; 15, interior of a fragmentary pedicle valve showing the adductor platform, $\times 1$, hypotype USNM 155131e; 16, 17, exterior and interior of a brachial valve, $\times 1$, hypotype USNM 155131f; 18, 19, interior and posterior views of the preceding specimen, $\times 2$, showing ear baffles, long median ridge, and adductor scars. [Cathedral Mountain Formation, USNM 702un.]

8-11, Posterior, side, ventral, and anterior views of a pedicle valve, $\times 1$, hypotype USNM 154021a; 12, interior of a brachial valve, $\times 1$, hypotype USNM 154021b; 13, 14, posterior and interior of the preceding brachial valve, $\times 2$, showing cardinal process, ear baffles, and adductor scars. [Cathedral Mountain Formation, USNM 721u.]

PLATE 348.—*Thamnosia*

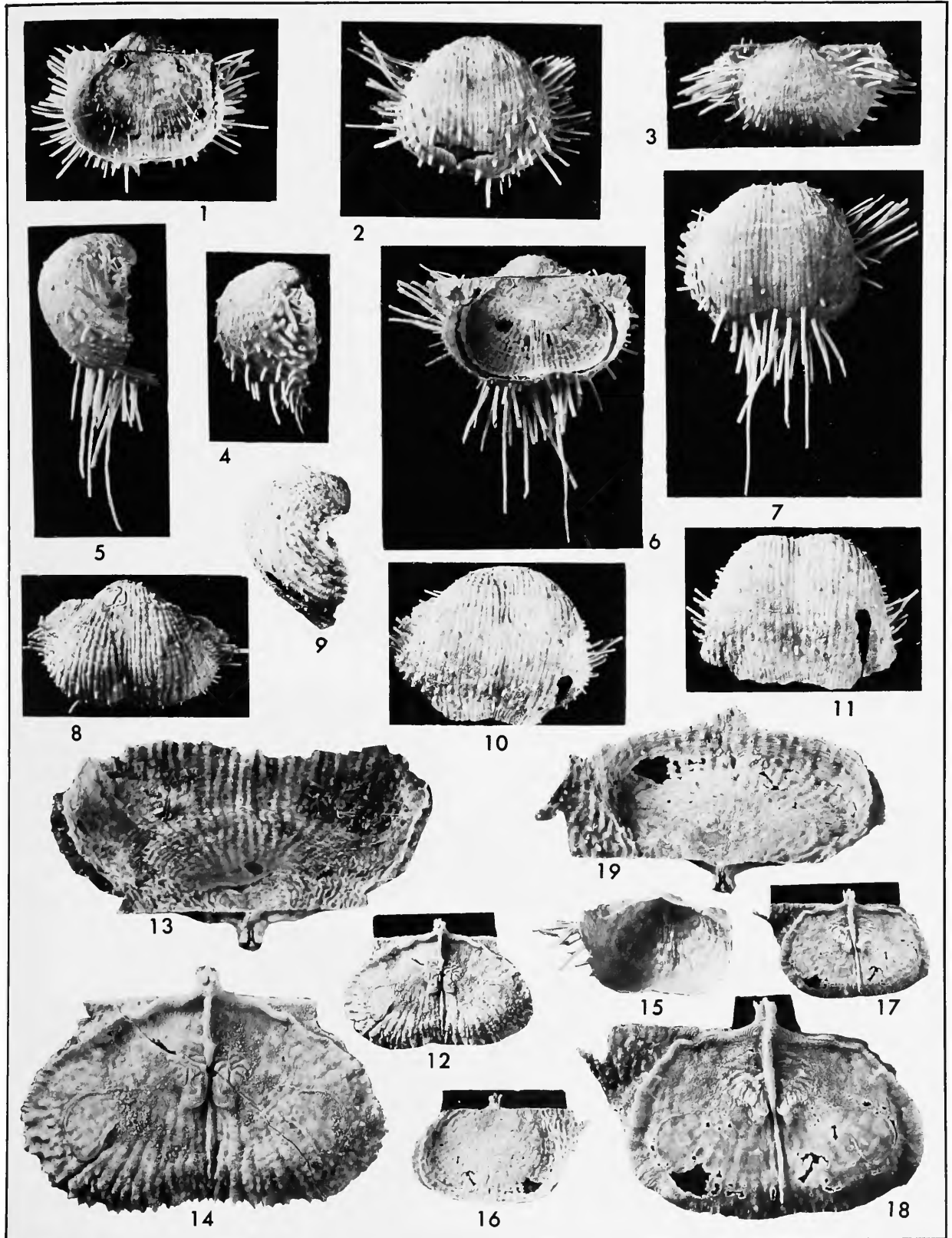


PLATE 349*Thamnosia*

Thamnosia anterospinosa Cooper and Grant: 1-3, Ventral, side, and posterior views, $\times 1$, of a pedicle valve, hypotype USNM 154022a; 4, 5, exterior and interior views of a brachial valve, $\times 2$, showing cardinal process, muscle scars and ear baffles, hypotype USNM 154022b. [Cathedral Mountain Formation, USNM 721u.]

Thamnosia capitanensis (Girty): 6-8, Exterior, side, and interior views of a brachial valve, $\times 1$, hypotype USNM 154017b; 9, exterior of the preceding specimen, $\times 2$, showing cardinal process. [Bell Canyon Formation (Rader Member), USNM 725f.]

10-12, Exterior, interior, and side views of a brachial valve, $\times 1$, hypotype USNM 154023; 13, 14, posterior and interior of the preceding specimen, $\times 2$, showing ear baffles, dendritic adductor scars, and brevisseptum. [Bell Canyon Formation (Rader Member), AMNH 410.]

15-17, Side, exterior, and interior views of another brachial valve, $\times 1$, hypotype USNM 154024; 18, posterior view of the preceding specimen, showing the cardinal process, $\times 2$; 19, interior of same specimen, $\times 2$, showing brevisseptum and relation of ridge to cardinal process. [Bell Canyon Formation (Pinery Member), USNM 733.]

PLATE 349.—*Thamnosia*

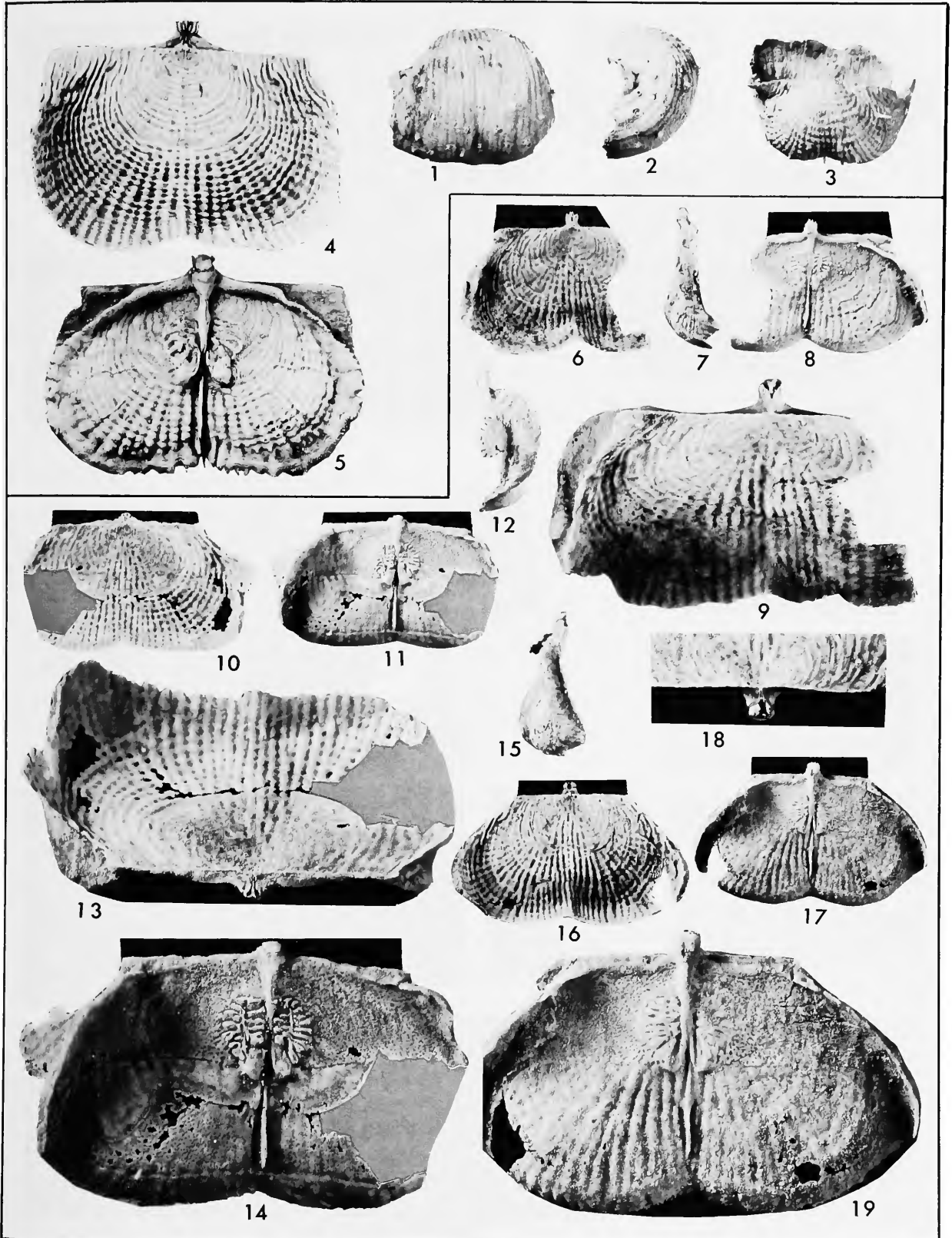


PLATE 350*Kutorginella*

Kutorginella sullivanensis (R. E. King): 1-4, Ventral, posterior, dorsal, and side views of a complete specimen, $\times 1$, hypotype USNM 149879. [Road Canyon Formation (base), USNM 702c.]

Kutorginella robusta, new species: 5-7, Interior, exterior, and side views of a brachial valve, $\times 1$, paratype USNM 154025a; 8, 9, interior and posterior of the preceding brachial valve, $\times 2$, showing cardinal process and ear baffles; 13-16, posterior, ventral, side, and dorsal views of a complete specimen, $\times 1$, paratype USNM 149887d; 17-20, side, posterior, dorsal, and ventral views of a complete specimen preserving some of its spines on the brachial valve, $\times 1$, holotype USNM 149887c. [Road Canyon Formation, USNM 721o.]

10, 11, Interior and side views of a brachial valve, $\times 1$, paratype USNM 149886a; 12, interior of the preceding specimen, $\times 2$, showing dendritic adductor scars, brachial ridges and ear baffles. [Road Canyon Formation, USNM 719x.]

PLATE 350.—*Kutorginella*

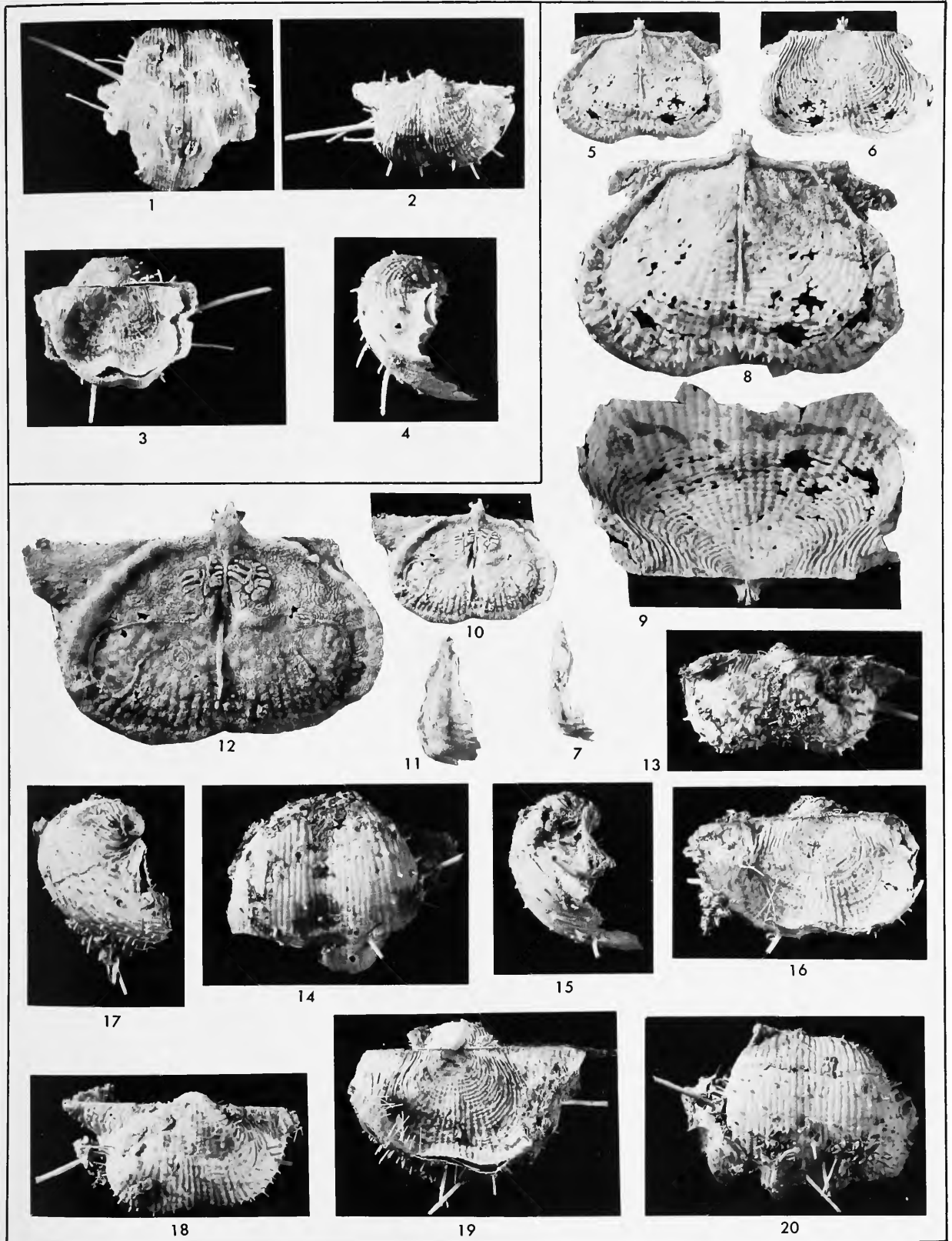


PLATE 351*Thamnosia and Rhamnaria*

Thamnosia silicica, new species: 1–4, Posterior, anterior, ventral and dorsal views of an imperfect specimen, × 1, paratype USNM 151470. [Hess Formation (Taylor Ranch Member), USNM 702m.]

5–10, Posterior, ventral, side, anterior, ventral (with ventral valve removed), and dorsal views, × 1, holotype USNM 151468b; 11–14, posterior, side, ventral, and anterior views of a large pedicle valve, × 1, paratype USNM 151468a. [Hess Formation (Taylor Ranch Member), USNM 702e.]

15–18, Posterior, ventral, side, and anterior views of another pedicle valve, × 1, showing a somewhat nasute anterior, paratype USNM 151469. [Hess Formation (Taylor Ranch Member), USNM 702f.]

Rhamnaria vinnula, new species: 19–22, Dorsal, side, ventral, and anterior views of a complete specimen, × 1, paratype USNM 152680a; 23–25, posterodorsal, side, and interior views of a brachial valve, × 1, paratype USNM 153904e. [Road Canyon Formation, USNM 721j.]

26–28, Posterior, dorsal, and ventral views of an adult, × 1, paratype USNM 152677. [Road Canyon Formation, USNM 719x.]

PLATE 351.—*Thamnosia* and *Rhamnaria*

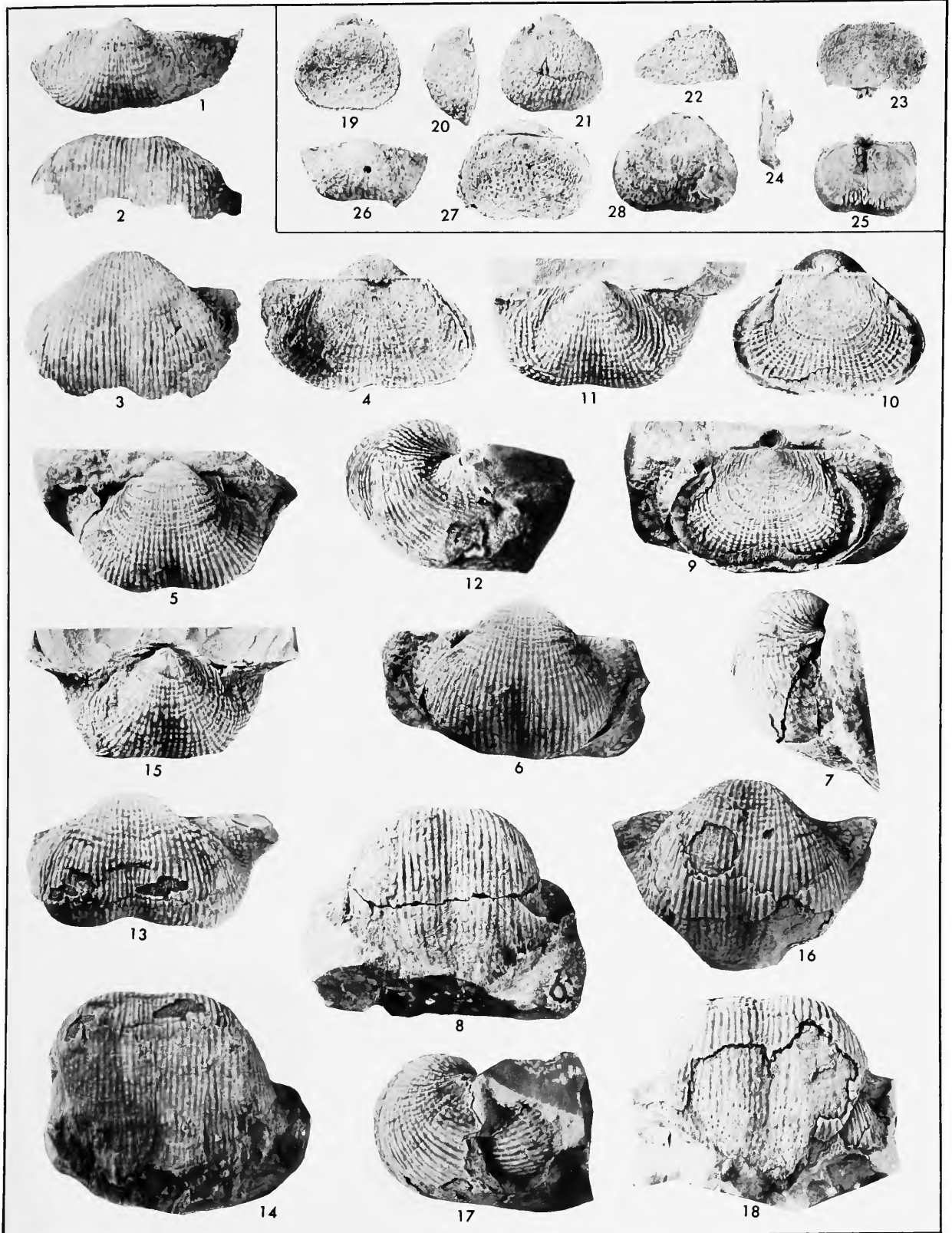


PLATE 352

Bathymyonia and *Waagenoconcha*

Bathymyonia nevadensis (Meek): 1, 2, Ventral and dorsal views of a young specimen, $\times 1$, hypotype USNM 154034a; 3, 4, ventral and dorsal views of an adult, $\times 1$, showing cardinal process and median septum and spines on brachial valve, hypotype USNM 154034b; 5, 6, exterior and interior views of an immature brachial valve, $\times 1$, hypotype USNM 154034c; 7, 8, interior and exterior of a brachial valve smaller than the preceding, $\times 1$, hypotype USNM 154034d; 9–11, ventral, side, and anterior views of a pedicle valve, $\times 1$, hypotype USNM 154034e; 12, ventral view of a small, spiny, pedicle valve, $\times 1$, hypotype USNM 154034f; 13–15, interior, side, and exterior views of a young brachial valve, $\times 1$, hypotype USNM 154034g; 16–19, dorsal, posterior, anterior, and side views of a complete adult pedicle valve, $\times 1$, hypotype USNM 154034h. [Park City Formation (Franson Member, upper), USNM 760.]

Waagenoconcha prophetica, new species: 20, Dorsal view of a large brachial valve, $\times 1$, paratype USNM 149668a. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701q.]

21–23, Posterior, anterior, and ventral views of a pedicle valve, $\times 1$, paratype USNM 149669. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701v.]

PLATE 352.—*Bathymyonia* and *Waagenoconcha*

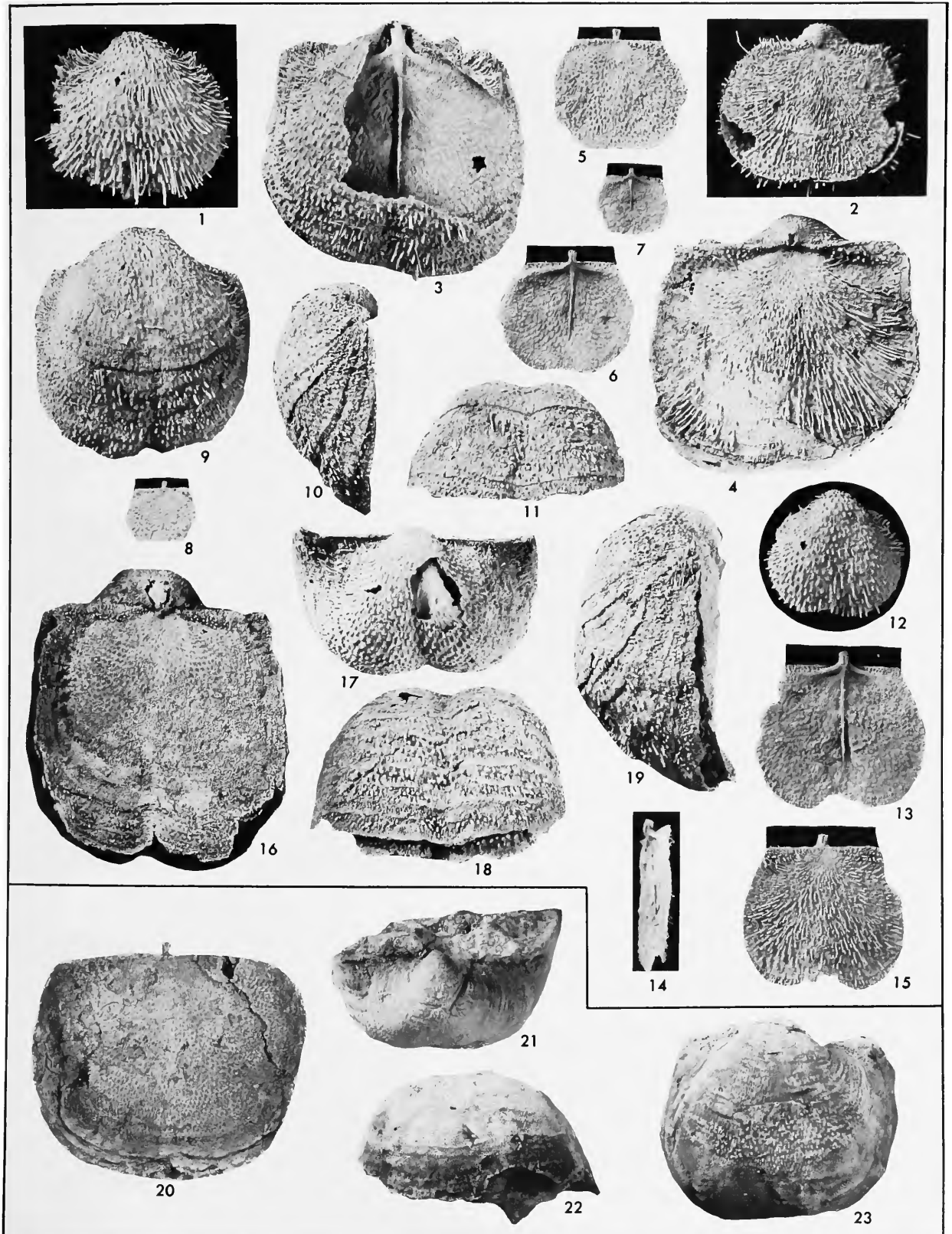


PLATE 353

Hercosia, *Juresania*, and *Bathymyonia*

Hercosia uddeni (Böse): 1, Cross section of a pedicle valve, $\times 1$, showing the median septum and vesicular material in the apical part, hypotype USNM 154036. [Cathedral Mountain Formation, USNM 726y.]

Juresania species 1: 2-4, Posterior, side, and ventral views of a pedicle valve, $\times 1$, figured specimen USNM 152736a. [Captank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701r.]

Juresania species 2: 5-7, Ventral, posterior, and side views of an imperfect pedicle valve, $\times 1$, figured specimen USNM 152739a; 8-10, exterior, side, and interior views of a brachial valve, $\times 1$, figured specimen USNM 152739b; 11, exterior of the preceding specimen, $\times 2$, showing spines and cardinal process. [Neal Ranch Formation (bed 4), USNM 701d.]

Bathymyonia nevadensis (Meek): 12, 13, Interior and exterior views of a large brachial valve, $\times 1$, showing muscle scars and roughened posterior margin, hypotype USNM 154034i; 14, fragment of the exterior of a pedicle valve, showing spine arrangement, $\times 2$, hypotype USNM 154034j. [Park City Formation (Franson Member, upper), USNM 760.]

15-17, Interior, side, and exterior views of an old brachial valve, $\times 1$, showing thickened cardinal process, hypotype USNM 154035a; 18, posterior of the preceding specimen, $\times 2$, showing the cardinal process. [Park City Formation (Franson Member), USNM 762.]

PLATE 353.—*Hercosia*, *Juresania*, and *Bathymyonia*

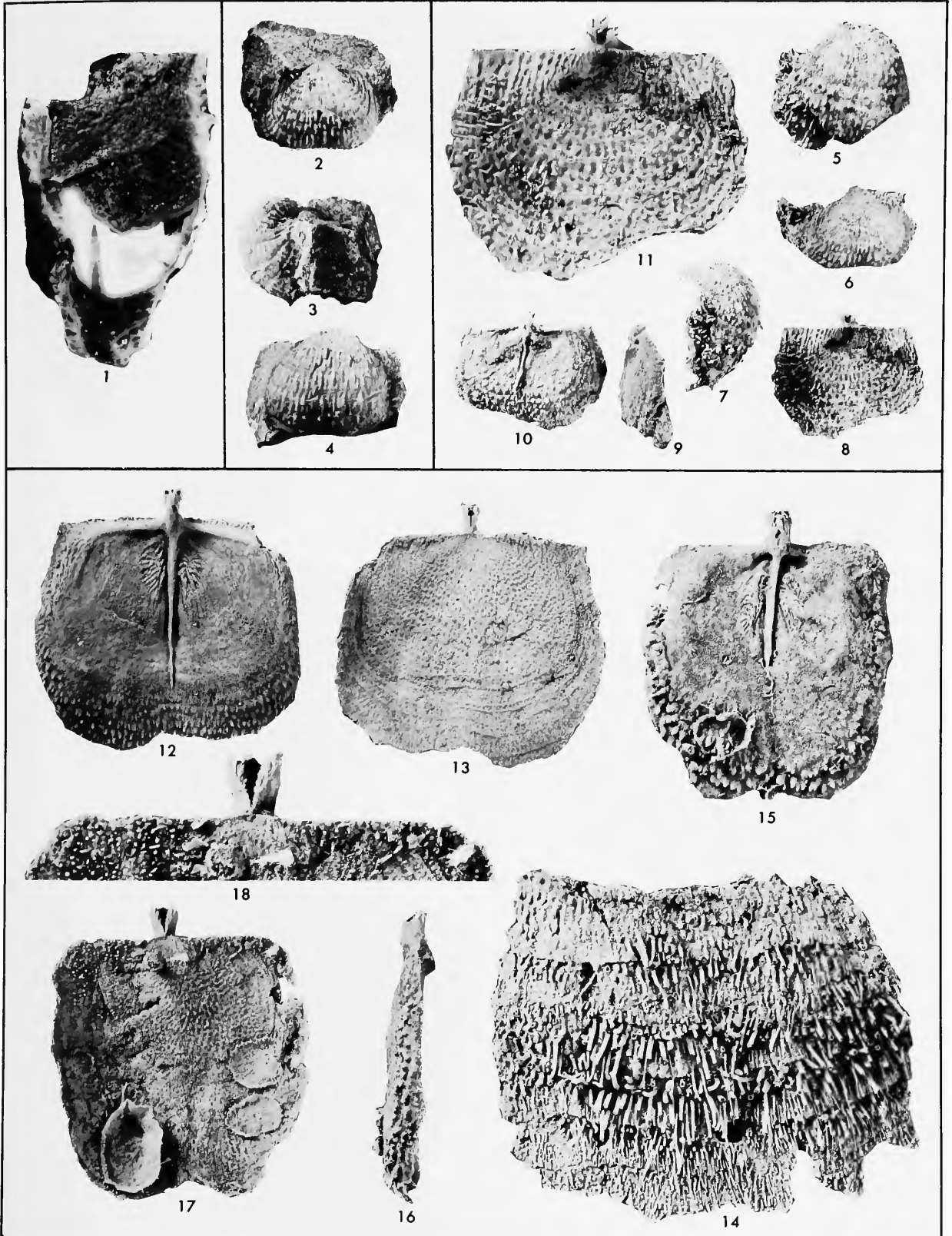


PLATE 354*Waagenoconcha*

Waagenoconcha magnifica, new species: 1-4, Anterior, side, posterior, and ventral views of a young adult, $\times 1$, paratype USNM 149676c; 5, 6, exterior and interior of a young adult brachial valve, $\times 1$, showing matted spines on exterior, paratype USNM 124153a; 7, exterior of the preceding specimen, $\times 2$, showing the profusion of fine spines; 8, 9, interior and exterior of another brachial valve, $\times 1$, paratype USNM 124153c; 10, 11, exterior and interior of a large adult brachial valve, showing median fold on exterior and long median septum and long cardinal process on the interior, $\times 1$, paratype USNM 149676b; 12, posterior view of the preceding specimen, $\times 2$, showing the myophore of the cardinal process; 13, 14, side and interior views of another brachial valve, $\times 1$, paratype USNM 124153b; 15, posterior view of the preceding specimen, $\times 1$, showing the narrow cardinal process. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 354.—*Waagenoconcha*

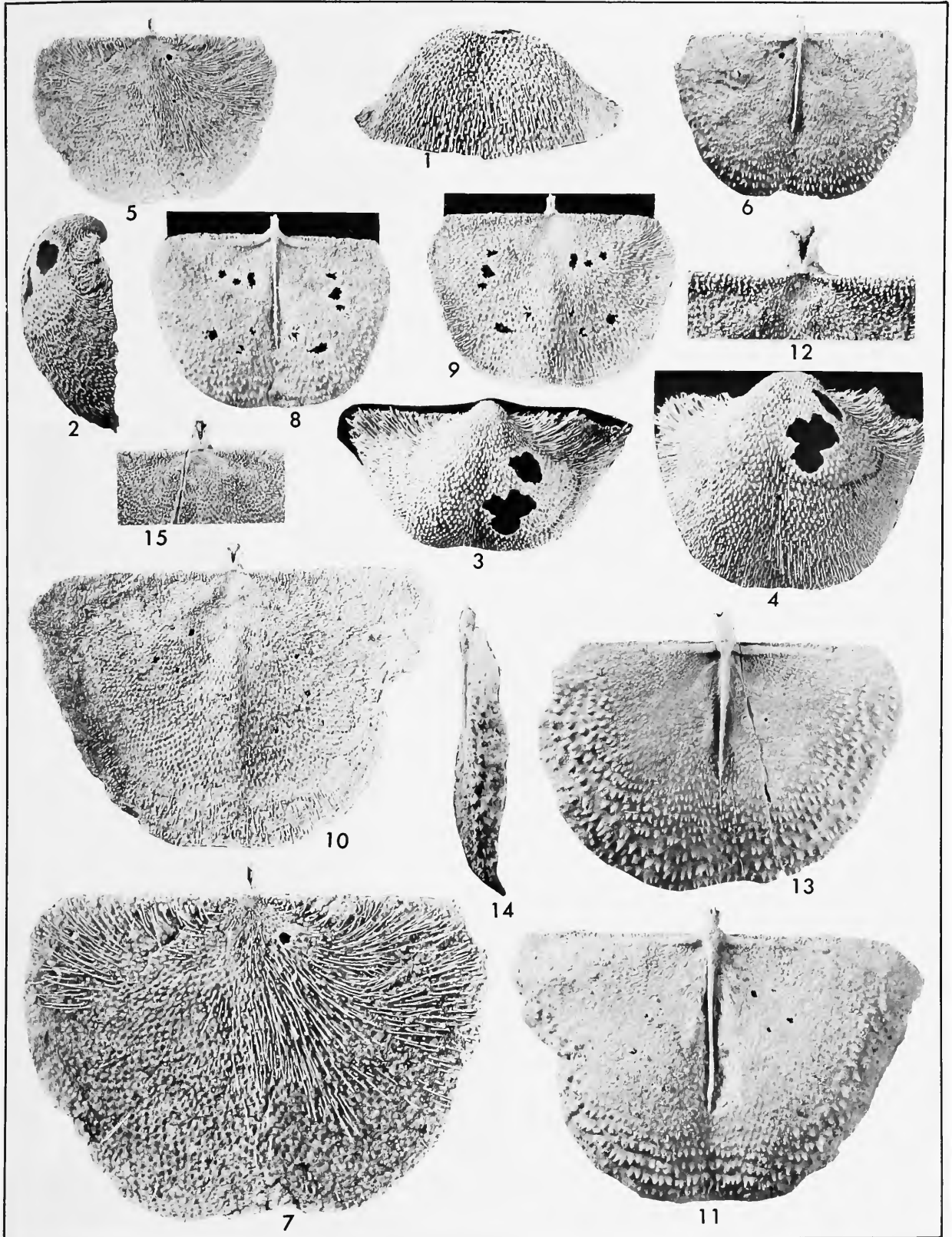


PLATE 355*Waagenoconcha*

Waagenoconcha platys, new species: 1-5, Dorsal, side, anterior, posterior, and ventral views of the holotype, $\times 1$, USNM 149647. [Road Canyon Formation, USNM 702c.]

6-10, Anterior, side, posterior, dorsal, and ventral views of a small adult, $\times 1$, paratype USNM 154027a; 11, interior of the brachial valve, $\times 1$, paratype USNM 154027b. [Road Canyon Formation, USNM 710z.]

Waagenoconcha prophetica, new species: 12-16, Dorsal, anterior, side, ventral, and posterior views of a well preserved specimen, $\times 1$, holotype USNM 149670; 17, median portion of the holotype enlarged $\times 2$ to show the anterior differentiation of spine bases. [Graham Formation (Jacksboro Member), Renfro locality 45.]

Waagenoconcha magnifica, new species: 18-21, Posterior, ventral, anterior, and side views of a large pedicle valve, $\times 1$, holotype USNM 149676a; 22, interior of a large brachial valve, $\times 3$, showing long median septum, long-shafted cardinal process, and denticulate posterior margin, paratype USNM 149676e; 23, posterior view of the preceding specimen, $\times 3$, showing myophore and denticulated hinge; 24, side view, $\times 2$, of the cardinal process of the preceding specimen. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 355.—*Waagenoconcha*

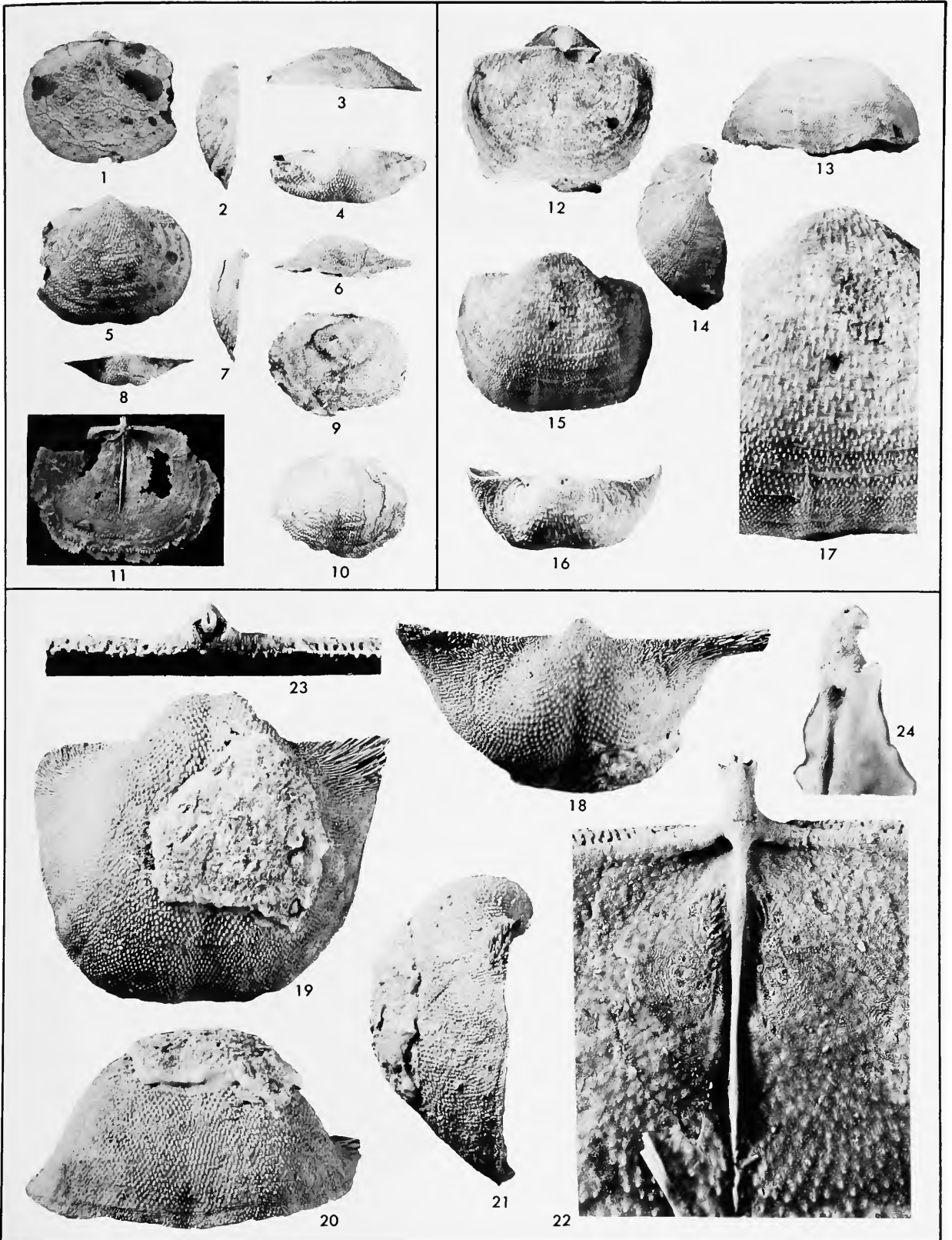


PLATE 356*Waagenoconcha*

Waagenoconcha convexa, new species: 1, 2, Ventral view of an immature specimen, $\times 3$, $\times 1$, showing the long spines, paratype USNM 154028; 6, ventral view of a crushed specimen, $\times 1$, showing the dense mat of very fine spines covering the shell, paratype USNM 154029a. [Road Canyon Formation, USNM 703c.]

3-5, Dorsal, $\times 1$, and ventral and dorsal, $\times 2$, views, showing the dense arrangement of very fine spines, paratype USNM 124154. [Road Canyon Formation (base), USNM 703a.]

Waagenoconcha magnifica, new species: 7-9, Side, anterior, and posterior views of a small adult, $\times 1$, paratype USNM 149676d; 10, dorsal view of the preceding paratype, $\times 2$, showing dense arrangement of hairlike spines; 11, 12, interior and exterior of a small brachial valve, $\times 1$, paratype USNM 154030b; 13, 14, interior and exterior of the preceding specimen, $\times 2$; 15, 16, interior and ventral views of a small pedicle valve, $\times 1$, paratype USNM 154030a. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 356.—*Waagenoconcha*

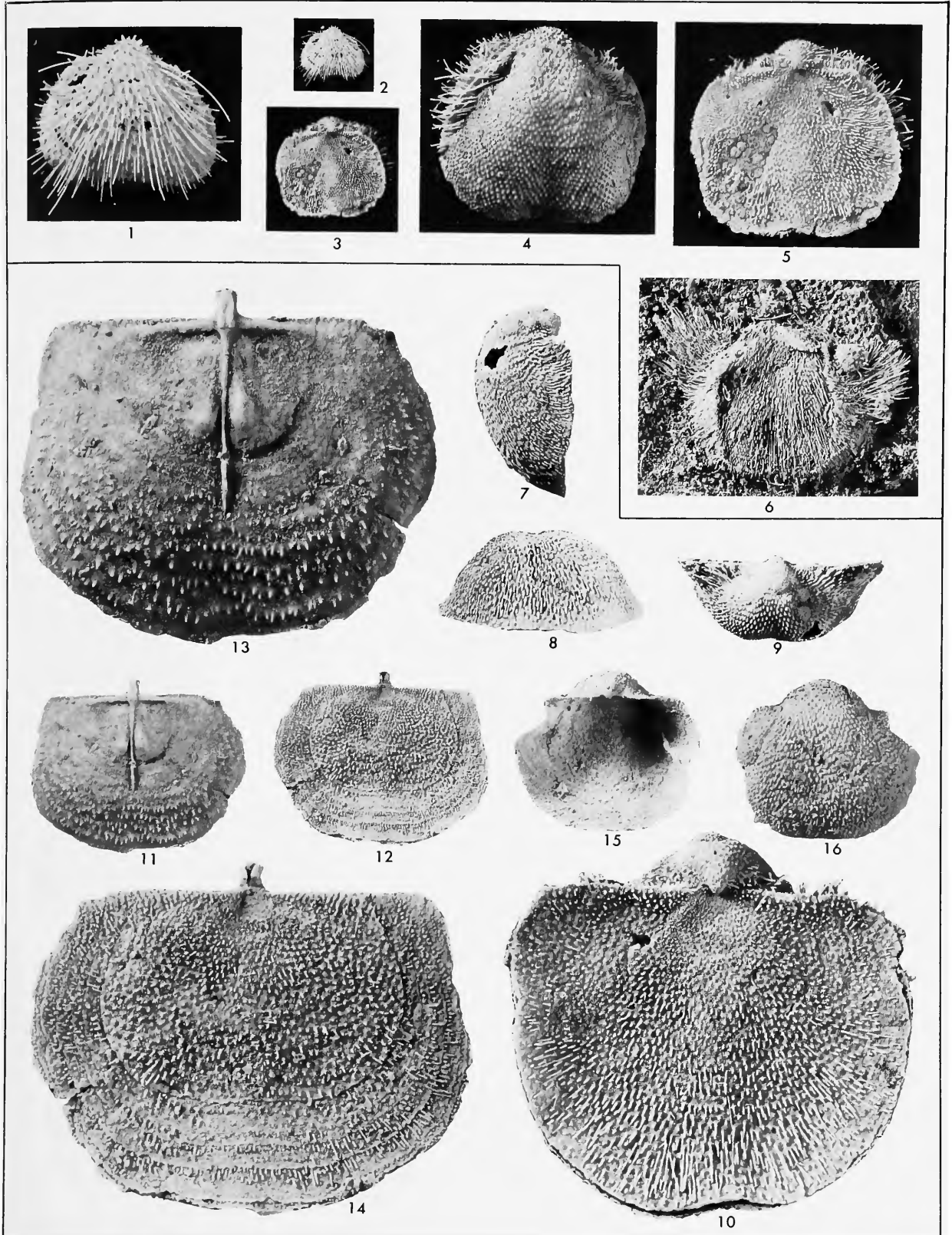


PLATE 357

Waagenoconcha

Waagenoconcha convexa, new species: 1-5, Ventral, dorsal, posterior, side, and anterior views, × 1, paratype USNM 149653n; 6-10, ventral, posterior, side, anterior, and dorsal views of a young specimen, × 1, paratype USNM 149653m; 11, 12, dorsal and ventral views, × 1, of another small individual, paratype USNM 149653i; 13, 14, ventral and dorsal views of an immature specimen, × 1, paratype USNM 149653-l; 15-19, dorsal, side, ventral, posterior, and anterior views of an adult, × 1, paratype USNM 149653c; 20-24, posterior, anterior, dorsal, ventral, and side views of another complete specimen, × 1, paratype USNM 149653d; 39-42, dorsal, ventral, posterior, and side views, × 1, holotype USNM 149652; 43, dorsal view of the holotype, × 2. [Road Canyon Formation, USNM 702c.]

25-28, Anterior, posterior, ventral, and side views of a pedicle valve, × 1, paratype USNM 154031a; 33-35, exterior, side, and interior views of a brachial valve, × 1, paratype USNM 154031c; 36-38, side, interior, and exterior views, × 1, of another brachial valve, paratype USNM 154031b. [Cathedral Mountain Formation, USNM 721u.]

29, 30, Ventral and dorsal views of a crushed specimen, showing matted spines, × 1, paratype USNM 154032a; 31, 32, ventral and dorsal views of a small specimen, × 1, paratype USNM 154032b. [Road Canyon Formation, USNM 703.]

Waagenoconcha sulcata, new species: 44-48, Posterior, anterior, side, ventral, and dorsal views of a complete specimen, × 1, holotype USNM 154033. [Hueco Canyon Formation, USNM 725z.]

PLATE 357.—*Waagenoconcha*

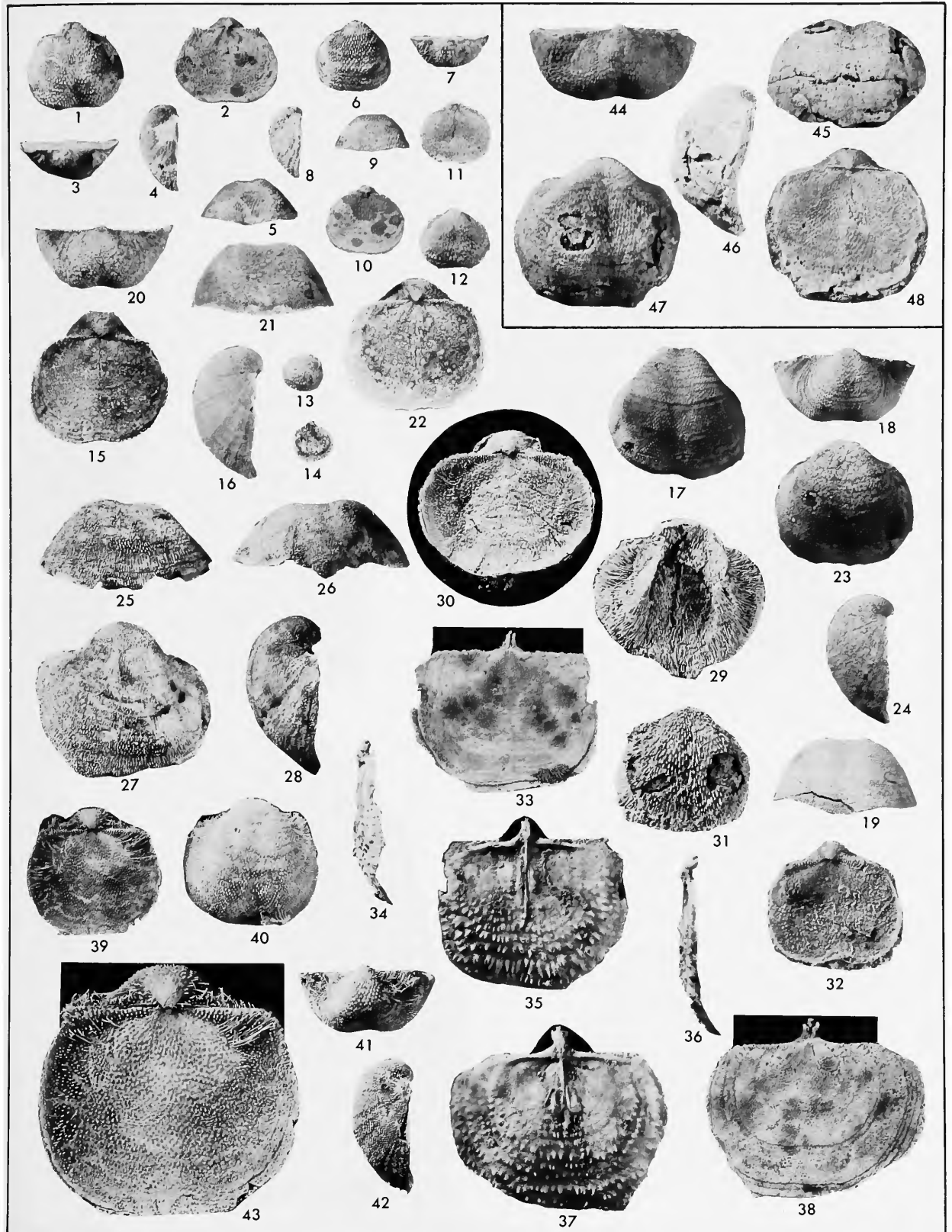


PLATE 358*Kochiproductus*

Kochiproductus occidentalis (R. E. King): 1, Ventral view of a fragmentary specimen, $\times 1$, cotype YPM 11552 = paratype. [Wolfcamp "Formation" (probably Neal Ranch Formation), R. E. King locality 91a (not given in King's list of localities).]

2, 3, Ventral and dorsal views of a crushed and fragmentary specimen, $\times 1$, lectotype YPM 11548 (specimen bears number 11548 but label and King's legend to his plate 17: figure 20 gives 11528). [Neal Ranch Formation (bed 9, R. E. King), R. E. King locality 93.]

Kochiproductus elongatus, new species: 4-6, Dorsal, posterior, and side views, $\times 1$, holotype USNM 152732. [Skinner Ranch Formation (top), USNM 710r.]

Kochiproductus species 1: 7-9, Posterior, anterior, and side views of a large pedicle valve, $\times 1$, figured specimen USNM 152729. [Skinner Ranch Formation (Decie Ranch Member), USNM 707w.]

PLATE 358.—*Kochiproductus*

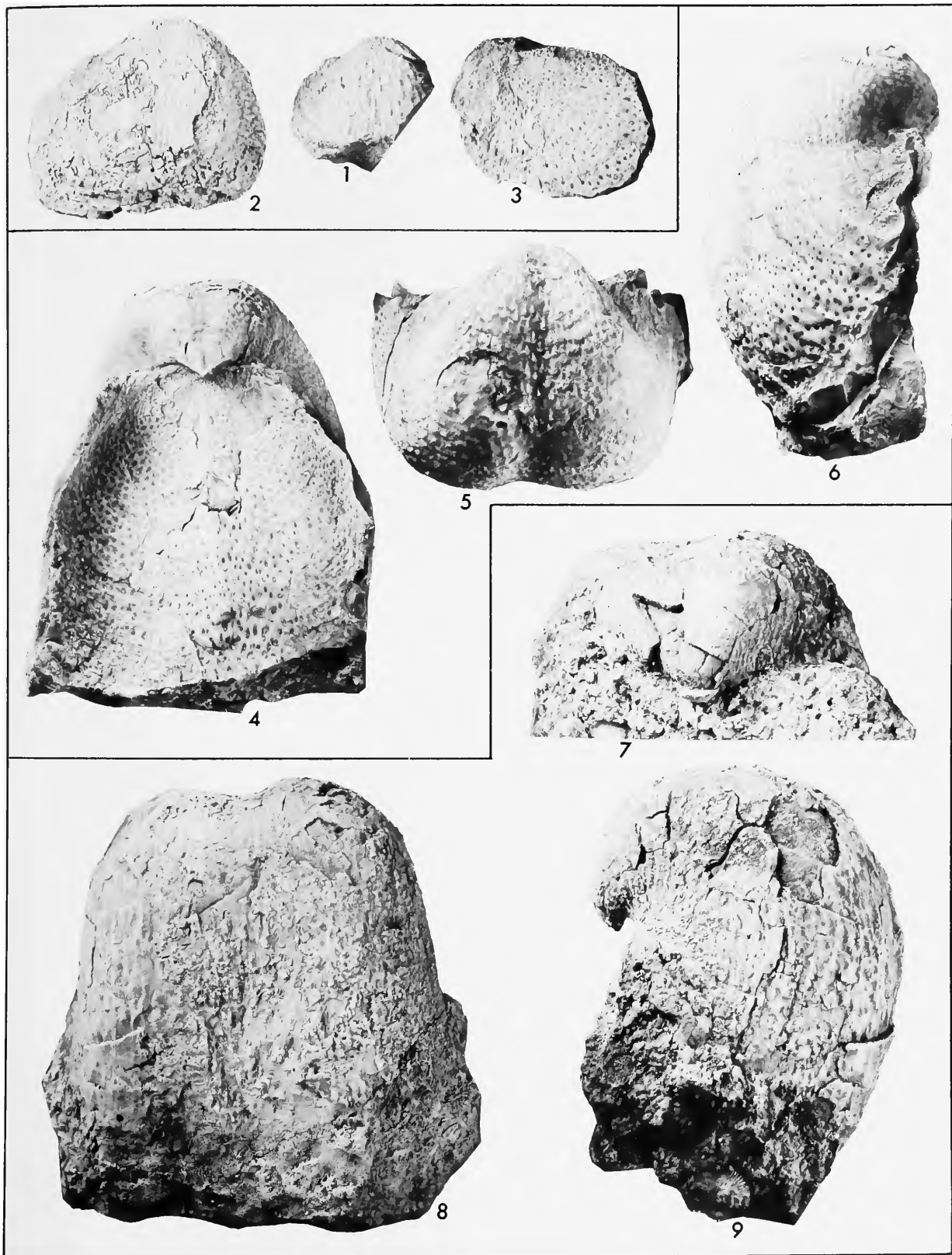


PLATE 359*Kochiproductus*

Kochiproductus quadratus, new species: 1, Dorsal view of a large complete specimen, $\times 1$, paratype USNM 153900d; 2-6, dorsal, side, posterior, anterior, and ventral views, $\times 1$, holotype, USNM 124065a; 7, part of exterior of the brachial valve of the holotype, $\times 2$, showing "protective" spines; 8, interior of a very young brachial valve, $\times 4$, showing cardinal process and median septum, paratype USNM 124065i. [Hueco Canyon Formation, USNM 725z.]

PLATE 359.—*Kochiproductus*

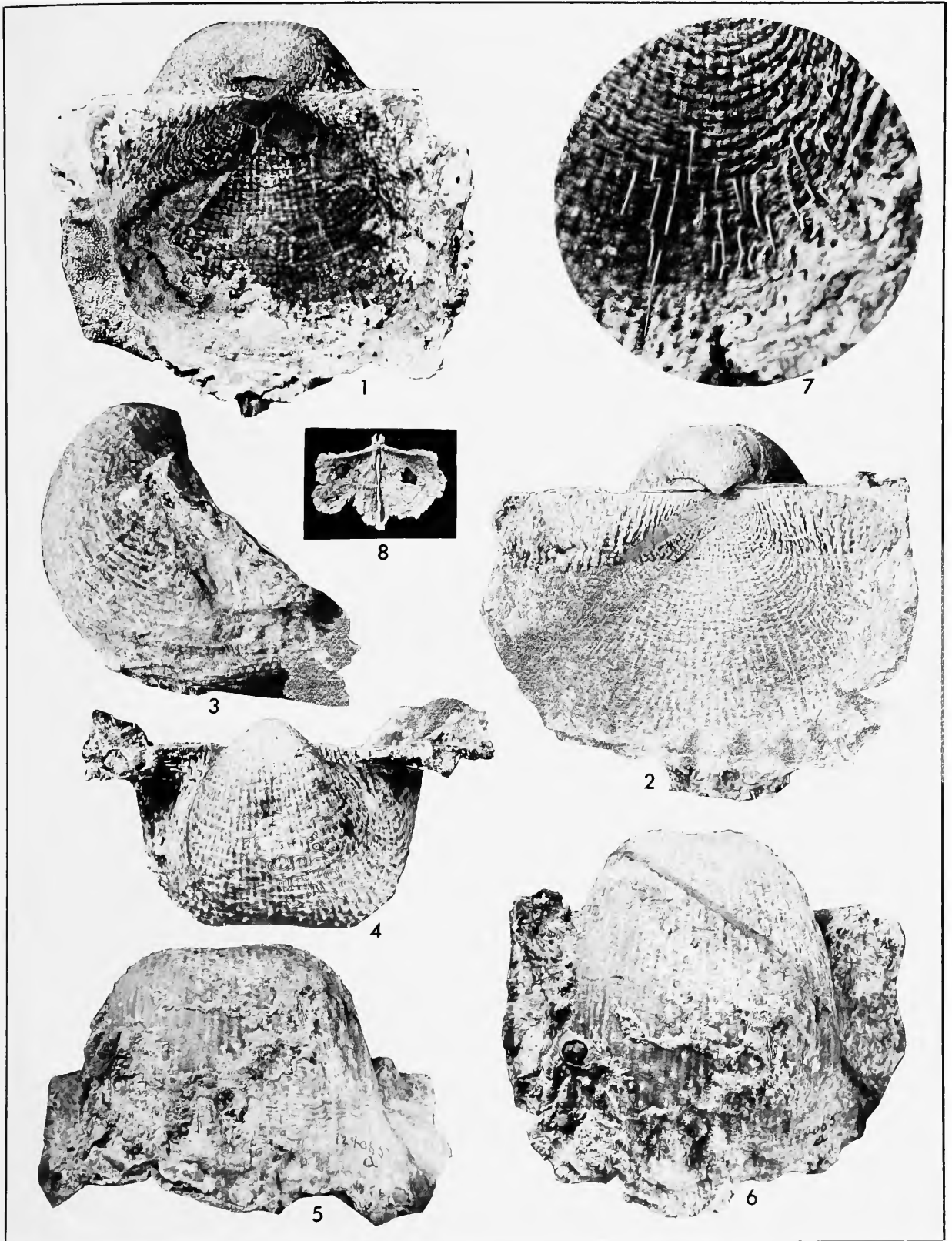


PLATE 360*Kochiproductus*

Kochiproductus species 6: 1, 2, Exterior and interior views of a large brachial valve, $\times 1$, showing long slender cardinal process, figured specimen, USNM 153901. [Cathedral Mountain Formation, USNM 721u.]

Kochiproductus aff. *K. elongatus*, new species: 3, Exterior of an exfoliated pedicle valve, $\times 1$, figured specimen T10345. [Cathedral Mountain Formation, University of Texas locality Tb recorded by R. E. King.]

Kochiproductus species 6: 4-6, Exterior, interior, and side views of a large brachial valve, showing an elongate cardinal process, $\times 1$, figured specimen, USNM 152735; 7, dorsal view of the cardinal process, $\times 2$, of the preceding specimen. [Road Canyon Formation, USNM 721x.]

Kochiproductus victorioensis (R. E. King): 8-12, Dorsal, posterior, side, anterior and ventral views, $\times 1$, of the holotype, YPM 11615. [Bone Spring Formation (Victorio Peak Member), R. E. King locality 498.]

PLATE 360.—*Kochiproductus*

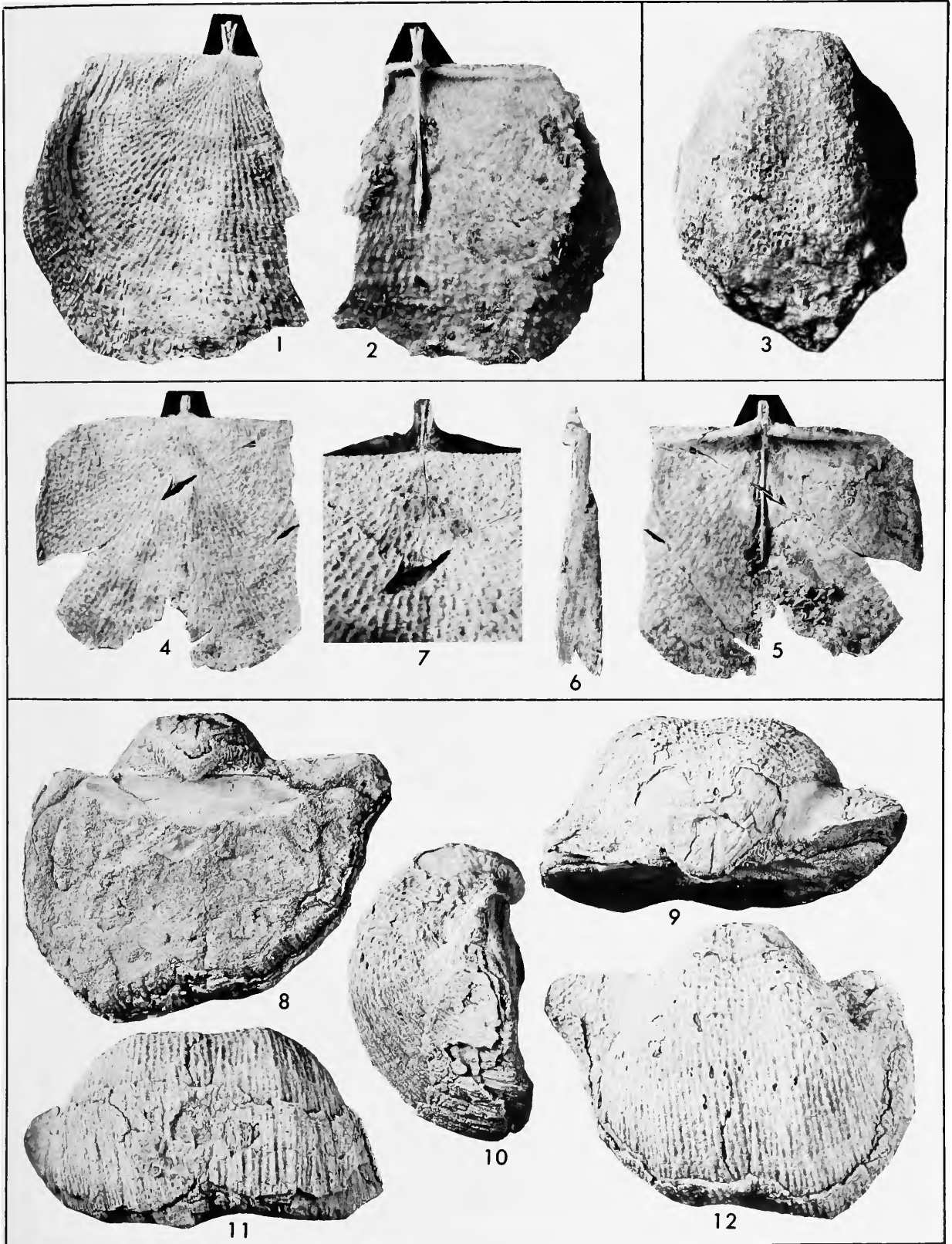


PLATE 361

Kochiproductus

Kochiproductus species 3: 1, 2, Interior and exterior of a fragment of the brachial valve, showing the cardinal process, $\times 1$, figured specimen, USNM 152730a. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

Kochiproductus species 5: 3, Ventral view of a long slender pedicle valve, $\times 1$, figured specimen USNM 152731. [Skinner Ranch Formation (Sullivan Peak Member), USNM 707d.]

4-6, Interior, exterior, and side views of a brachial valve, $\times 1$, figured specimen USNM 153902a; 7, 8, exterior and interior of the posterior part of another brachial valve, $\times 1$, figured specimen USNM 153902b. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

Kochiproductus aff. *K. elongatus*, new species: 9, 10, Interior and exterior of a brachial valve having the configuration of *K. elongatus* (see plate 360: figure 3), $\times 1$, figured specimen USNM 153903a; 11, posterior of a pedicle valve, $\times 1$, figured specimen USNM 153903b. [Cathedral Mountain Formation, USNM 721u.]

Kochiproductus primitivus, new species: 12, Interior of a brachial valve, $\times 1$, paratype USNM 148951. [Lenox Hills Formation, USNM 704r.]

13, Dorsal view of a partially preserved specimen, $\times 1$, paratype USNM 148947a. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 702q.]

14, Dorsal view of another specimen preserving the brachial valve, $\times 1$, holotype USNM 148950. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 701e.]

Kochiproductus quadratus, new species: 15, Dorsal view of a complete specimen, showing reticulate and dimpled exterior, $\times 1$, paratype USNM 124065d. [Huocco Canyon Formation, USNM 725z.]

Kochiproductus species 6: 16, Posterior view of a pedicle valve, $\times 1$, figured specimen, USNM 152734a; 17, posterior part of a brachial valve with long slender cardinal process, $\times 1$, figured specimen USNM 152734c; 18, 19, fragment of brachial valve, $\times 1$, and $\times 2$, showing the cardinal process, figured specimen USNM 152734b. [Cathedral Mountain Formation, USNM 721u.]

PLATE 361.—*Kochiproductus*

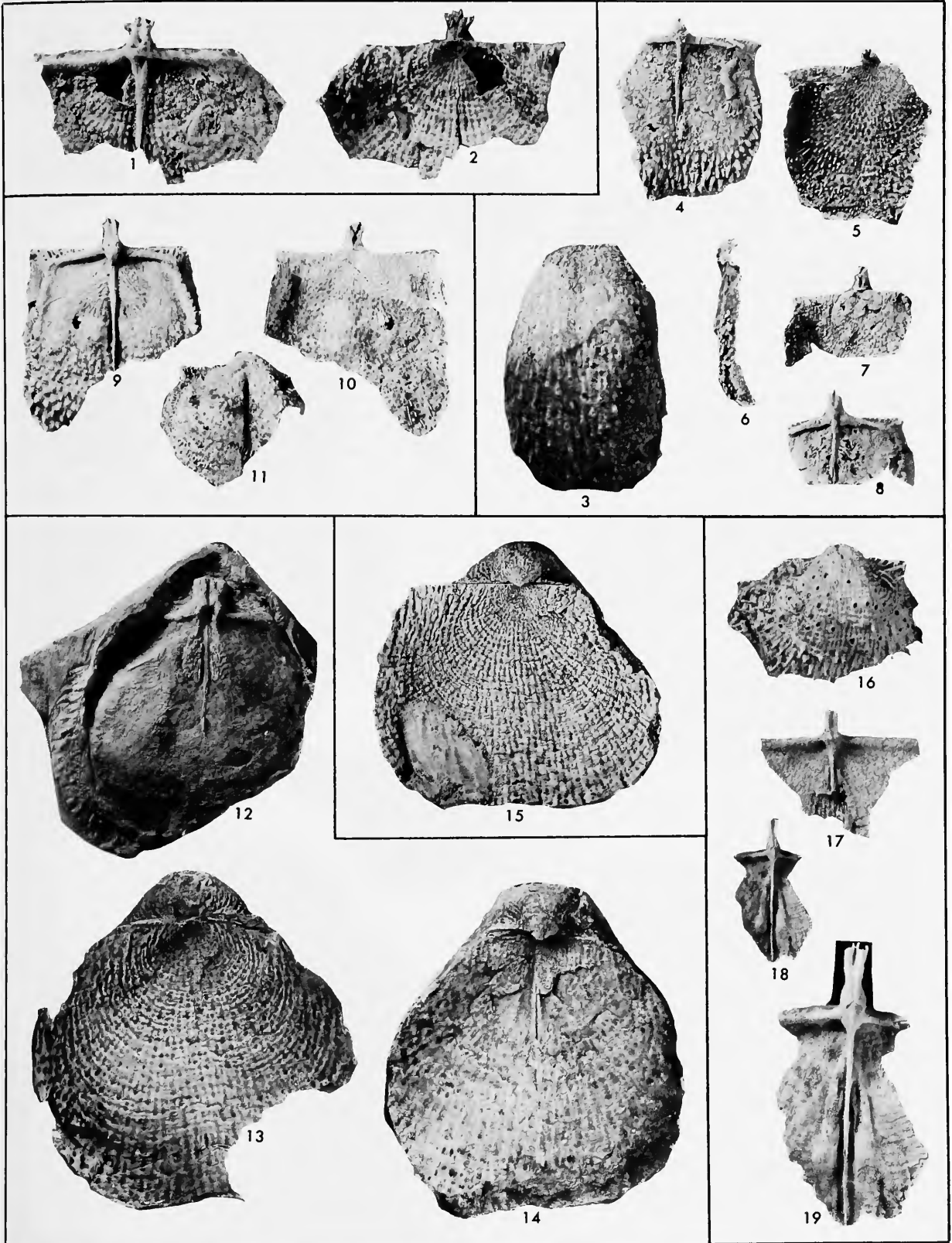


PLATE 362

Rhamnaria and *Kochiproductus*

Rhamnaria vinnula, new species: 1-3, Interior, side, and posterodorsal views of a brachial valve, × 1, paratype USNM 153904a; 4-6, interior, posterodorsal and side views of another brachial valve, × 1, paratype USNM 153904b; 7-9, posterodorsal, interior, and side views of somewhat distorted brachial valve, × 1, paratype USNM 153904c; 10-12, exterior, side, and interior views of a large brachial valve, × 1, paratype USNM 153904d; 13-16, dorsal, ventral, side, and anterior views of complete specimen, × 1, paratype USNM 152680b. [Road Canyon Formation, USNM 721j.]

17-20, Dorsal, ventral, side, and anterior views of a complete specimen, × 1, paratype USNM 152676. [Road Canyon Formation, USNM 724a.]

21-24, Anterior, dorsal, side, and ventral views of a complete specimen, × 1, holotype USNM 149359b; 25-28, dorsal, ventral, side, and anterior views of another complete specimen, × 1, paratype USNM 149359c. [Road Canyon Formation, USNM 702c.]

Kochiproductus quadratus, new species: 29, 30, Interior and posterior views of a brachial valve, × 1, showing cardinal process and septum fused to cardinal process shaft, paratype USNM 153900c; 31, interior view of another adult brachial valve, × 1, showing septum and shaft fused together, paratype USNM 153900b; 32, interior of another fragmentary brachial valve, × 2, showing incomplete fusion of shaft and septum leaving an alveolus, paratype USNM 153900a; 33, dorsal view of a large and nearly complete adult, × 1, paratype USNM 124065b. [Hueco Canyon Formation, USNM 725z.]

PLATE 362.—*Rhamnaria* and *Kochiproductus*

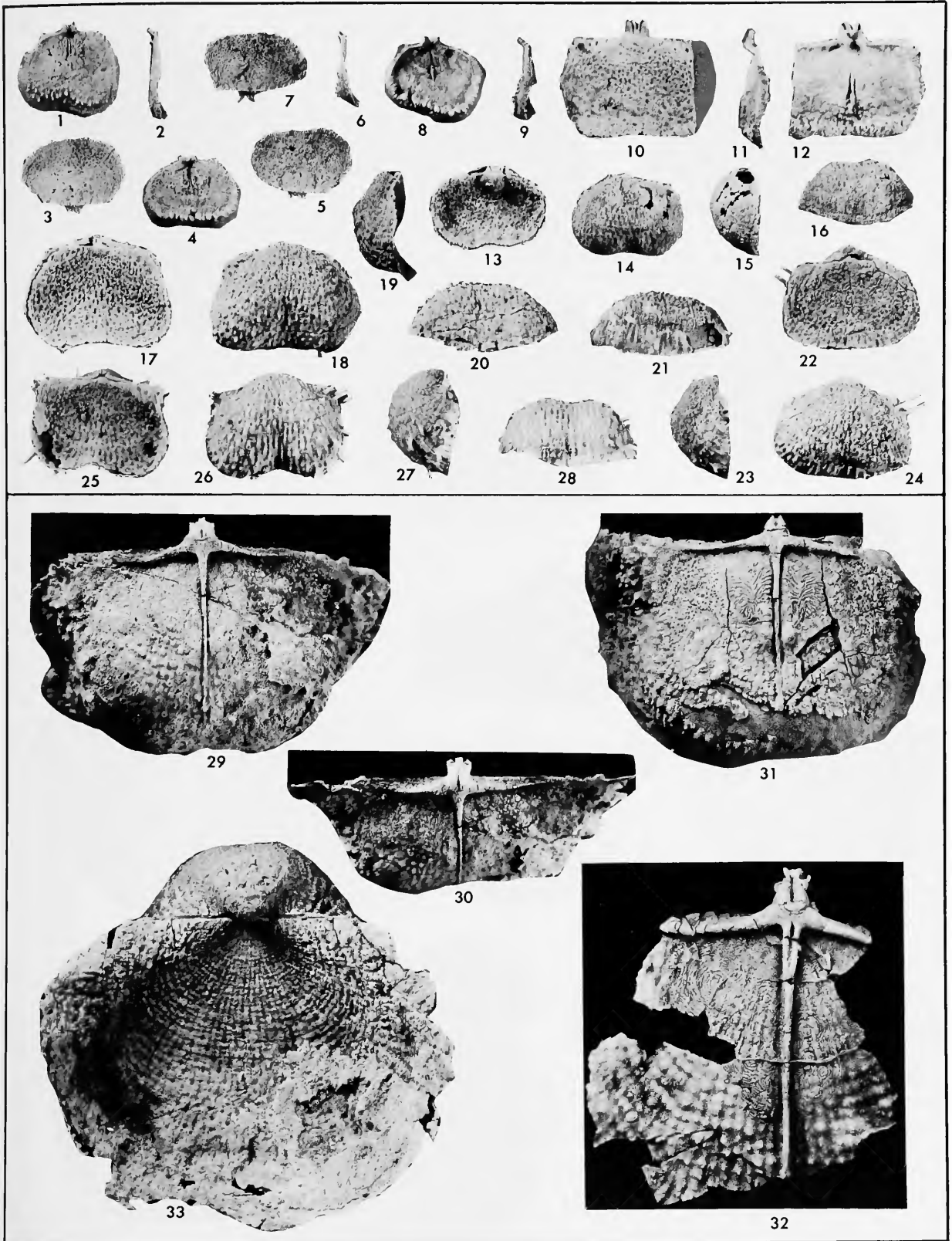


PLATE 363*Dasysaria*

Dasysaria undulata Cooper and Grant: 1-4, Posterior, side, ventral, and anterior views of a large pedicle valve, $\times 1$, holotype USNM 148914 (= 153880). [Hueco Formation, USNM 720a.]

5, Interior of a large pedicle valve, $\times 1$, showing the lightly impressed muscle scars, hypotype USNM 153879d; 6, interior of the brachial valve belonging to the preceding pedicle valve, $\times 1$; 7, dorsal view of the cardinal process, $\times 2$, of the preceding brachial valve. [Hueco Formation, USNM 719.]

Dasysaria welleri (R. H. King): 8-11, Dorsal, posterior, ventral, and side views of a complete specimen, $\times 1$, hypotype USNM 148926a; 12, dorsal view of a large, alate, complete specimen, $\times 1$, hypotype USNM 148926b; 13, 14, side and interior views of the brachial valve, $\times 1$, hypotype USNM 148927a; 15, dorsal view of the cardinal process of the preceding specimen, $\times 2$. [Putnam Formation, 0.1 mile south of U. S. 80, 2.3 miles west of Putnam, Callahan County, Texas.]

PLATE 363.—*Dasysaria*

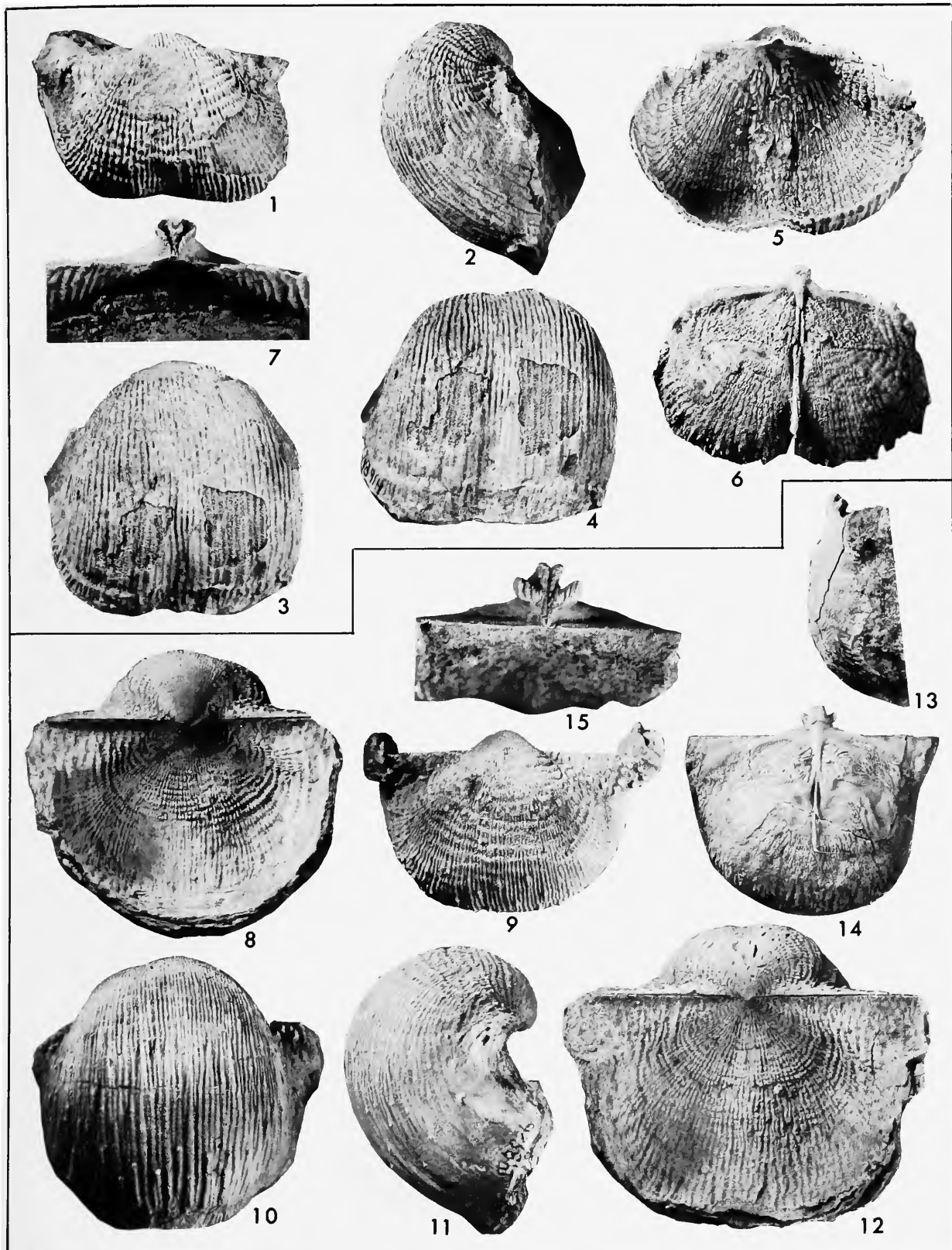


PLATE 364*Dasysaria*

Dasysaria undulata Cooper and Grant: 1-3, Ventral, side, and dorsal views of the hypotype, × 1, USNM 148919a; 4, 5, interior of the pedicle and brachial valves of the same hypotype, × 1. [Hueco Formation, USNM 726.]

6, 7, Dorsal and interior views of a brachial valve, × 1, hypotype USNM 148918b; 8, dorsal view of the cardinal process of the preceding specimen, × 2. [Hueco Formation, USNM 728d.]

9-11, Posterior, side, and ventral views of a pedicle valve, × 1, hypotype USNM 153879a; 12-14, posterior, ventral, and side views of another large pedicle valve, × 1, hypotype USNM 153879b. [Hueco Formation, USNM 719.]

15-17, Posterior, ventral, and dorsal views of a large specimen with both valves but minus the anterior part of the trail, × 1, hypotype USNM 148916. [Hueco Formation, USNM 720c.]

PLATE 364.—*Dasysaria*

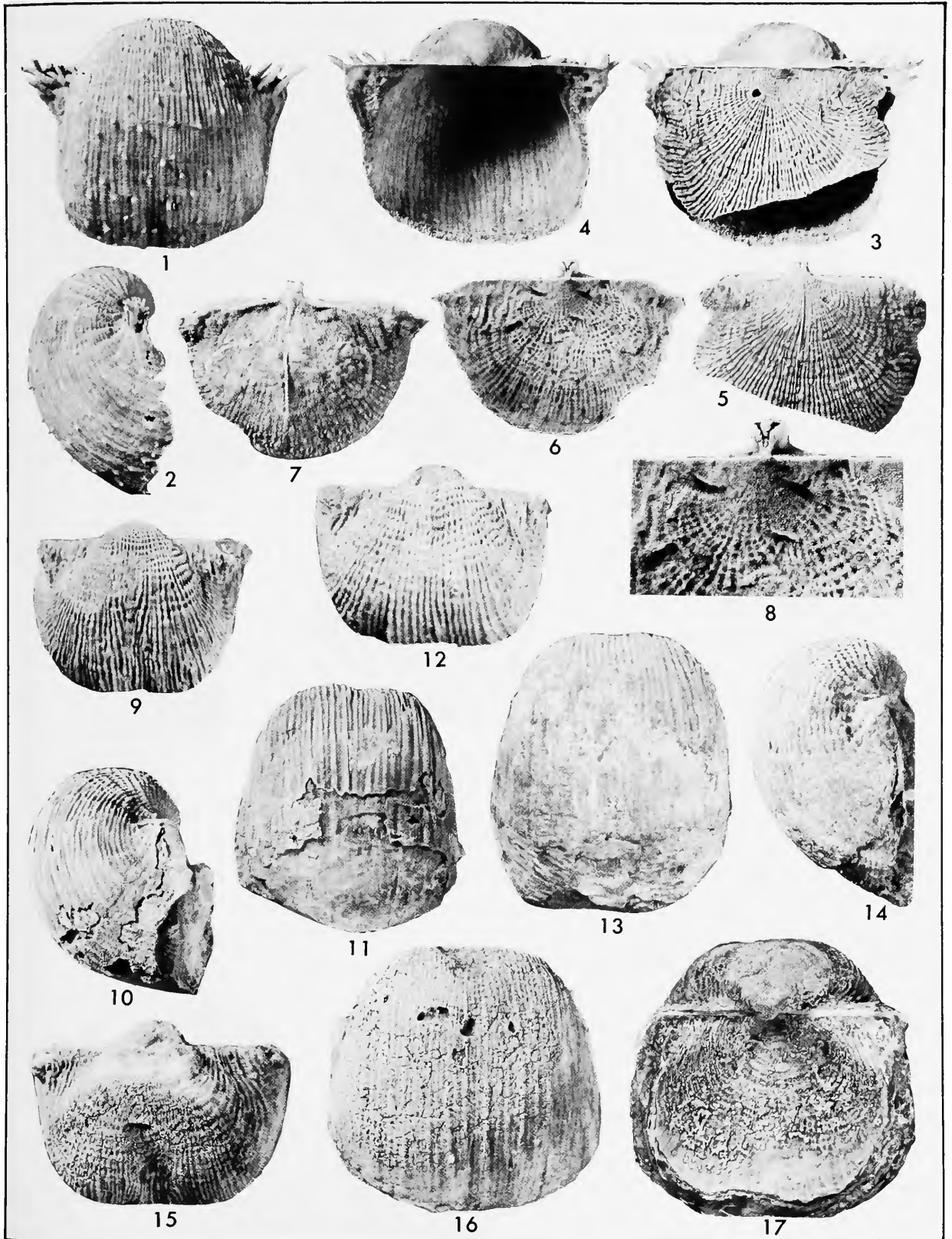


PLATE 365*Dasysaria* and *Nudauris*

Dasysaria wolfcampensis (R. E. King): 1-3, Ventral, side, and posterior views of a large pedicle valve, $\times 1$, hypotype USNM 123991a; 4, dorsal view of a complete specimen, $\times 1$, hypotype USNM 123991b; 5-7, side, posterior, and dorsal views of a complete specimen, $\times 1$, hypotype USNM 148921b; 8-10, side, posterior, and ventral views of a large pedicle valve, $\times 1$, hypotype USNM 148921a; 11-13, ventral, side, and posterior views of a ventral valve with strongly wrinkled visceral region, $\times 1$, hypotype USNM 148921c; 14-16, posterior, ventral, and side views of well wrinkled pedicle valve, $\times 1$, hypotype USNM 148921d. [Hueco Canyon Formation, USNM 725z.]

Nudauris reticulata, new species: 17, 18, Posterior and interior views of the brachial valve, $\times 2$, showing cardinal process and brevisseptum, paratype USNM 124009f. [Camp Creek Formation (50 feet below the top), Moore locality 9880.]

PLATE 365.—*Dasysaria* and *Nudauris*

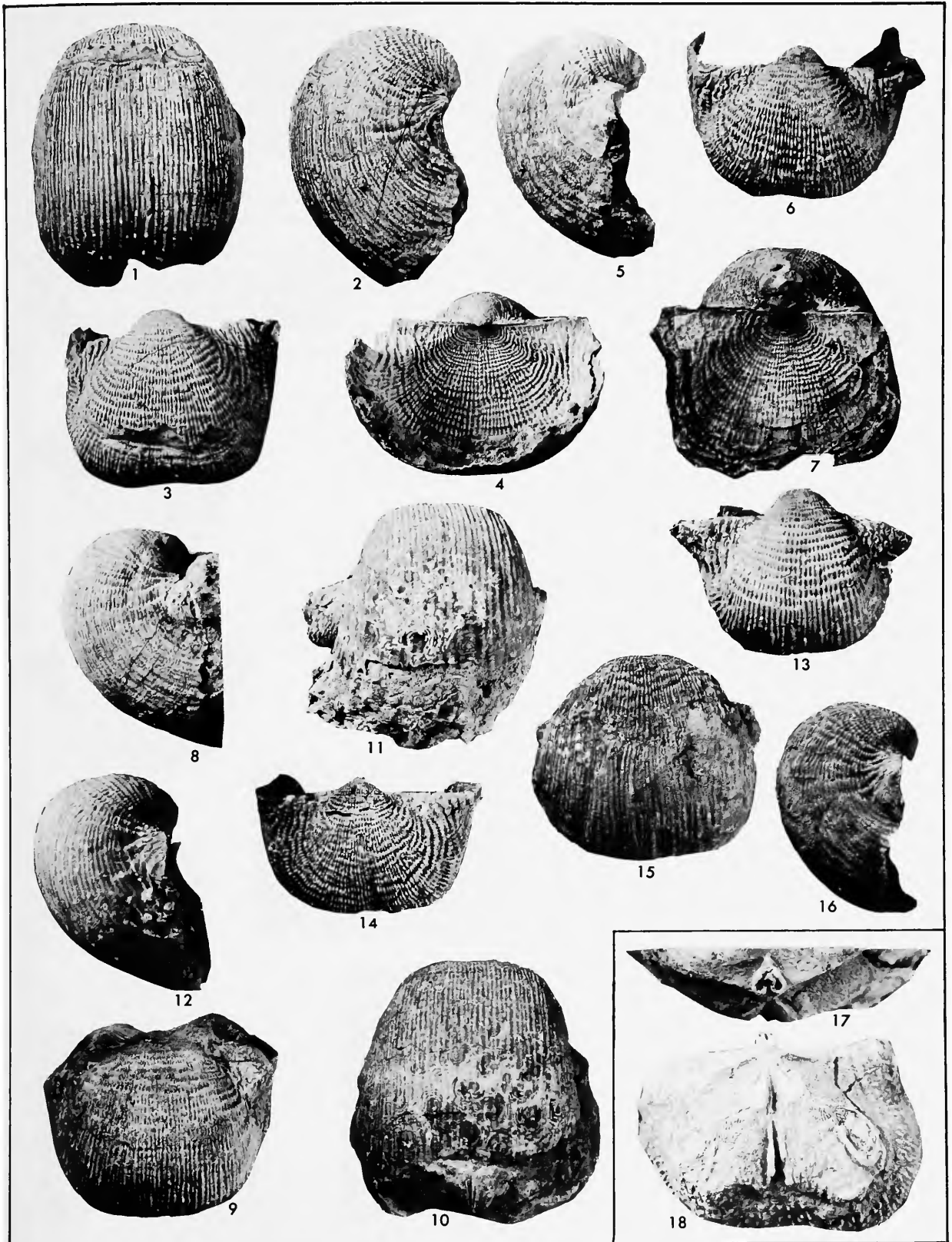


PLATE 366*Xestosia* and *Nudauris*

Xestosia schucherti (R. E. King): 1-3, Side, anterior, and ventral views of a ventral valve, \times 1, paratype YPM 10764. [Cathedral Mountain Formation, R. E. King, locality 174]

Nudauris transversa, new species: 4-8, Side, ventral, anterior, dorsal, and posterior views, \times 1, of a complete specimen stripped of its spines, holotype USNM 152746b; 9-12, anterior, side, ventral, and posterior views of a pedicle valve, \times 1, paratype USNM 152746d; 13-16, posterior, anterior, ventral, and side views of a large pedicle valve, \times 1, paratype USNM 152746a; 17-19, anterior, side, and ventral views of a pedicle valve with most of its spines, \times 1, paratype USNM 153981a; 20-22, side, posterior and ventral views of another pedicle valve with spines, \times 1, paratype USNM 153981c. [Hueco Canyon Formation, USNM 725z.]

PLATE 366.—*Xestosia* and *Nudauris*

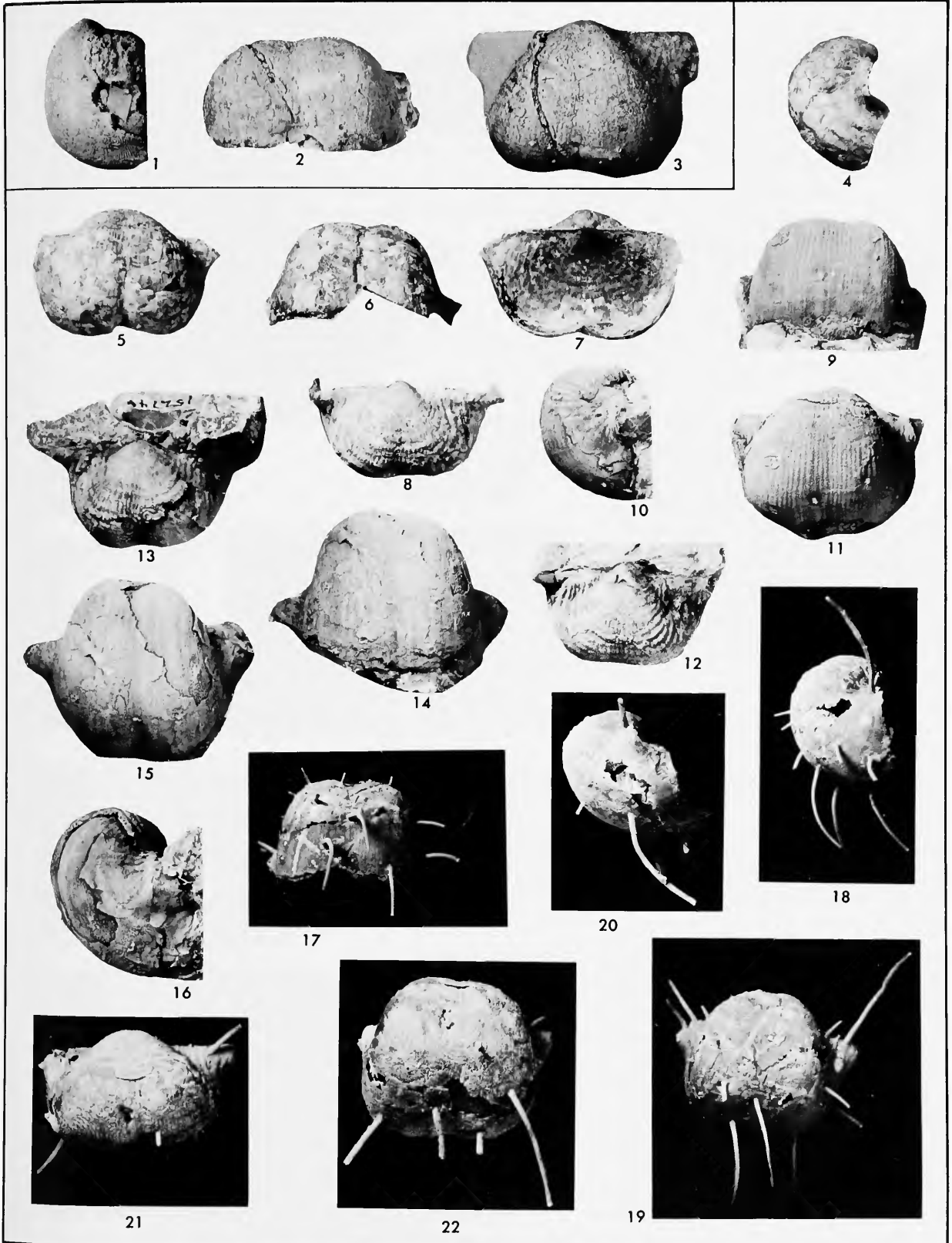


PLATE 367*Echinauris*, *Xestosia*, and *Nudauris*

Echinauris cf. *E. boulei* (Kozłowski): 1-2, Dorsal and side views of a complete specimen $\times 1$, showing dorsal spines, figured specimen USNM 153483a. [Hueco Canyon Formation, USNM 725z.]

Xestosia schucherti (R. E. King): 3-6, Posterior, anterior, side, and ventral views of a pedicle valve, $\times 1$, hypotype YPM 10762. [Bone Spring Formation, R. E. King locality 484.]

Nudauris tribulosa, new species: 7, Interior of a brachial valve, $\times 1$, paratype USNM 152747e; 8, 9, interior of another brachial valve, $\times 1$, $\times 2$, showing cardinal process and brevisseptum, paratype USNM 152747f; 10-13, side, ventral, anterior, and dorsal views of a small adult with some of its spines, $\times 1$, paratype USNM 152747a; 14-17, anterior, dorsal, side, and ventral views of the holotype, $\times 1$, USNM 152747c; 18, view of the holotype nestled among flakes of the alga *Eugonophyllum* as it was found after decalcification of the block in which it occurred, \times ca. 0.5. [Neal Ranch Formation (bed 4 of P. B. King), USNM 727e.]

PLATE 367.—*Echinauris*, *Xestosia*, and *Nudauris*

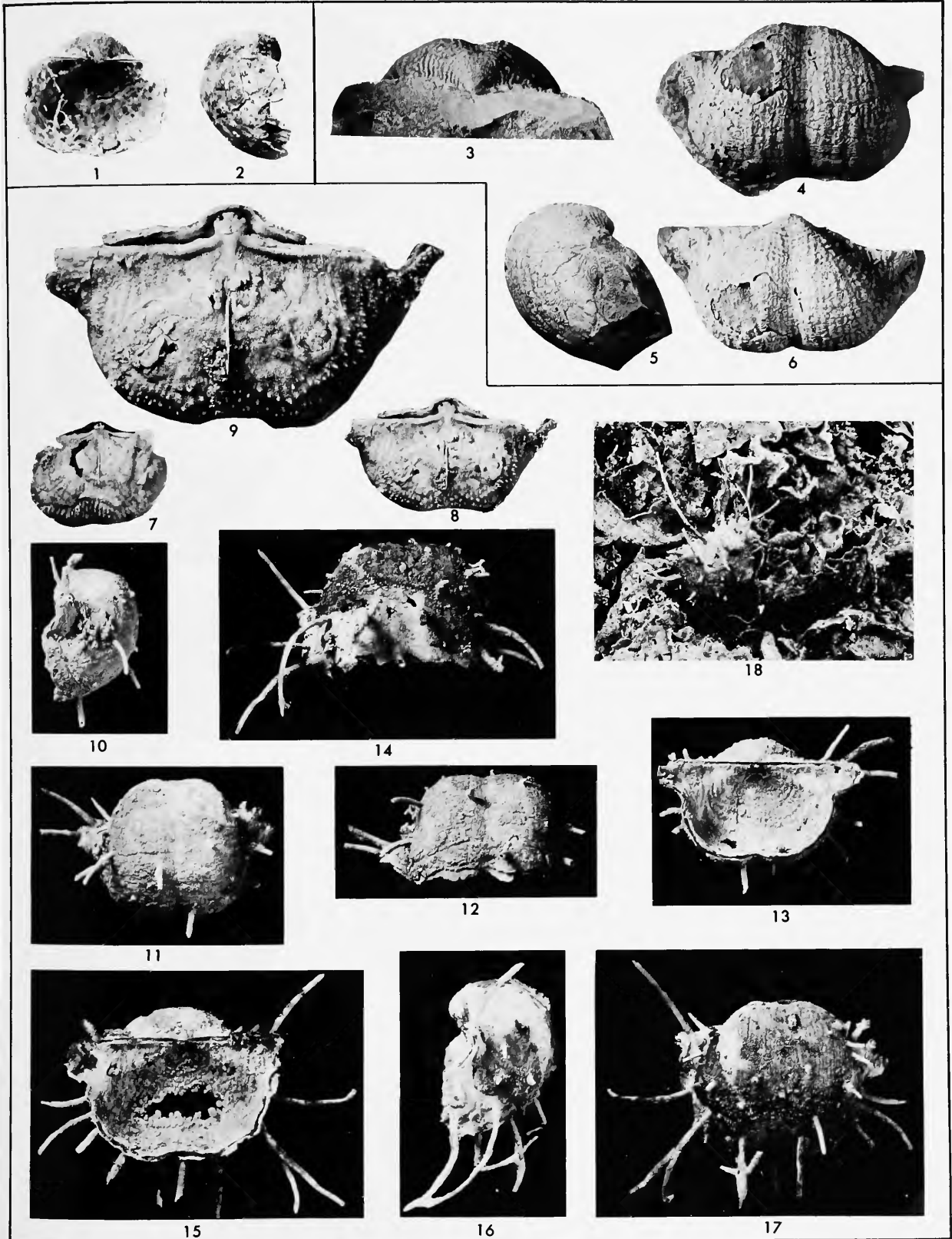


PLATE 368*Nudauris*

Nudauris linospina, new species: 1, Ventral view of a small pedicle valve, × 1, paratype USNM 148860a. [Cathedral Mountain Formation, USNM 702-low.]

2-6, Ventral, anterior, posterior, dorsal, and side views of a young specimen, × 1, paratype USNM 148863a; 7-11, side, dorsal, posterior, anterior, and ventral views, × 1, paratype USNM 148863b; 12-14, ventral, posterior, and dorsal views of a young specimen, × 1, paratype USNM 153982a; 15, ventral view, × 1, of an immature specimen, paratype USNM 153982c. [Cathedral Mountain Formation, USNM 703b.]

16-19, Posterior, dorsal, ventral, and anterior views of a large, complete adult, × 1, paratype USNM 148856a; 20-24, anterior, side, posterior, ventral, and dorsal views of a young adult, × 1, paratype USNM 148856b; 25-29, posterior, anterior, side, ventral, and dorsal views of the holotype, × 1, USNM 148856c. [Cathedral Mountain Formation, USNM 702.]

PLATE 368.—*Nudauris*

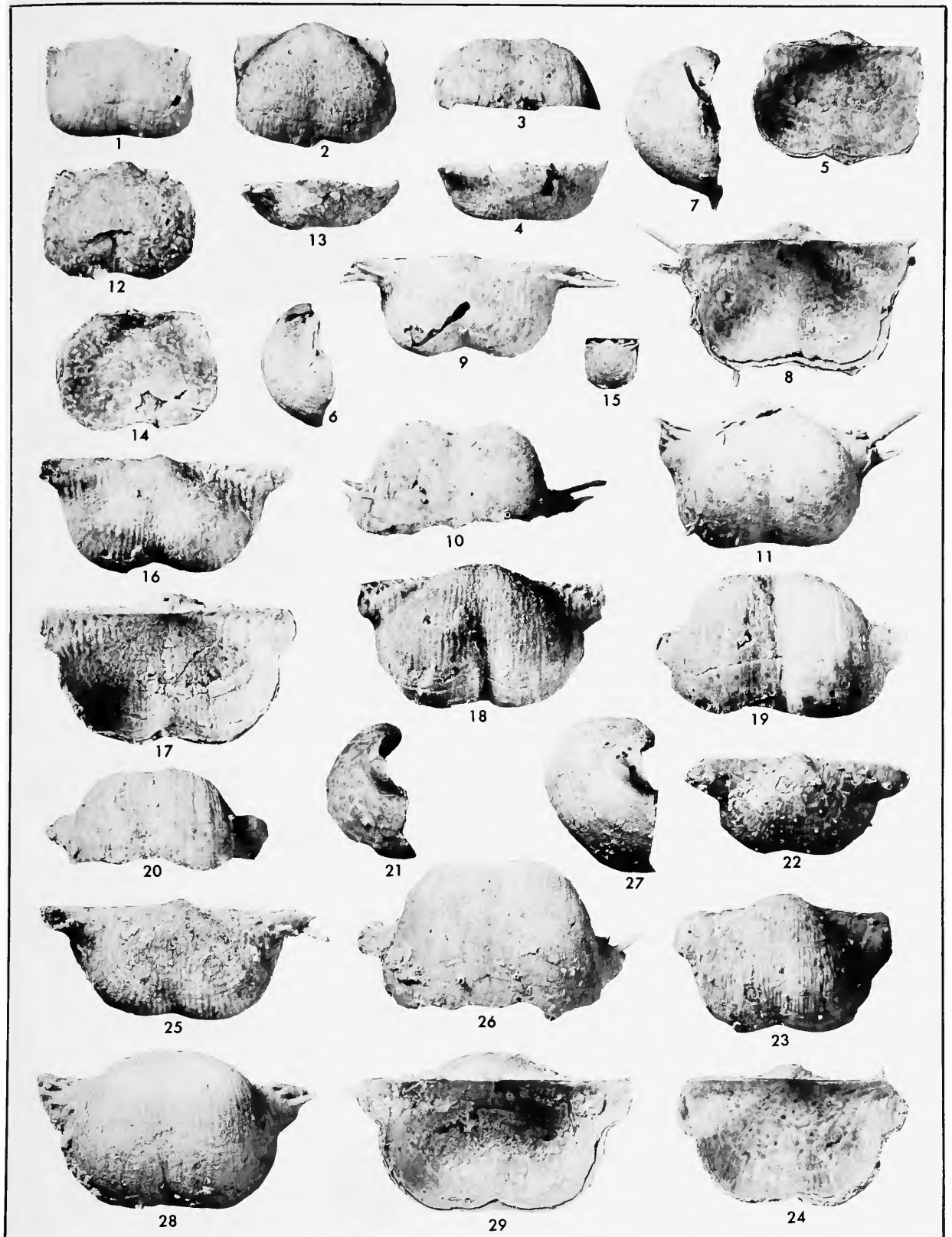


PLATE 369

Nudauris

Nudauris presplendens, new species: 1–5, Dorsal, posterior, ventral, anterior, and side views, × 1, of the holotype USNM 148887. [Graham Formation (Jacksboro Member), USNM 510.]

Nudauris reticulata, new species: 6–8, Posterior, ventral, and side views of a pedicle valve, × 1, paratype YPM 10667. [Neal Ranch Formation, R. E. King locality 92.]

9, Fragmentary interior of the pedicle valve, × 1, showing the muscle scars, paratype USNM 124009j; 10, 11, side and interior views of the brachial valve, × 1, paratype USNM 124009f (for enlarged views, see plate 365: figures 17, 18); 12–16, side, posterior, anterior, ventral, and dorsal views, × 1, holotype, USNM 124009e; 17–19, ventral, posterior, and side views of a large pedicle valve, × 1, paratype USNM 124009a; 20, dorsal view of another complete specimen, × 1, paratype USNM 148905. [Pueblo Formation (Camp Creek Member), Moore locality 9880.]

Nudauris linospina, new species: 21, 22, Interior, × 1, and posterior, × 2, views of a brachial valve, showing cardinal process and brevisseptum, paratype USNM 148860c; 23, ventral view of an immature pedicle valve, × 1, paratype USNM 148860b. [Cathedral Mountain Formation, USNM 702–low.]

24, Interior of another brachial valve, × 1, paratype USNM 148846d. [Cathedral Mountain Formation USNM 702.]

25, Interior of the pedicle valve, showing thick adductor platform and surrounding diductor scars, × 1, paratype USNM 153983. [Cathedral Mountain Formation, USNM 703a¹.]

26–29, Posterior, dorsal, anterior, and ventral views of a damaged specimen, showing part of the interior, × 1, paratype USNM 153982b. [Cathedral Mountain Formation, USNM 703b.]

PLATE 369.—*Nudauris*

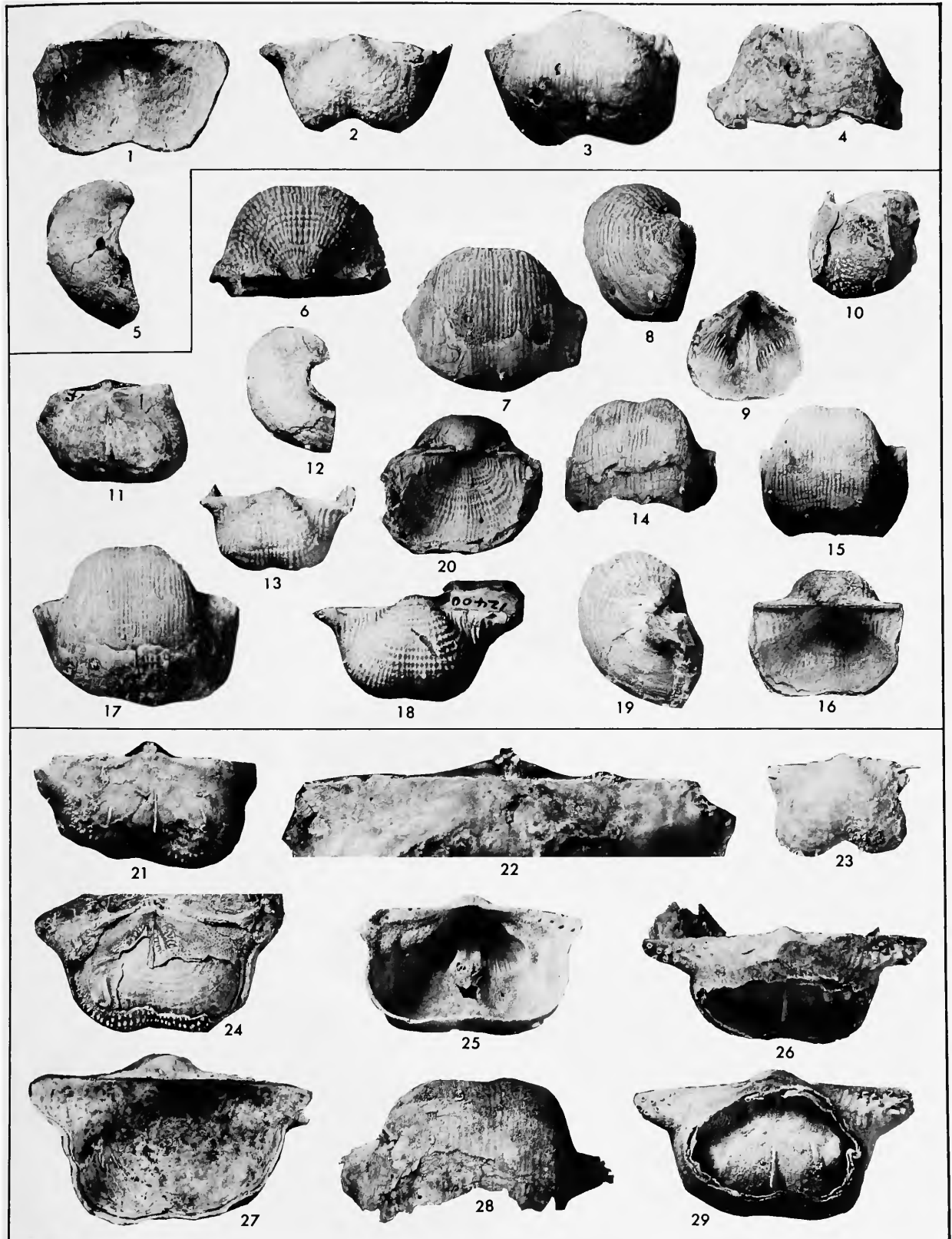


PLATE 370

Nudauris

Nudauris splendens, new species: 1-4, Anterior, posterior, side, and ventral views of a large pedicle valve, $\times 1$, paratype USNM 152745. [Gaptank Formation, (*Uddenites*-bearing Shale Member), USNM 701e.]

5-9, Posterior, ventral, side, dorsal, and anterior views $\times 1$, of the holotype, USNM 148872a; 10-14, side, ventral, posterior, dorsal, and anterior views of another complete specimen, $\times 1$, paratype USNM 148872b; 15, 16, exterior and interior of a fragmentary brachial valve, $\times 1$, paratype USNM 148872k; 17, interior of the preceding specimen, $\times 2$, showing the cardinal process and brachial ridges; 18, 19, interior of another fragmentary brachial valve, $\times 1$, $\times 2$, showing the cardinal process and brachial ridges, paratype USNM 148872-l; 20, posterior of the preceding specimen, $\times 2$, showing the myophore of the cardinal process; 21, interior of a fragmentary pedicle valve, $\times 1$, showing the muscle scars. [Neal Ranch Formation (upper 15 feet of bed 2 of P. B. King), USNM 701.]

PLATE 370.—*Nudauris*

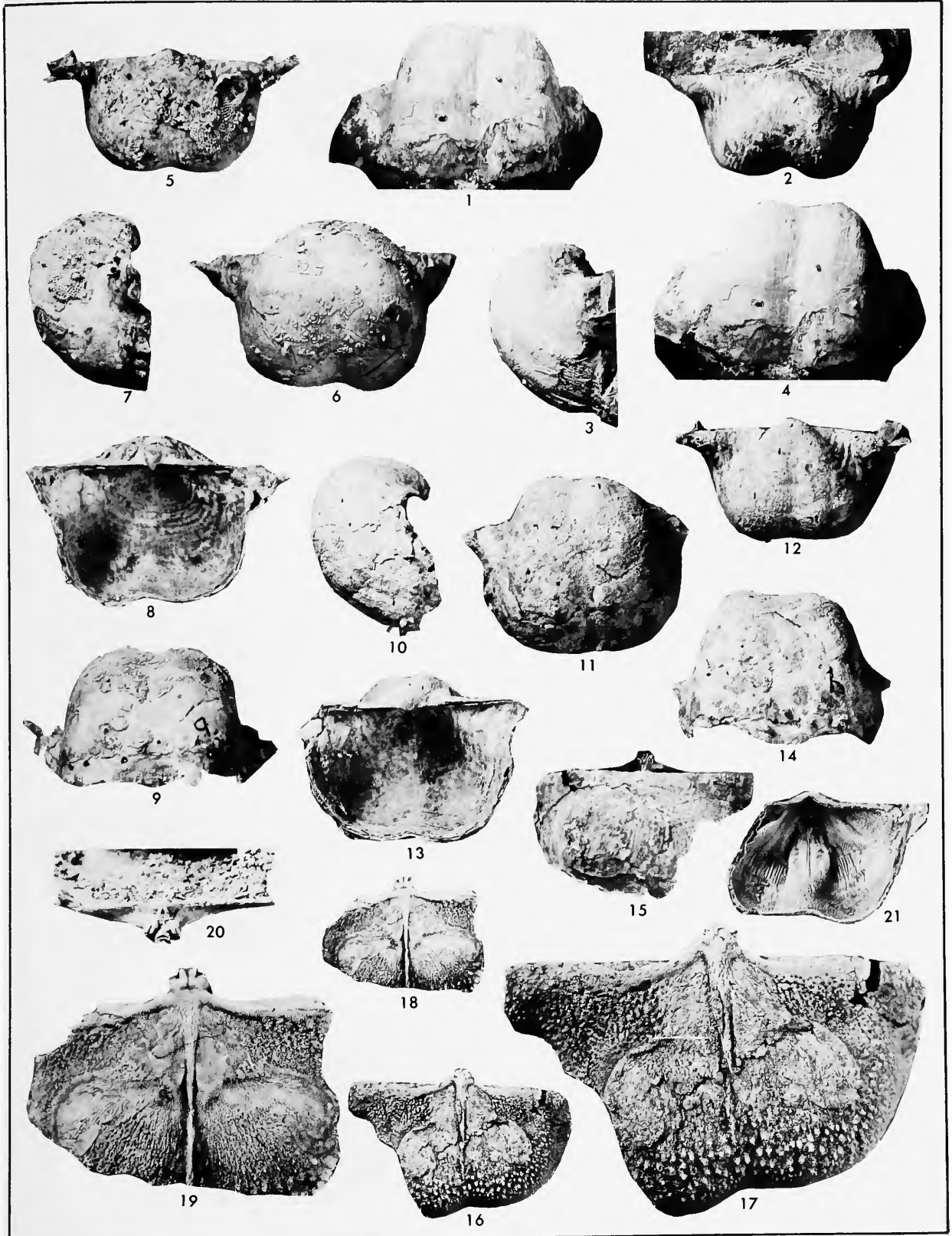


PLATE 371*Nudauris* and *Xestosia*

Nudauris convexa, new species: 1-3, Anterior, side, and posterior views of the holotype, $\times 1$, USNM 152742. [Lenox Hills Formation, USNM 705.]

Nudauris enigmatica, new species: 4-6, Side, posterior, and anterior views, $\times 1$, paratype, USNM 152750a; 7-9, anterior, posterior, and side views, $\times 1$, holotype, USNM 152750b. [Skinner Ranch Formation (Poplar Tank Member), USNM 708e.]

Nudauris aff. *N. enigmatica*, new species: 10, 11, Interior and exterior views of a brachial valve, $\times 1$, figured specimen USNM 153984; 12, 13, same specimen, $\times 1.5$. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

Xestosia cf. *X. schucherti* (R. E. King): 14, 15, Dorsal and ventral views of a poorly preserved complete specimen, $\times 1$, figured specimen 148867. [Bone Spring Formation, AMNH 591.]

PLATE 371.—*Nudauris* and *Xestosia*

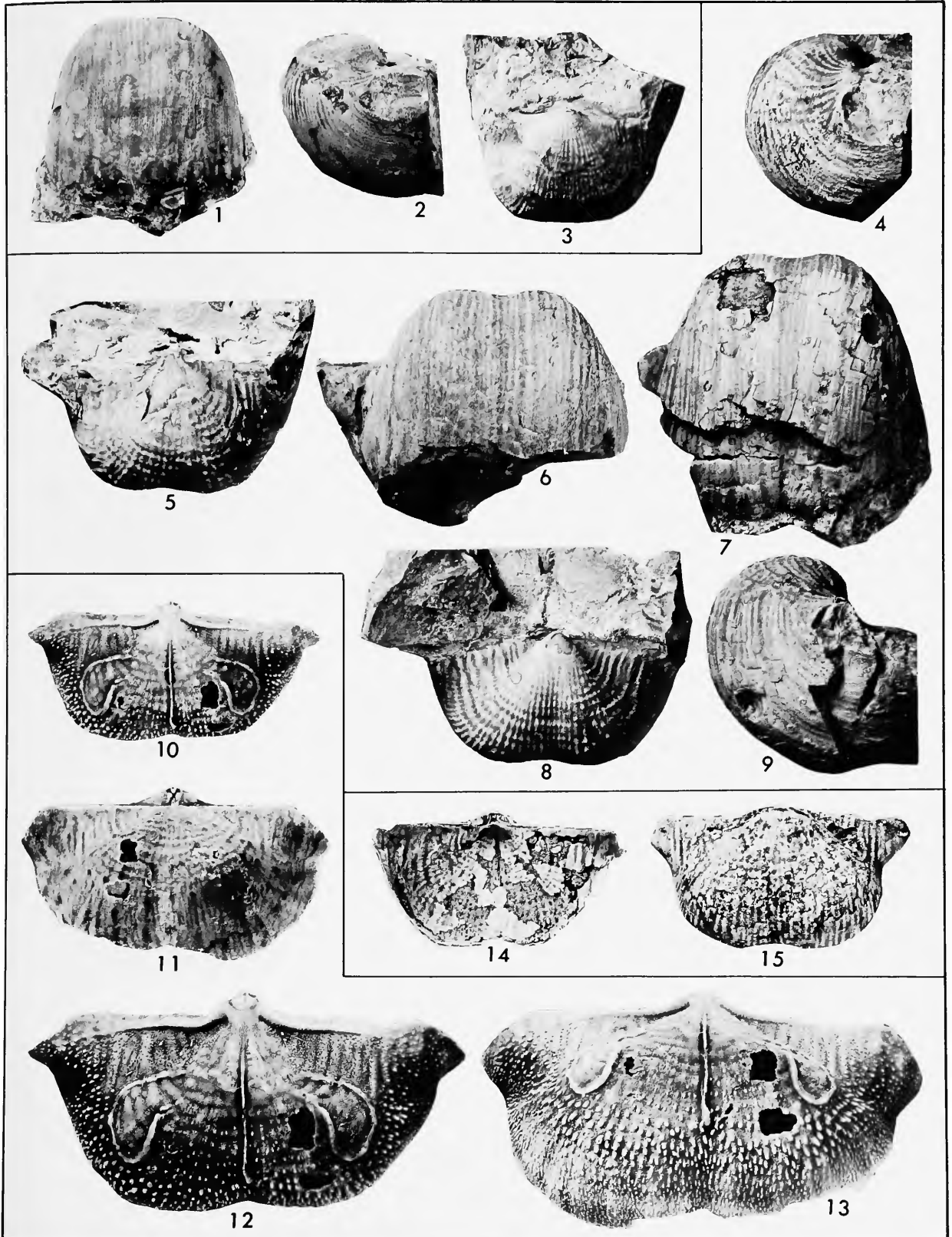


PLATE 372*Nudauris*

Nudauris diabloensis Stehli: 1-4, Dorsal, posterior, anterior, and interior views of a brachial valve, × 1, hypotype USNM 153985b; 5-8, dorsal, anterior, posterior, interior views of another brachial valve, × 1, hypotype USNM 153985a; 9-12, side, posterior, ventral, and anterior views of a large pedicle valve, × 1, hypotype USNM 152748b; 13-16, posterior, dorsal, anterior, and interior views of a brachial valve, × 1, showing the brachial ridges and cardinal process, hypotype USNM 152748f; 17-20, anterior, posterior, side, and ventral views of a large pedicle valve, × 1, hypotype USNM 152748a. [Bone Spring Formation, USNM 728e.]

PLATE 372.—*Nudauris*

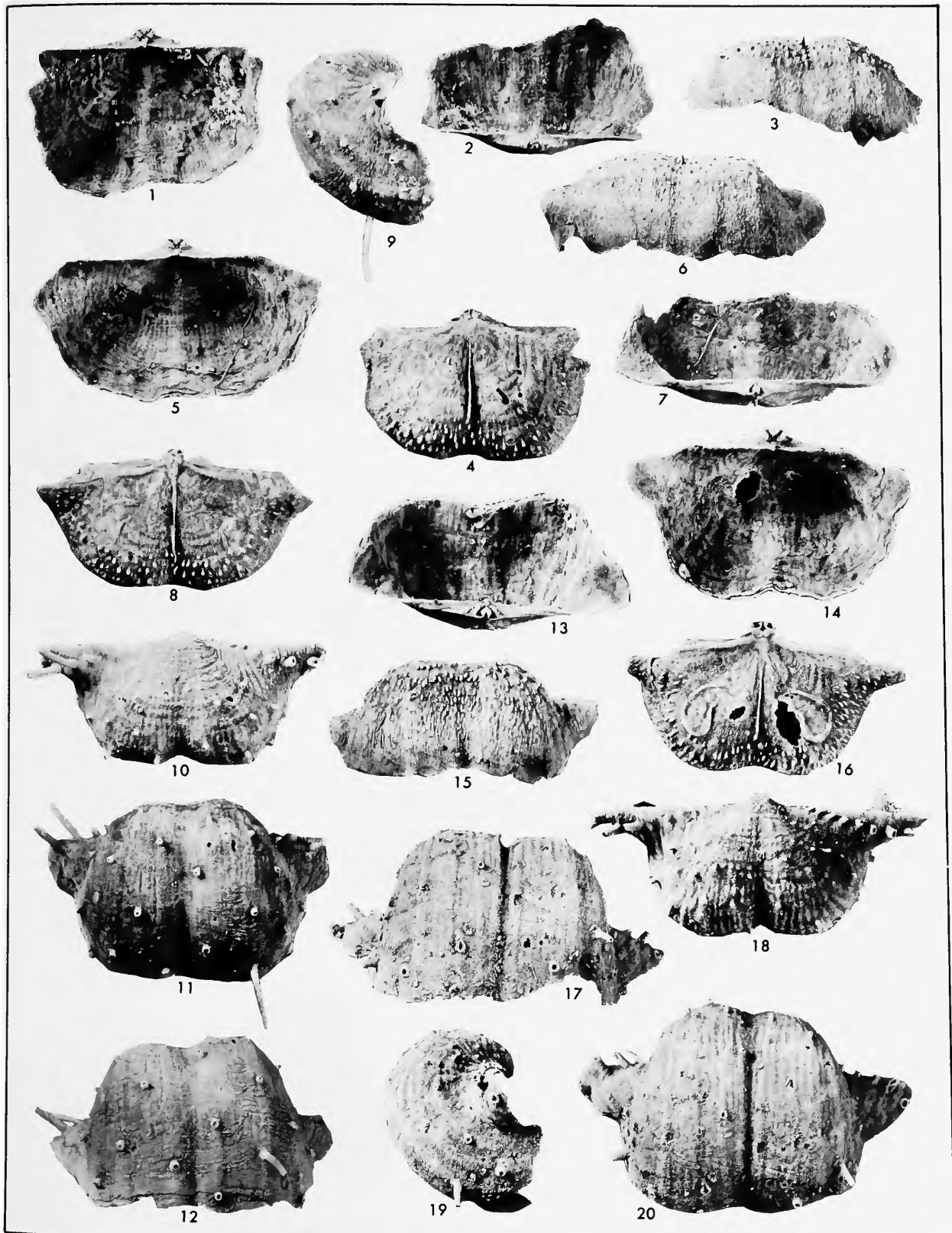


PLATE 373*Rugatia*

Rugatia convexa, new species: 1-5, Posterior, anterior, ventral, dorsal, and side views of a pedicle valve preserving some of its long halteroid spines, × 1, holotype USNM 149530d; 6-10, posterior, anterior, dorsal, side, and ventral views of a large specimen with both valves, × 1, paratype USNM 149530e; 11-15, posterior, dorsal, ventral, anterior, and side views of a young adult, × 1, paratype USNM 149530b; 16-19, posterior, ventral, side, and anterior views of a specimen preserving a long body spine, × 1, paratype USNM 149530a. [Road Canyon Formation (base), USNM 702c.]

PLATE 373.—*Rugatia*

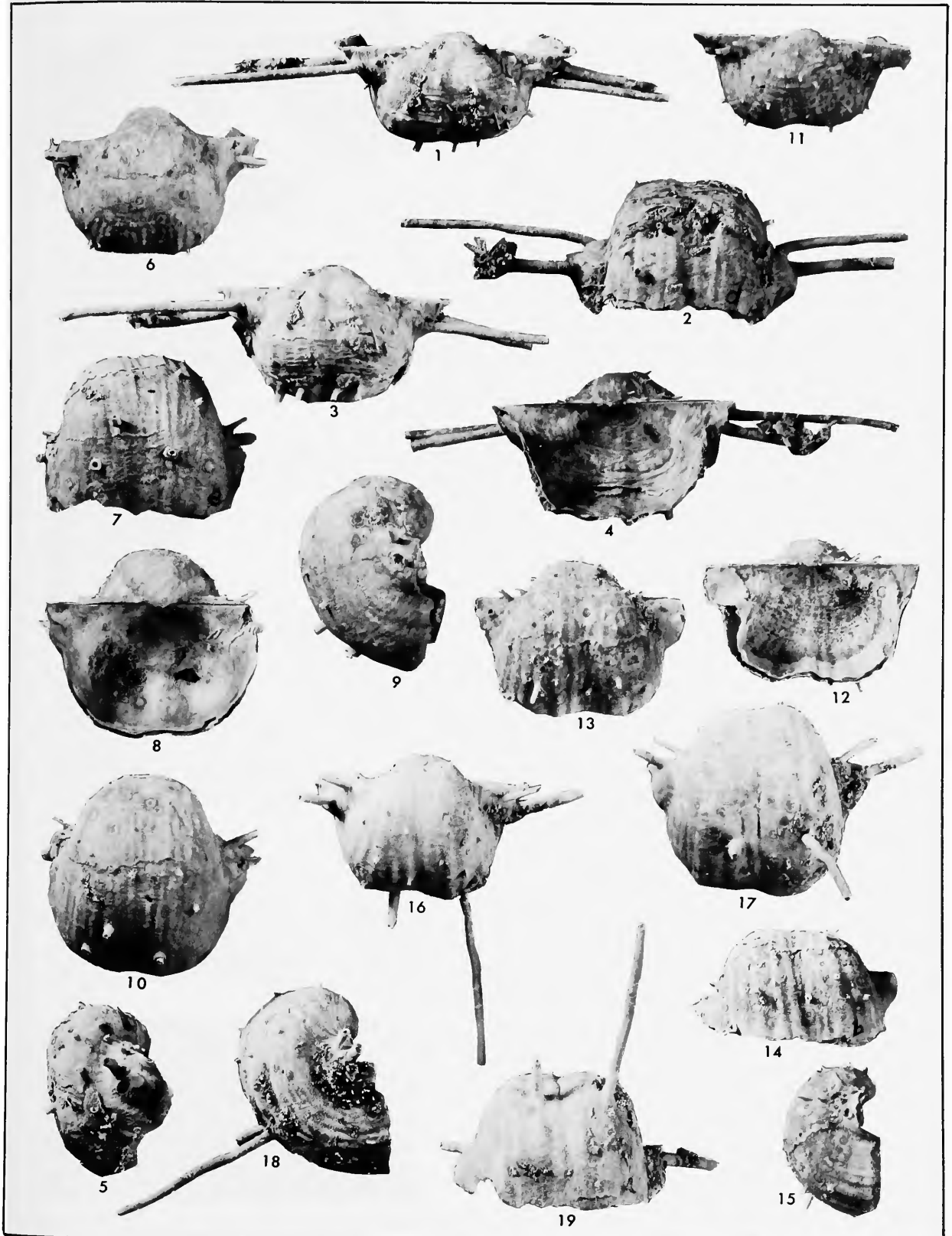


PLATE 374

Rugatia

Rugatia paraindica (McKee): 1, 2, Partial side and side views of a specimen broken to show the brevisseptum and cardinal process, $\times 1$, hypotype USNM 123439b; 4, 5, dorsal and interior views of a brachial valve, $\times 1$, hypotype USNM 154004; 9–12, side, posterior, anterior, and dorsal views of a complete specimen with bored shell, $\times 1$, hypotype USNM 123438e; 13, dorsal view of a small adult with some of its halteroid spines, $\times 1$, hypotype USNM 1234439a; 14, 15, interior and side views of a brachial valve interior, $\times 1$, showing brachial ridges and adductor scars, hypotype USNM 123439c; 16, 17, dorsal and ventral views of the posterior of the preceding specimen, $\times 2$, showing the cardinal process and muscle scars; 18, 19, dorsal and ventral views of a complete specimen with long halteroid spines, $\times 1$, hypotype USNM 123439f. [Cathedral Mountain Formation, USNM 702un.]

3, Interior of an incomplete brachial valve, $\times 1$, showing adductor scars, hypotype USNM 154003. [Cathedral Mountain Formation, USNM 721u.]

6, Interior of a brachial valve, $\times 1$, showing brachial ridges, hypotype USNM 123996a; 7, ventral view of a pedicle valve, $\times 1$, hypotype USNM 123996d; 8, fragment of a pedicle valve, $\times 1$, showing adductor platform, hypotype USNM 149515. [Cathedral Mountain Formation, USNM 702.]

PLATE 374.—*Rugatia*

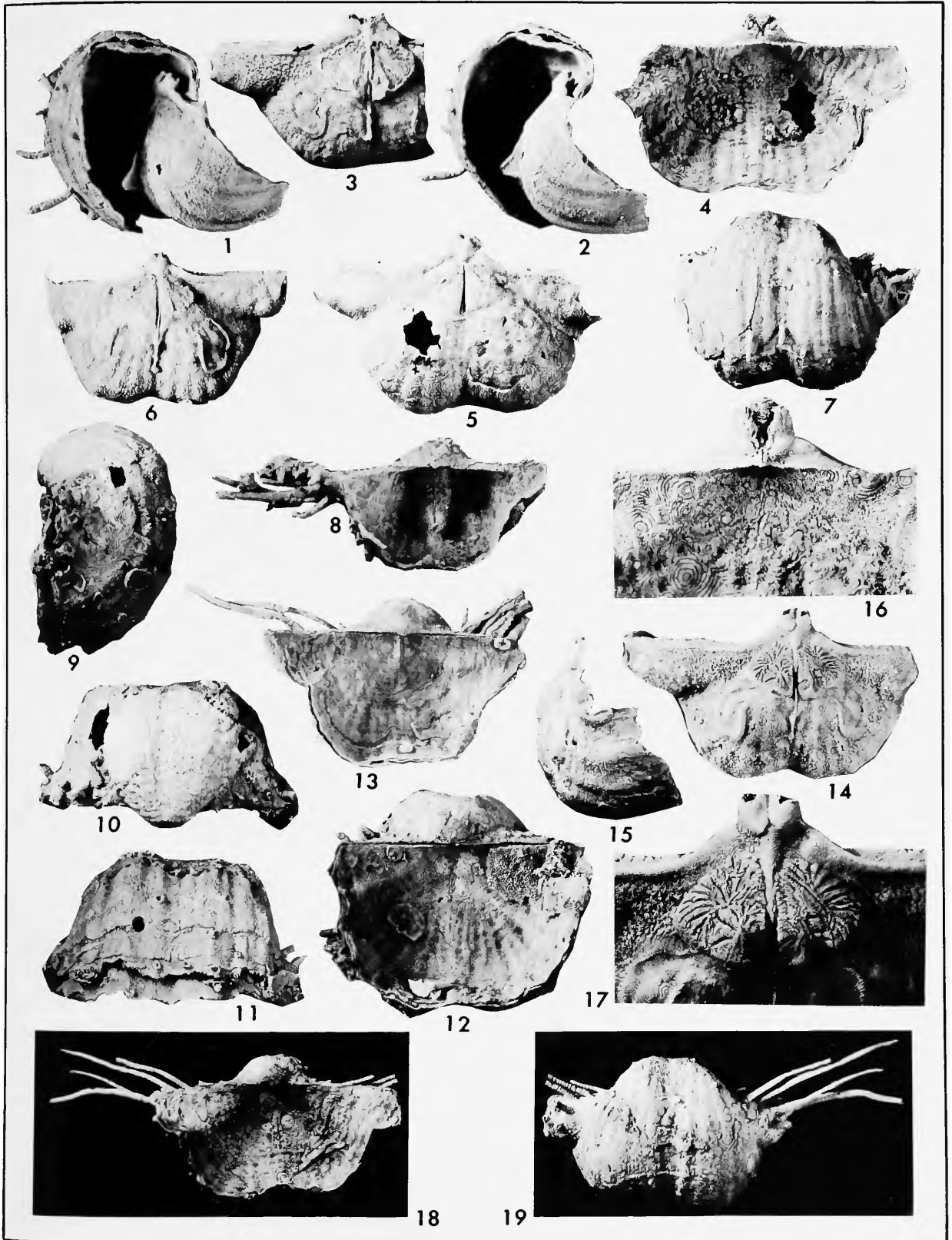


PLATE 375

Rugatia

Rugatia paraindica (McKee) : 1-4, Ventral, side, posterior, and anterior views of a large specimen playing host to *Hercosia*, $\times 1$, hypotype USNM 154002a, 5-7, ventral, side, and posterior views of a pedicle valve with bifurcated ear spine, $\times 1$, hypotype USNM 154002c. [Cathedral Mountain Formation, USNM 726o.]

8, 9, Ventral and dorsal views of a large pedicle valve with unusually long spines and "gastropod" boring, $\times 1$, hypotype USNM 149520 (this specimen was suspended by its spines among branching bryozoans); 10, interior of a large and greatly thickened specimen with both valves in contact but separable, $\times 1$, hypotype USNM 149521f; 11, pedicle valve of the preceding specimen, showing ginglymus and adductor platform, $\times 1$; 12, brachial valve of the preceding specimen, $\times 1$, showing adductor scars and brachial ridges; 13, myophore of the preceding specimen, $\times 2$, showing also a chilidial structure. [Cathedral Mountain Formation, USNM 702un.]

PLATE 375.—*Rugatia*

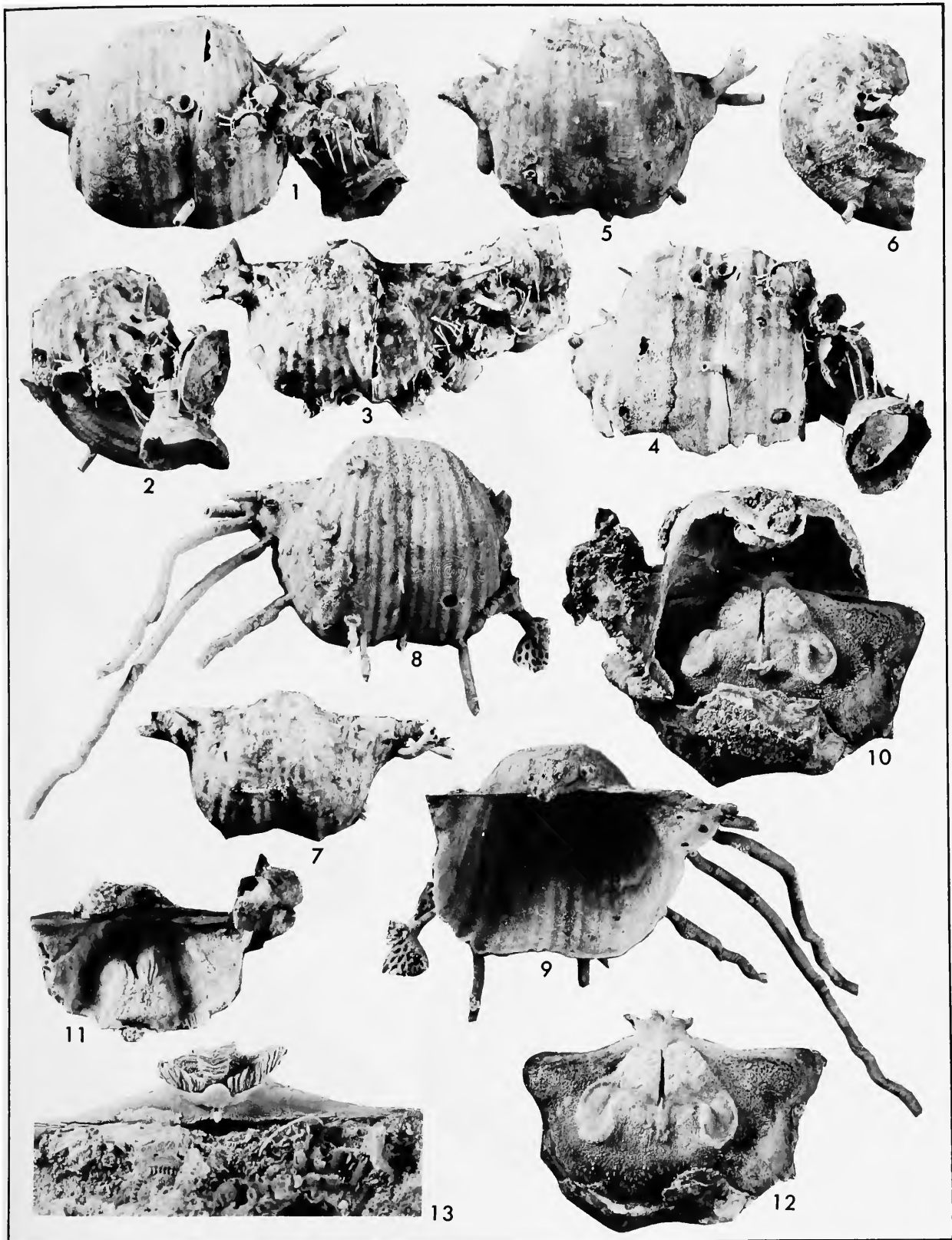


PLATE 376*Rugalia*

Rugalia mckeei, new species: 1, 2, Exterior and interior of the brachial valve, $\times 1$, paratype USNM 149534a; 3-7, anterior, side, ventral, dorsal, and posterior views of a complete specimen, $\times 1$, paratype USNM 149535a; 8-12, anterior, ventral, dorsal, side, and posterior views of a complete specimen, $\times 1$, holotype USNM 149534b. [Road Canyon Formation, USNM 707e.]

13, 14, Interior and dorsal views of a brachial valve, $\times 1$, paratype USNM 154001. [Road Canyon Formation, USNM 703d.]

PLATE 376.—*Rugatia*

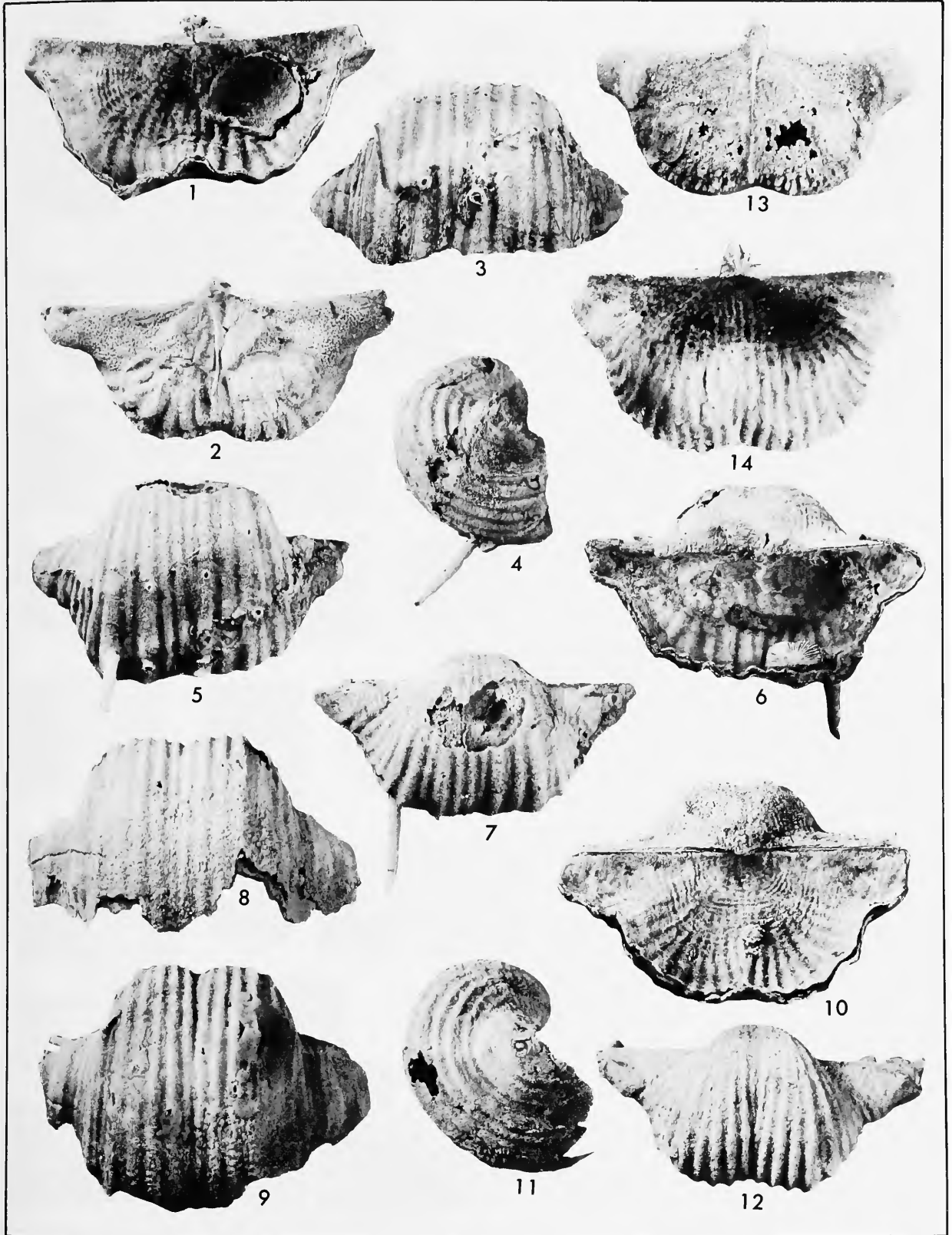


PLATE 377

Rugatia

Rugatia incurvata (R. E. King): 1-5, Ventral, side, posterior, anterior, and dorsal views, \times 1, holotype YPM 11583. [Road Canyon Formation, R. E. King locality 46.]

6-10, Dorsal, anterior, posterior, side, and ventral views of a small specimen, \times 1, hypotype USNM 152751c; 20-24, dorsal, posterior, side, anterior, and ventral views of an adult with some of its spines, \times 1, hypotype USNM 152751a; 44, interior of a brachial valve, \times 1, hypotype USNM 152751d; 45, 46, exterior and interior, \times 2, of the preceding specimen showing brevisseptum and cardinal process. [Road Canyon Formation (base), USNM 702c.]

11-14, Ventral, anterior, posterior, and dorsal views of a complete specimen, \times 1, hypotype USNM 154006a; 15, 16, interior and posterior views of the brachial valve of the preceding specimen, \times 1; 37, 38, interior and exterior views of the brachial valve, \times 2, hypotype USNM 154006b; 39, 40, interior of the pedicle valve, \times 1, \times 2, showing adductor platform, hypotype USNM 154006c.

17-19, Interior, \times 1, \times 2, and exterior, \times 2, of a brachial valve, hypotype USNM 154007. [Road Canyon Formation, USNM 703c.]

25, Ventral view of an immature pedicle valve, \times 1, hypotype USNM 154005b; 26-30, dorsal, ventral, side, anterior, and posterior views of an adult, \times 1, hypotype USNM 154005d; 31, dorsal view of a young specimen with long halteroid spines, \times 1, hypotype USNM 154005a; 32-35, posterior, anterior, side, and ventral views of a large and spiny pedicle valve, \times 1, hypotype USNM 154005e; 36, ventral view of the preceding specimen, \times 2, showing the numerous spines; 41, interior of a brachial valve, \times 1, hypotype USNM 154005g; 42, 43, interior and exterior of the preceding brachial valve, \times 2, showing cardinal process, adductor scars, brevisseptum, and endospines. [Road Canyon Formation (base), USNM 703a.]

PLATE 377.—*Rugatia*

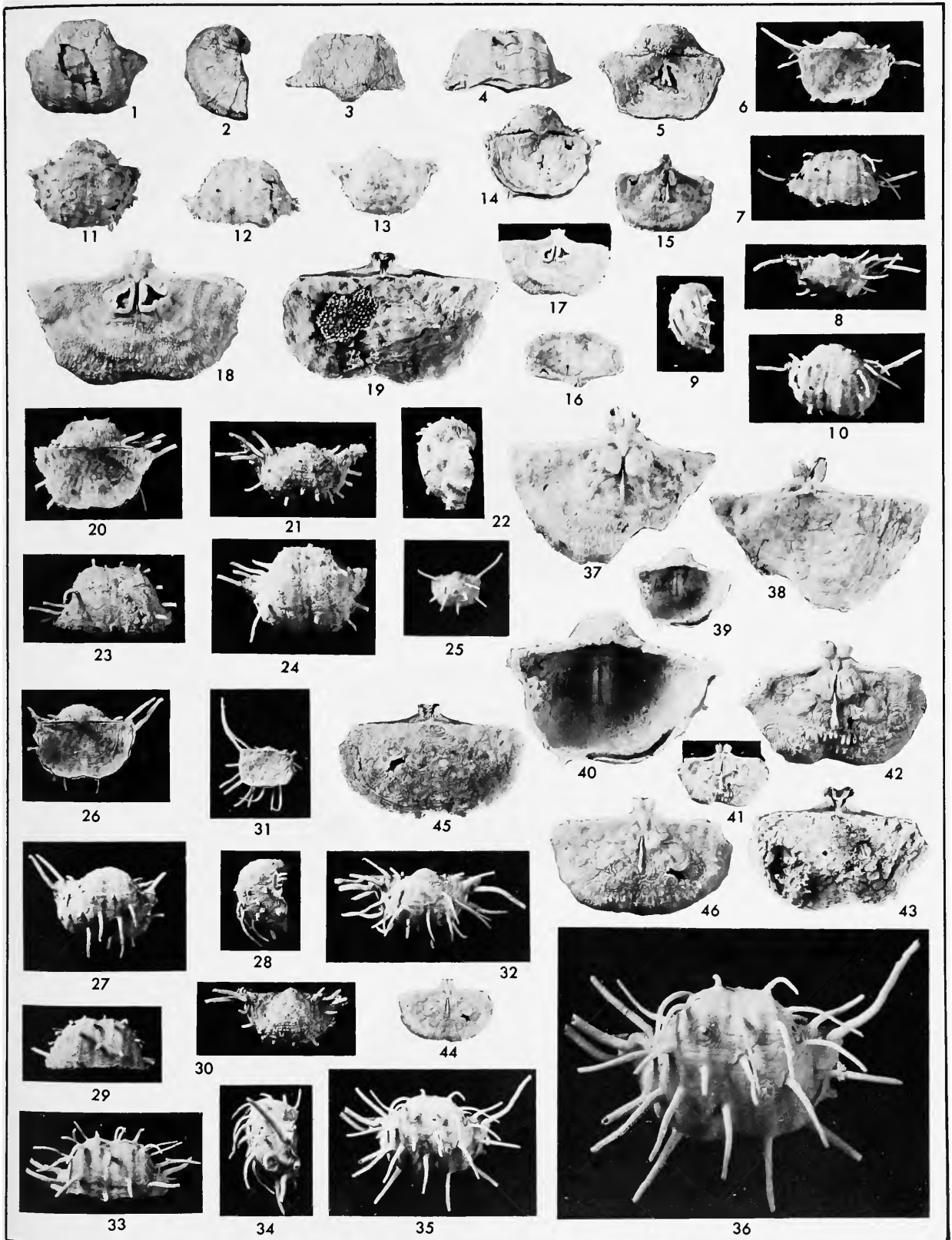


PLATE 378

Rugatia and *Reticulatia*

Rugatia occidentalis parvauris, new species: 1-3, Ventral, anterior, and side views of a fine pedicle valve, \times 1, holotype USNM 153471. [Cathedral Mountain Formation, USNM 702.]

4, 5, Side and interior views of an imperfect brachial valve, \times 1, paratype USNM 154008a; 6-8, posterior, interior, and side views of another brachial valve, \times 1, paratype USNM 154008b. [Cathedral Mountain Formation, USNM 726y.]

Rugatia occidentalis (Newberry): 9-12, Posterior, side, ventral, and dorsal views of an internal mould, \times 1, showing deep slit produced by adductor platform, hypotype USNM 154009; 13, latex replica of the brachial valve interior prepared from the preceding, \times 1, showing brachial ridges and fine endospines. [Kaibab Formation, USGS 664.]

Reticulatia huecoensis (R. E. King): 14-17, Side, anterior, posterior, and dorsal views of the holotype, \times 1, YPM 10554. [Hueco Canyon Formation, R. E. King locality 380.]

Reticulatia species 2: 18-20, Posterior, side, and ventral views of a large pedicle valve, \times 1, figured specimen 148998. [Captank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701v.]

PLATE 378.—*Rugatia* and *Reticulatia*

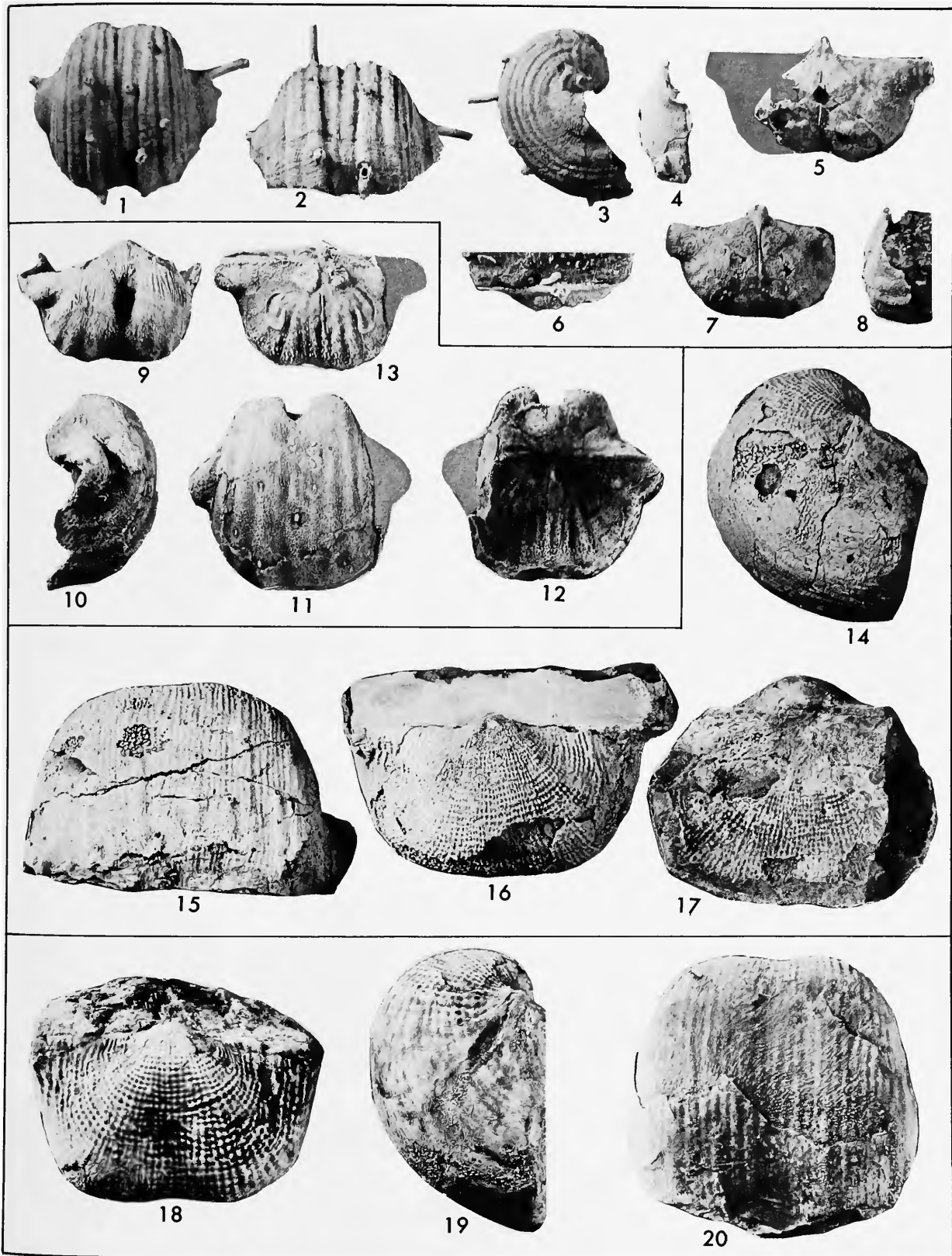


PLATE 379

Spinarella

Spinarella paulula, new species: 1-3, Ventral, dorsal, and side views of an immature specimen, $\times 1$, paratype USNM 149527g; 4-7, posterior, dorsal, side, and ventral views of a complete specimen, $\times 1$, paratype USNM 149527b (for a view showing ear spines see plate 380: figure 18); 8-10, ventral, side, and dorsal views of another complete specimen, $\times 1$, paratype USNM 149527c; 11-13 ventral, side and dorsal views of an immature specimen, $\times 1$, paratype USNM 149527d; 14-17, ventral, posterior, dorsal and side views of another complete individual, $\times 1$, paratype USNM 149527h. [Road Canyon Formation (base), USNM 702c.]

18-21, Ventral, posterior, anterior, and dorsal views, $\times 1$, holotype USNM 153470a; 22, interior of a fragment of a brachial valve showing the cardinal process and brevisseptum, $\times 1$, paratype USNM 153470b; 23, 24, interior and side views of the preceding specimen, $\times 2$, showing the cardinal process; 25, 26, interior and posterior views of a brachial valve, $\times 1$, paratype USNM 153470c; 27, posterior of the preceding specimen, showing the myophore, $\times 2$. [Road Canyon Formation, USNM 719x.]

Spinarella perfecta, new species: 28, 29, Ventral and interior views of a pedicle valve, $\times 1$, showing muscle field and endospines, paratype USNM 148844h; 30-33, ventral, side, posterior and dorsal views of a complete specimen, $\times 1$, holotype USNM 148844a; 34, 35, posterior and interior views of a brachial valve, $\times 1$, paratype USNM 148844i. [Road Canyon Formation (base), USNM 702c.]

PLATE 379.—*Spinarella*

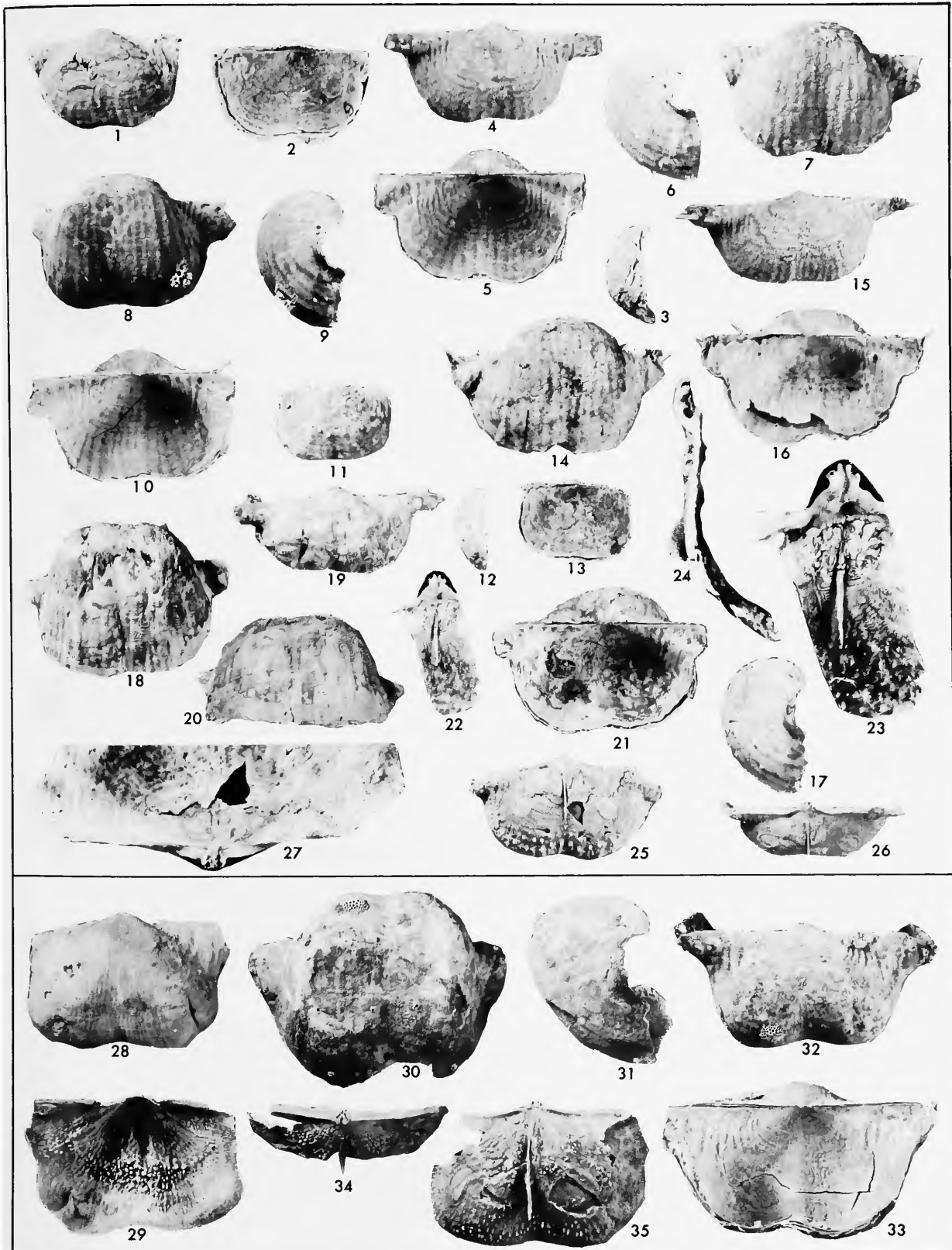


PLATE 380*Spinarella*

Spinarella perfecta, new species: 1-4, Side, anterior, posterior, and ventral views of a pedicle valve, $\times 1$, paratype USNM 148844e; 5, 6, right side and posterior views of the preceding specimen, $\times 2$, showing the row of spines on the ear; 7-10, posterior, ventral, dorsal, and side views of a large complete specimen, $\times 1$, paratype USNM 148844c; 11-13, exterior, interior, and posterior views of the brachial valve, $\times 1$, paratype USNM 148844j; 14-16, interior, posterior, and dorso-posterior views of the preceding specimen, $\times 2$, showing brachial ridges, brevisseptum and cardinal process. [Road Canyon Formation (base), USNM 702c.]

Spinarella paulula, new species: 17, Posterior of the brachial valve interior, $\times 2$, showing cardinal process, paratype USNM 153470d. [Road Canyon Formation, USNM 719x.]

18, Posterior of a pedicle valve showing row of spines on ear, $\times 2$, paratype USNM 149527b (for additional views of this specimen, see plate 379; figures 4-7). [Road Canyon Formation (base), USNM 702c.]

PLATE 380.—*Spinarella*

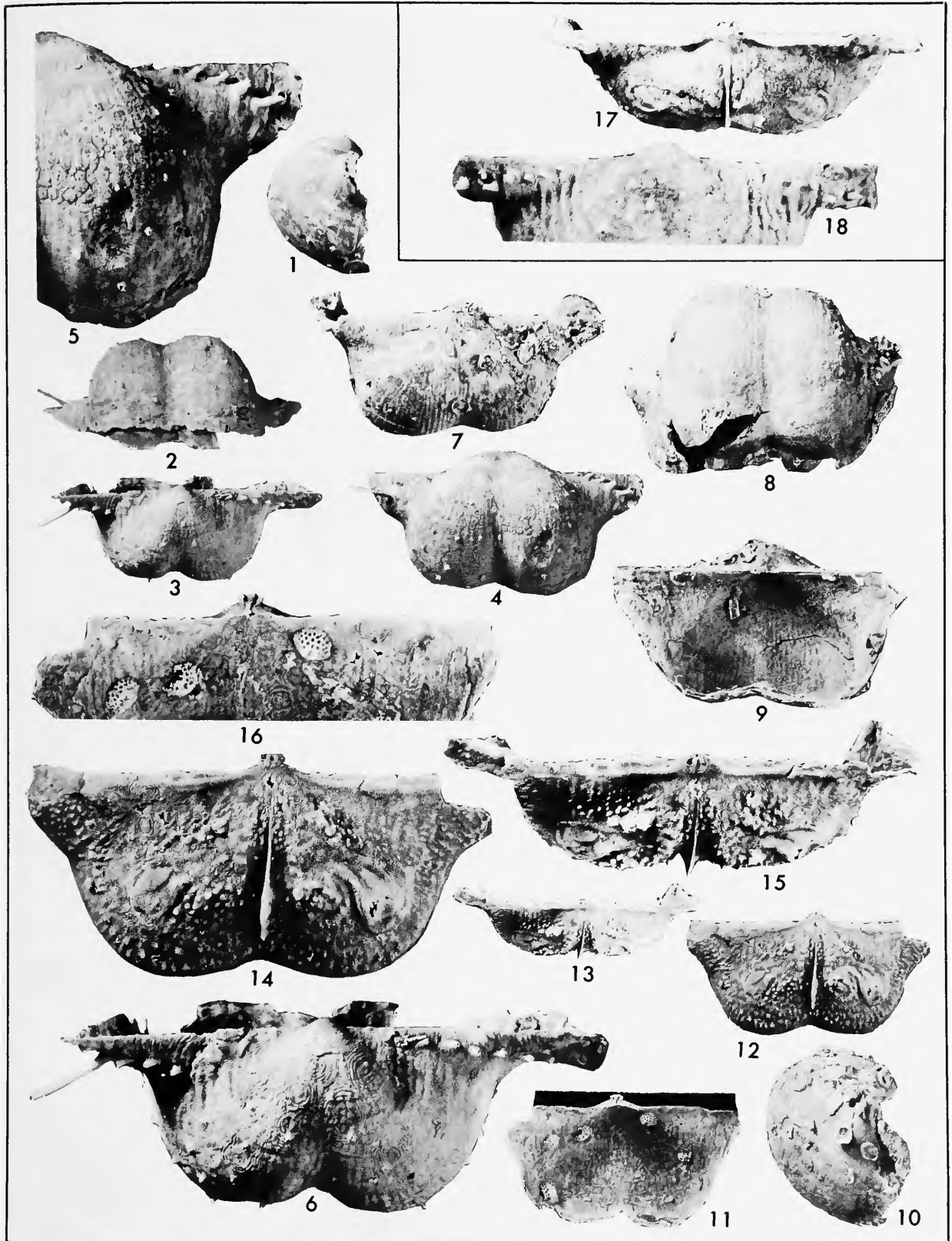


PLATE 381

Spinarella

Spinarella costellata, new species: 1-4, Posterior, side, ventral and dorsal views of a complete specimen, $\times 1$, holotype USNM 148842a; 5, interior of the pedicle valve of the holotype, $\times 1$, showing granulose interior and muscle field; 6, 7, interior of the brachial valve of the holotype, $\times 1$, $\times 2$, showing brachial ridges and abundant endospines; 8-11, dorsal, ventral, side and posterior views of another imperfect individual, $\times 1$, paratype USNM 148842b. [Road Canyon Formation, USNM 703d.]

Spinarella lobata, new species: 12-16, Dorsal ventral, anterior, posterior, and side views of a complete individual, $\times 1$, paratype USNM 148843e; 17-21, anterior, posterior, dorsal, ventral, and side views of a strongly lobate specimen, $\times 1$, holotype USNM 148843a; 22, 23, ventral and dorsal views of another complete specimen, $\times 1$, paratype USNM 148843f; 24, interior of the pedicle valve of the preceding paratype, $\times 1$, 25, interior, $\times 1$, of the brachial valve of the preceding paratype, $\times 1$, showing brevisseptum; 26, posterior of the brachial valve, $\times 2$, of the preceding specimen showing low cardinal process. [Road Canyon Formation, USNM 707e.]

27-31, Dorsal, posterior, ventral, anterior, and side views of a complete, less deeply indented specimen than the preceding ones, $\times 1$, paratype USNM 154010a; 32-36, posterior, ventral, side, anterior, and dorsal views of a complete individual, $\times 1$, paratype USNM 154010b. [Road Canyon Formation, USNM 719x.]

PLATE 381.—*Spinarella*

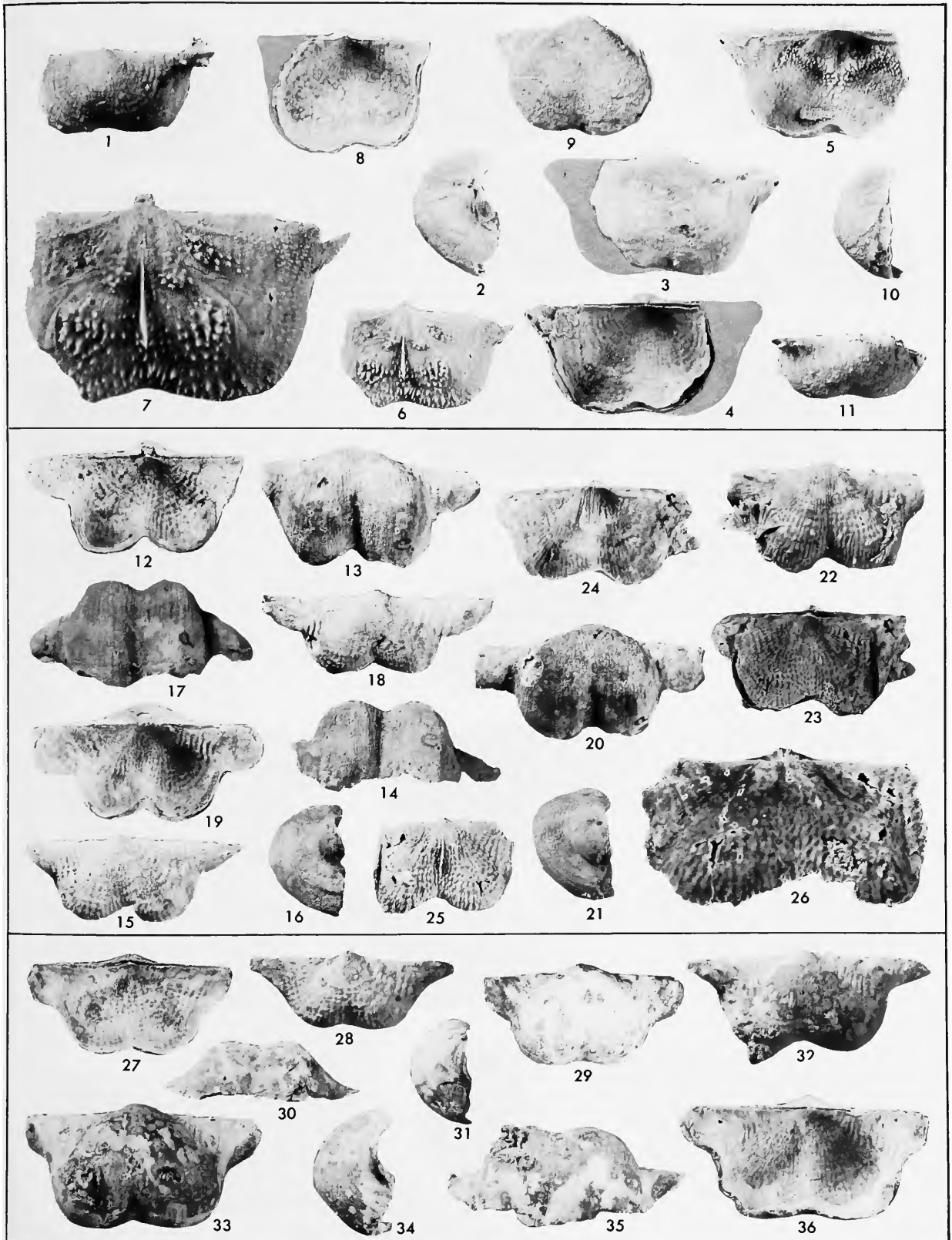


PLATE 382

Xestosia

Xestosia schucherti (R. E. King): 1-5, Dorsal, anterior, posterior, ventral, and side views of a complete and well formed specimen, $\times 1$, hypotype USNM 152744a; 6, 7, interior and side views of a brachial valve, $\times 1$, showing fine brevisseptum and endospines, hypotype USNM 153998f (see plate 383: figure 12, for enlarged posterior view); 8, 9, interior and side views of another brachial valve, $\times 1$, hypotype USNM 153998c; 10, interior of a fragmentary pedicle valve, $\times 1$, showing muscle scars and ginglymus, hypotype USNM 153998b. [Cathedral Mountain Formation, USNM 721u.]

Xestosia obsolescens, new species: 11, Ventral view of an immature specimen with long halteroid spines, $\times 1$, paratype USNM 148861h; 12, 13, interior and posterior of a fragmentary brachial valve, $\times 1$, showing sharp brevisseptum, paratype USNM 148861g; 14, 15, side and interior views of a brachial valve, $\times 1$, showing brachial ridges, paratype USNM 148861k; 16, posterior of the preceding specimen, $\times 2$, showing the cardinal process; 17, 18, posterior and dorsal views of an immature individual, $\times 1$, paratype USNM 148861j; 19, dorsal view, $\times 1$, of a complete specimen, paratype USNM 148861a; 20, 21, interior of the pedicle and brachial valves of the preceding specimen, $\times 1$, showing brachial ridges, brevisseptum, and depressed cardinal process; 22-25, posterior, ventral, side, and dorsal views of another specimen, $\times 1$, holotype USNM 148861b; 26, interior, $\times 1$, of the holotype. [Cathedral Mountain Formation, USNM 702un.]

PLATE 382.—*Xestusia*

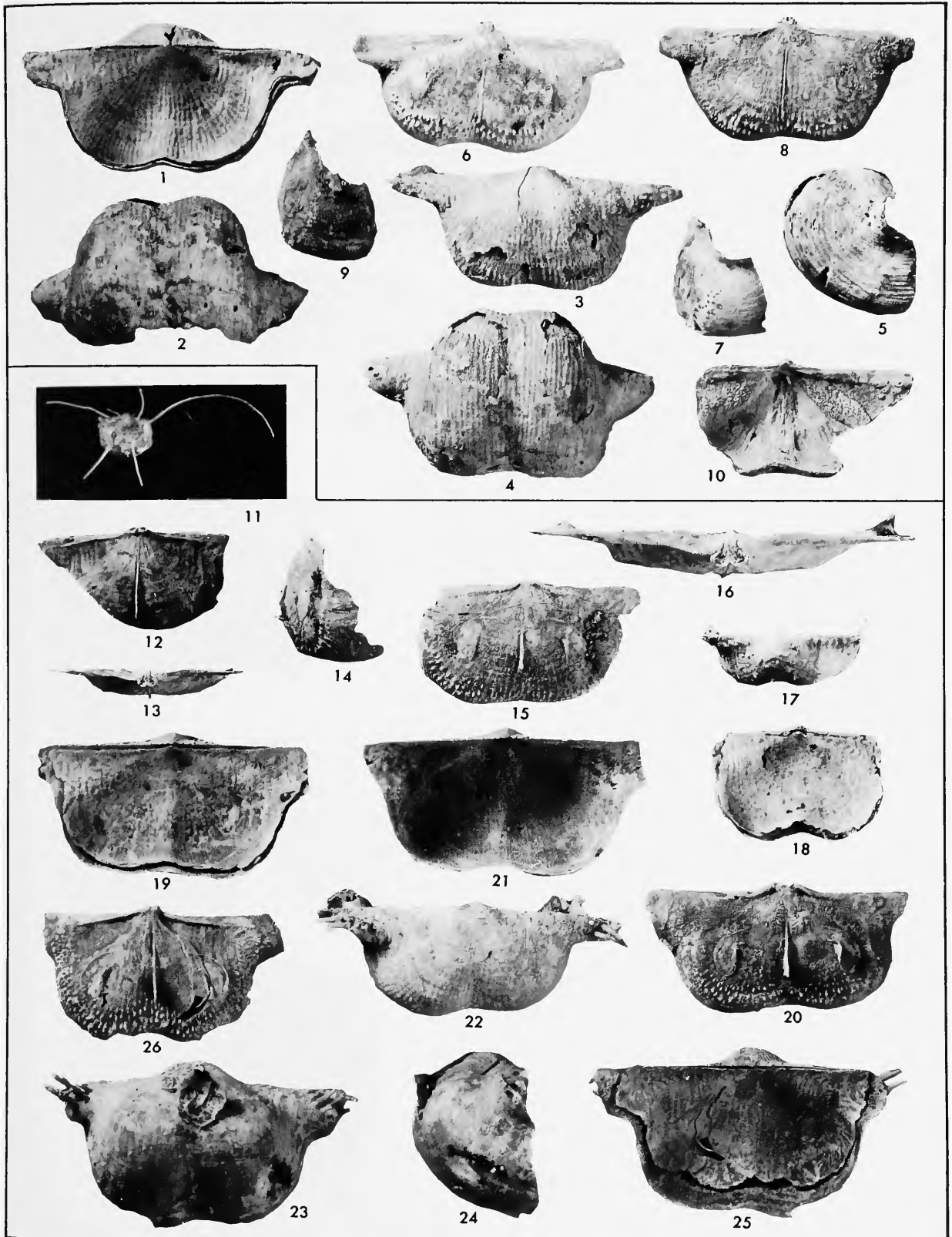


PLATE 383*Xestosia and Reticulatia*

Xestosia schucherti (R. E. King): 1–5, Ventral, posterior, side, dorsal, and anterior views of an imperfect specimen with both valves, $\times 1$, paratype YPM 10763a; 6–9, posterior, side, anterior, and ventral views, $\times 1$, lectotype YPM 10763b. [Cathedral Mountain Formation, R. E. King locality 120.]

10, Ventral view of an immature pedicle valve, $\times 1$, hypotype USNM 153998g; 11, posterior of a brachial valve, $\times 2$, hypotype USNM 153998d; 12, posterior of another brachial valve, $\times 2$, showing the cardinal process, hypotype USNM 153998f (for interior view, see plate 382: figures 6, 7); 13, ventral view of a nearly adult pedicle valve, $\times 1$, hypotype USNM 153998e. [Cathedral Mountain Formation, USNM 721u.]

Reticulatia americana (Dunbar and Condra): 14–16, Interior, side, and dorsal views of a large brachial valve, $\times 1$, hypotype USNM 149002a. [Neal Ranch Formation (top 15 feet of Gray Limestone Member of P. B. King), USNM 701.]

17, 18, Side and interior views of another brachial valve, $\times 1$, hypotype USNM 148999a; 19–22, anterior, ventral, side, and posterior views of a pedicle valve, $\times 1$, hypotype USNM 148999b. [Neal Ranch Formation (beds 5–8 of P. B. King), USNM 713h.]

PLATE 383.—*Xestostia* and *Reticulatia*

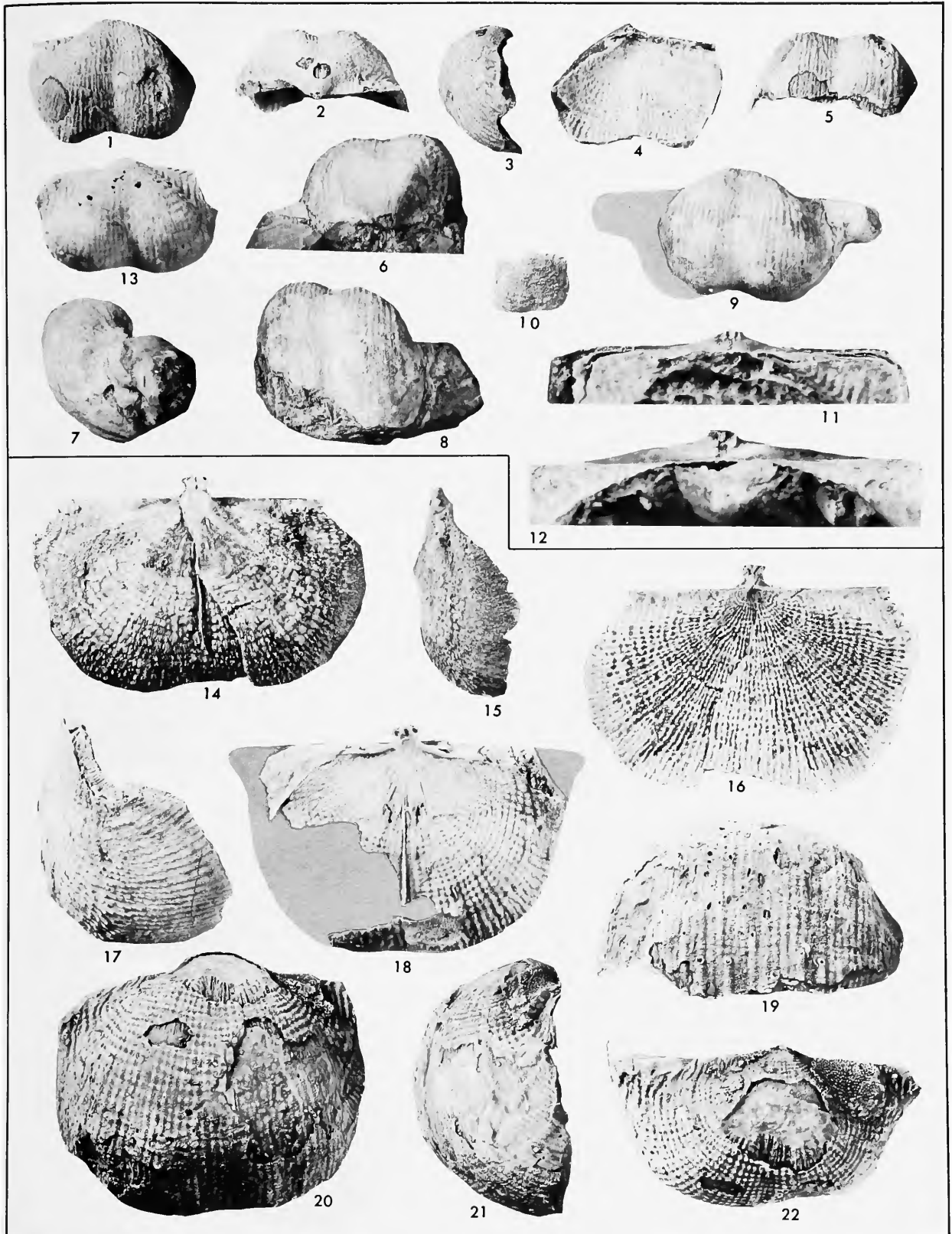


PLATE 384

Spinifrons

Spinifrons quadrata Stehli: 1, Ventral view of an immature pedicle valve, \times 1, hypotype USNM 148931; 7, 8, posterior and ventral views of another immature pedicle valve, \times 1, hypotype USNM 154014f. [Bone Spring Formation, USNM 728e.]

2, Ventral view of a young pedicle valve, showing halteroid spines, \times 1, hypotype USNM 155035; 9–11, side, interior, and exterior views of a young brachial valve with exterior spines, and solid shaft, \times 1, hypotype USNM 153842b; 12, posterior view of the preceding brachial valve, \times 2, showing the myophore. [Bone Spring Formation, USNM 728h.]

3–6, Side, dorsal, posterior, and ventral views of a complete specimen, \times 1, hypotype USNM 148942. [Bone Spring Formation, AMNH 631.]

Spinifrons magna, new species: 13, 14, Exterior and interior of a young brachial valve with partially filled shaft, \times 1, paratype USNM 154013e; 15, interior of the preceding specimen, \times 2, showing the partially filled shaft of the cardinal process; 16, 17, dorsal and interior views of an adult brachial valve showing a solid-shafted cardinal process and lobate myophore, \times 2, paratype USNM 154011c; 18, exterior of a brachial valve, showing the long protective spines, \times 1, paratype USNM 154013b; 19, myophore, \times 2, of the preceding specimen. [Bone Spring Formation, USNM 728f.]

PLATE 384.—*Spinifrons*

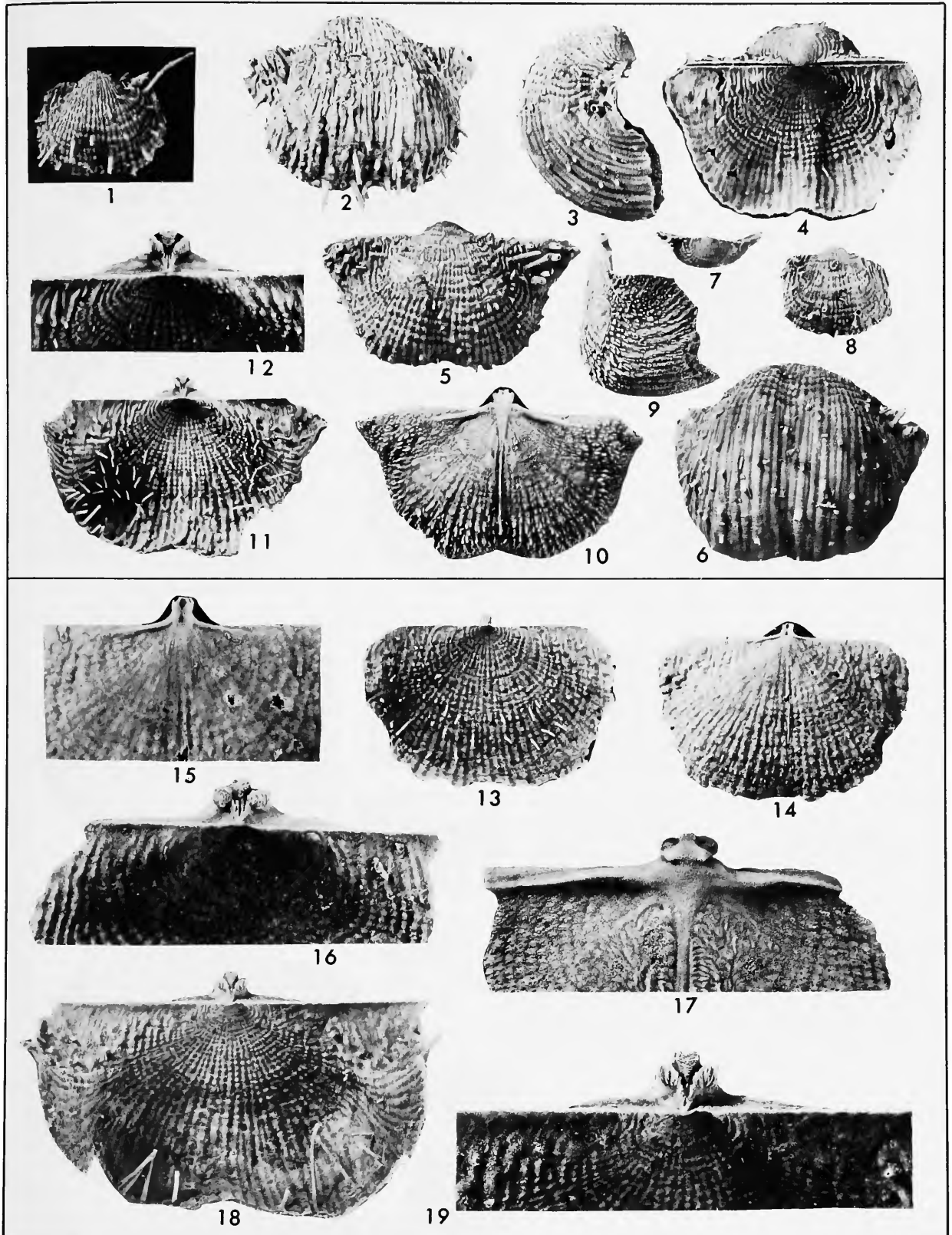


PLATE 385

Spinifrons

Spinifrons delicatula, new species: 1-4, dorsal, ventral, posterior and side views of an imperfect pedicle valve, $\times 1$, paratype USNM 154015a; 5, interior of the pedicle valve of the preceding specimen, $\times 1$; 6, posterior view of the cardinal process of the preceding brachial valve, $\times 2$; 7, 8, exterior and interior of a fragmentary pedicle valve, showing the muscle scars, $\times 1$, paratype USNM 154015b. [Skinner Ranch Formation (base), USNM 724p.]

9-12, Dorsal, ventral, anterior, and side views of a complete specimen, $\times 1$, holotype USNM 148929. [Skinner Ranch Formation (base) USNM 711p.]

Spinifrons magna, new species: 13, 14, Ventral views of two immature pedicle valves, $\times 1$, $\times 2$, showing initial rings of attachment, paratype USNM 154016a, b; 15-17, interior, posterodorsal, and exterior views of a young brachial valve, $\times 1$, showing open cardinal process shaft, paratype USNM 154016d; 18, 19, posterodorsal and interior views of the preceding brachial valve $\times 2$, showing immature cardinal process; 20, ventral view of an immature pedicle valve, $\times 1$, paratype USNM 154014-1; 21, 22, exterior and interior of another brachial valve, $\times 1$, paratype USNM 154011e; 23, interior of an immature brachial valve, $\times 1$, paratype USNM 154011f; 24, 25, interior and posterodorsal views of the preceding specimen, $\times 2$, showing open-shafted cardinal process and narrow myophore; 26, interior of a brachial valve deformed in growth, $\times 1$, paratype USNM 154011g. [Bone Spring Formation, USNM 728f.]

PLATE 385.—*Spinifrons*

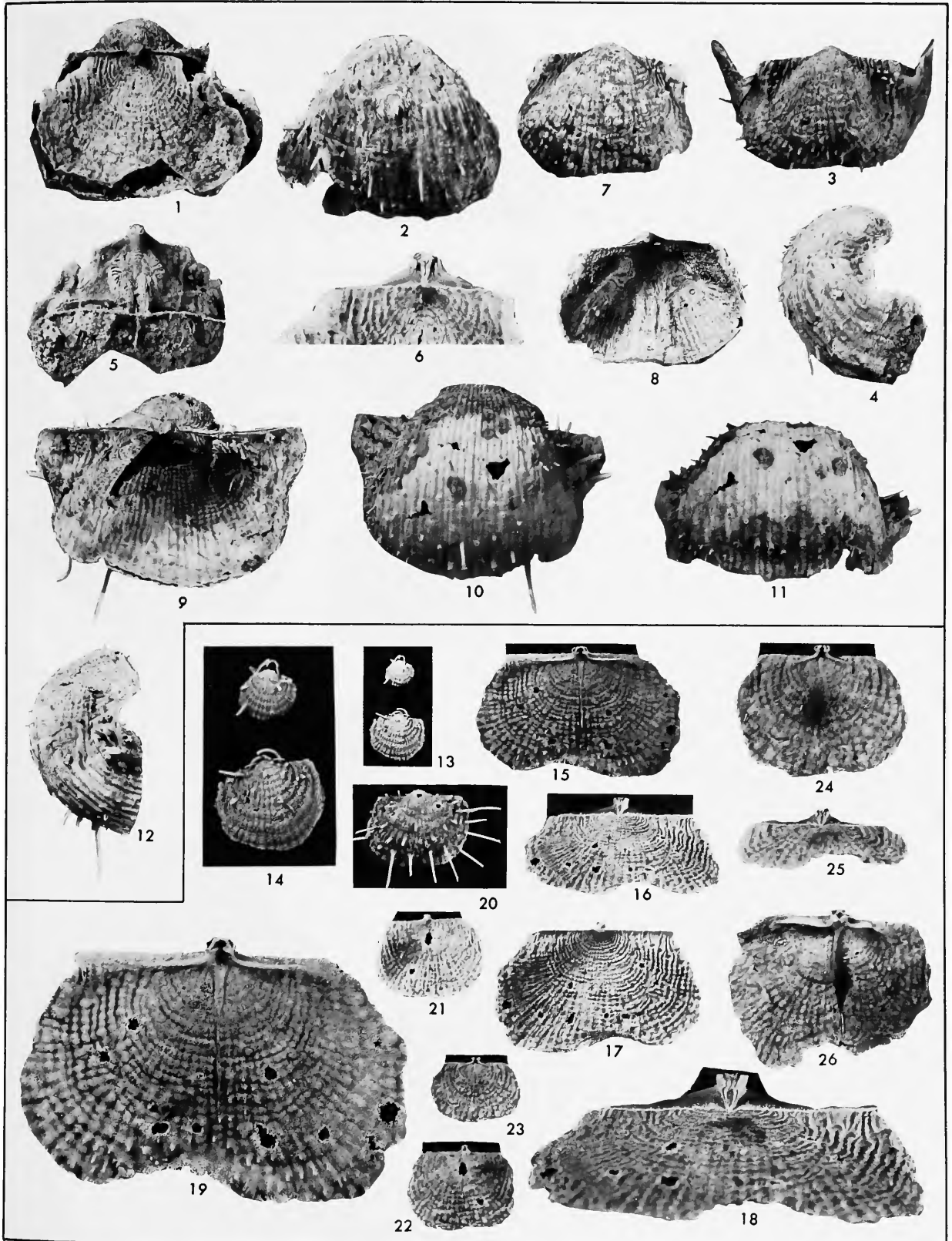


PLATE 386

Reticulatia, *Antiquatonia*, *Calliprotonia* and *Echinaria*

Reticulatia robusta, new species: 1, Very young specimen, $\times 3$, showing the initial attachment ring and early spines, paratype USNM 153840. [Neal Ranch Formation (bed 4 of P. B. King), USNM 721g.]

Antiquatonia inflativentra, new species: 2-5, Anterior, side, ventral, and posterior views of a pedicle valve, $\times 1$, paratype USNM 148965b; 6-9, posterior, anterior, side, and posterior views of the holotype, $\times 1$, USNM 148965c. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701e.]

Calliprotonia species: 10-13, Dorsal, side, ventral, and anterior views of a small, rare specimen, $\times 1$, figured specimen USNM 149684. [Neal Ranch Formation (bed 4), USNM 701d.]

Echinaria cf. *E. moorei* (Dunbar and Condra): 14, Interior of a pedicle valve, $\times 1$, showing the long cardinal process, figured specimen USNM 153841; 15, 16, dorsal and side views of an incomplete specimen, $\times 1$, figured specimen USNM 149689a; 17, ventral view of a pedicle valve, $\times 1$, figured specimen USNM 149689b. [Gaptank Formation USNM 702n.]

PLATE 386.—*Reticulatia*, *Antiquatonia*, *Calliprotonia*, and *Echinaria*

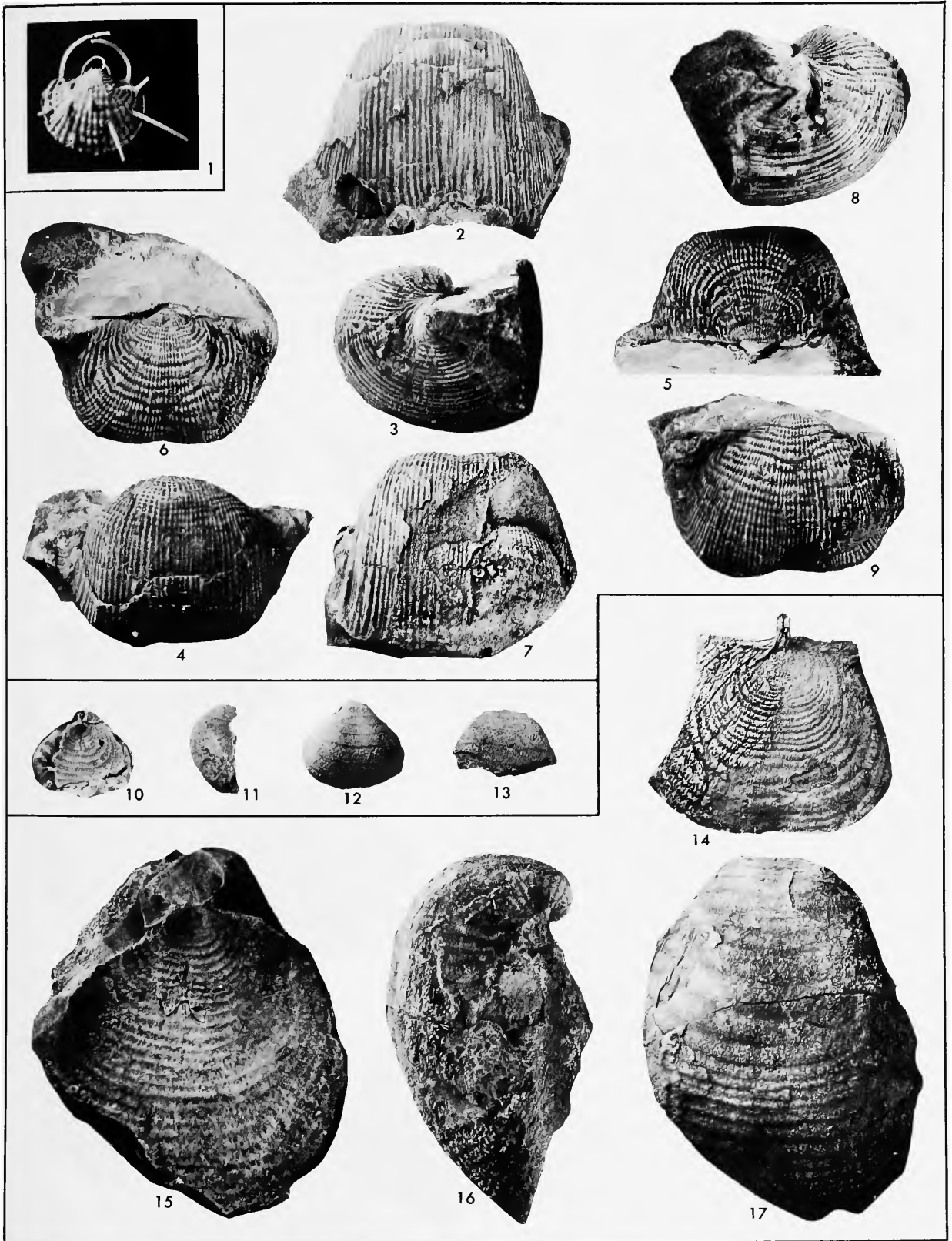


PLATE 387*Spinifrons*

Spinifrons quadrata Stehli: 1, Ventral view of an immature pedicle valve preserving the initial attachment ring, $\times 2$, hypotype USNM 154014a; 2, 3, interior and exterior of an immature brachial valve, $\times 1$, showing open cardinal process, hypotype USNM 154014b; 4, 5, interior and exterior of another pedicle valve slightly larger than the preceding but showing the same features, $\times 1$, hypotype USNM 154014c; 6, 7, exterior and interior of a brachial valve larger than the preceding but with open cardinal process, $\times 1$, hypotype USNM 154014d; 8, exterior of a brachial valve showing spines on the exterior, $\times 1$, hypotype USNM 154014e; 9–12, ventral, side, posterior, and anterior views of a young pedicle valve, $\times 1$, hypotype USNM 154014g; 13–16, posterior, anterior, side, and ventral views of another young pedicle valve, $\times 1$, hypotype USNM 154014j; 17–20, ventral, posterior, side, and anterior views of an adult pedicle valve, $\times 1$, hypotype USNM 154014i; 21–24, posterior, side, anterior, and ventral views of an adult pedicle valve with long, stout spines on the trail, $\times 1$, hypotype USNM 154014k; 25–28, side, posterior, anterior, and ventral views of a large pedicle valve with stout halteroid spines on the trail, $\times 1$, hypotype USNM 154014m. [Bone Spring Formation, USNM 728e.]

PLATE 387.—*Spinifrons*

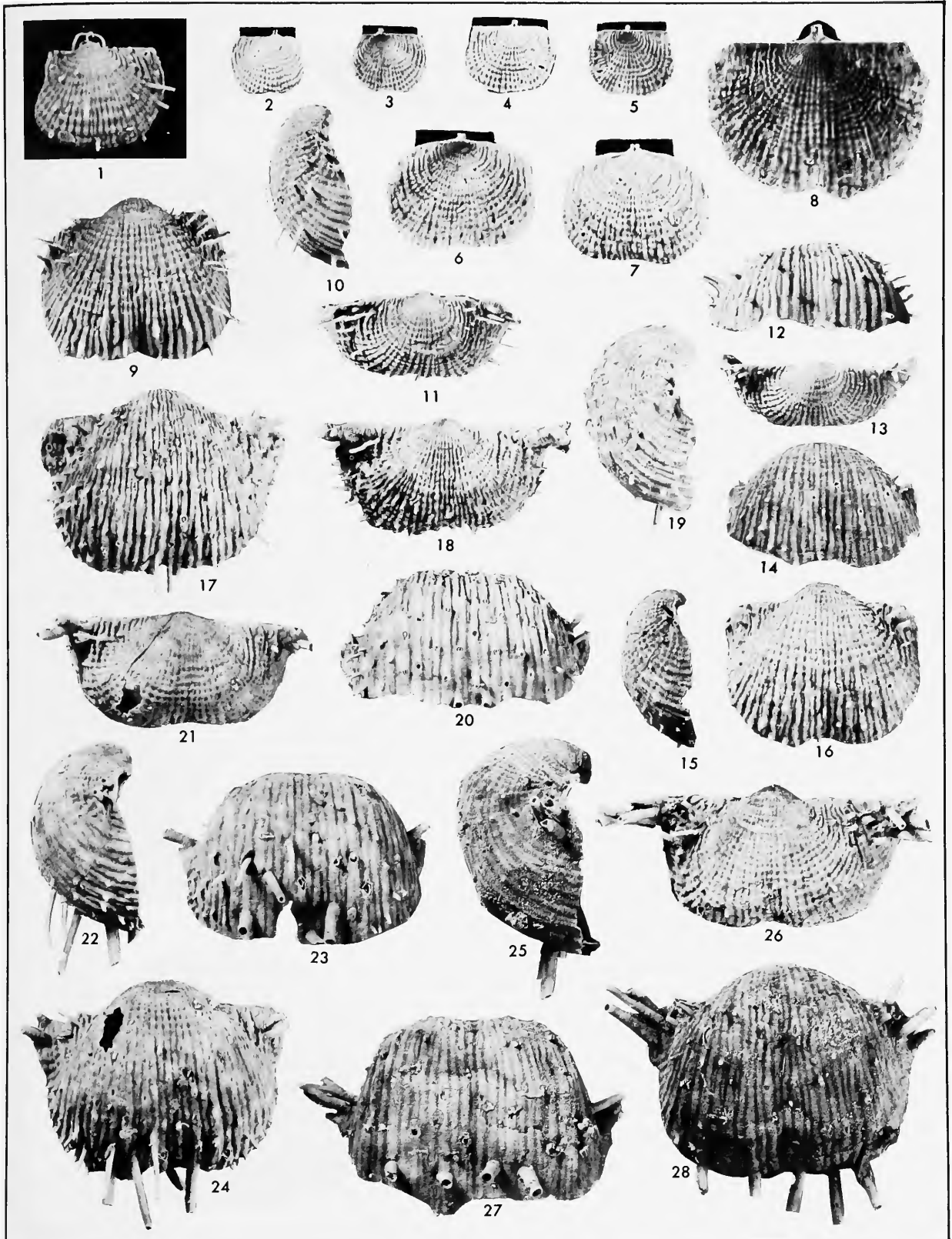


PLATE 388*Spinifrons*

Spinifrons magna, new species: 1, 2, Posterodorsal and interior views of a fragment of the brachial valve, $\times 1$, preserving a young cardinal process, paratype USNM 154011b; 3-5, interior, exterior, anterointerior views of a brachial valve preserving its endospines on the trail and spines on the exterior, $\times 1$, paratype USNM 154013a; 6-8, interior, side, and exterior of a large brachial valve, $\times 1$, showing the brachial ridges and cardinal process shaft solidly filled in, paratype USNM 154013f; 9, 10, exterior and interior of another brachial valve, $\times 1$, showing external spines and solid shaft of cardinal process, paratype USNM 154013c; 11-13, side, ventral, and anterior views of a pedicle valve, $\times 1$, paratype USNM 148932b. [Bone Spring Formation, USNM 728f.]

PLATE 388.—*Spinifrons*

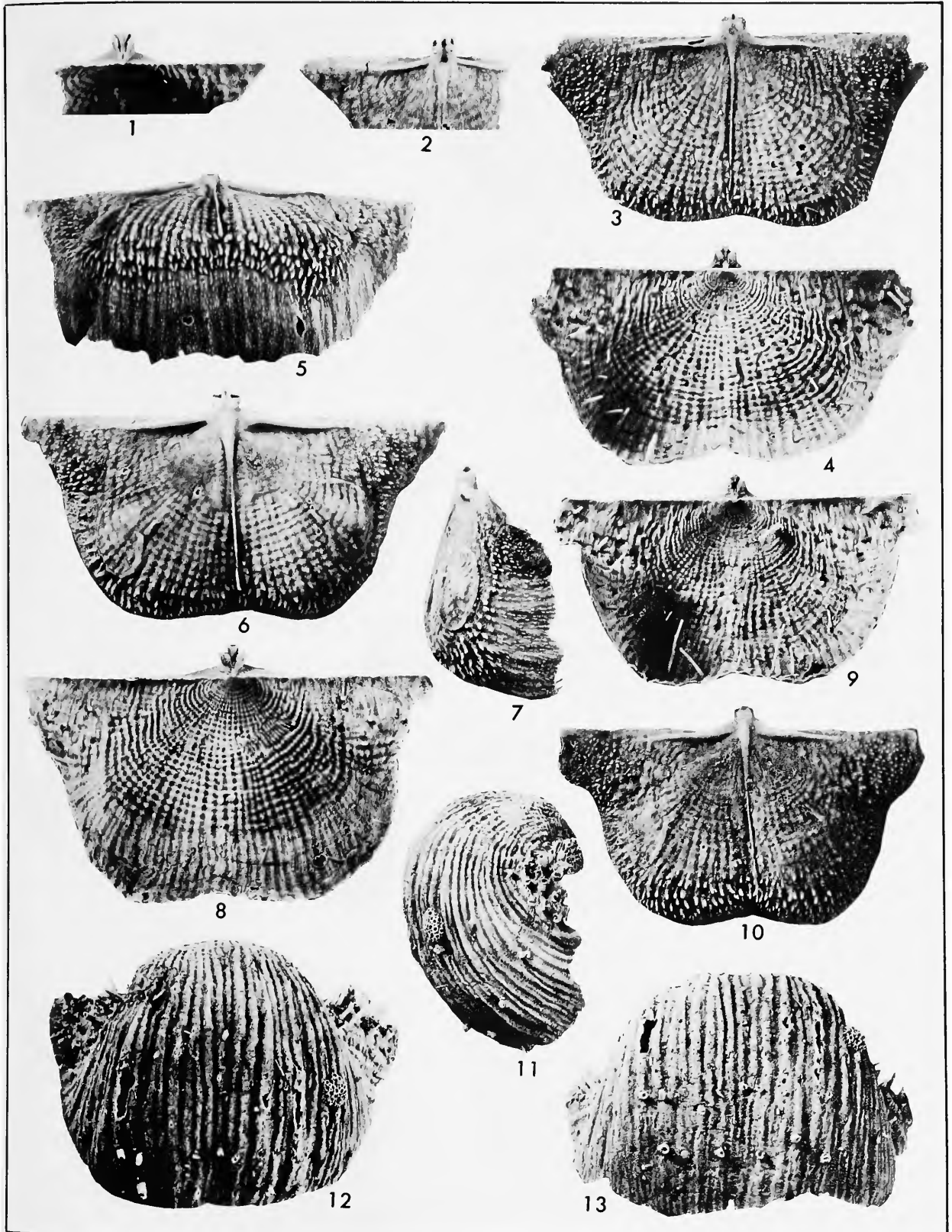


PLATE 389*Spinifrons*

Spinifrons magna, new species: 1-3, Interior, exterior, and posterior views of an immature brachial valve, × 1, showing a juvenile cardinal process, paratype USNM 154011a; 4-7, posterior, side, ventral, and anterior views of a pedicle valve, × 1, showing the large halteroid spines on the trail, paratype USNM 148932c; 8-11, posterior, side, anterior, and ventral views of a large pedicle valve, × 1, paratype USNM 154012a; 12-14, side, posterior and dorsal views of a large complete specimen, × 1, holotype USNM 148932a. [Bone Spring Formation, USNM 728f.]

PLATE 389.—*Spinifrons*

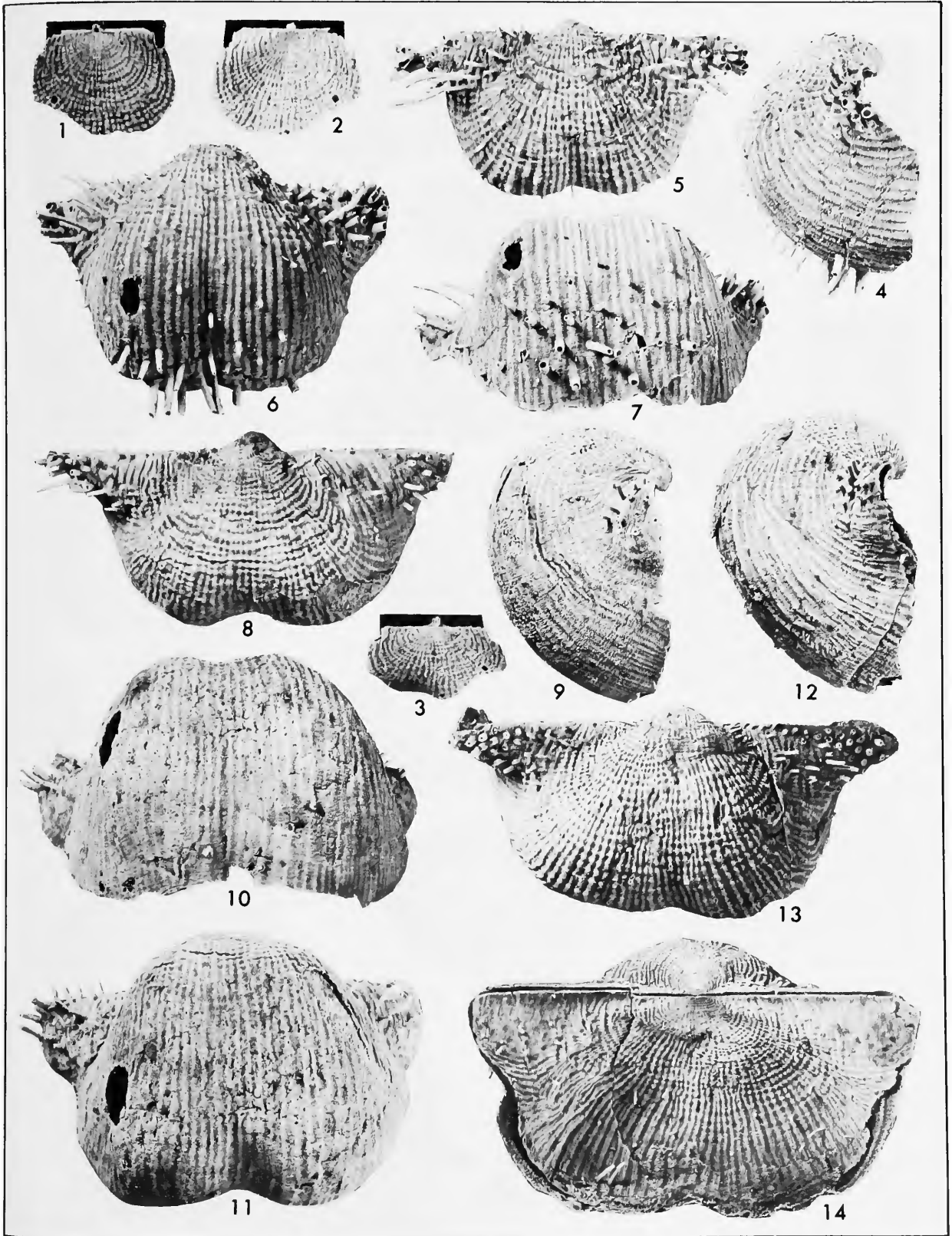


PLATE 390

Spinifrons and *Antiquatonia*

Spinifrons quadrata Stehli: 1-4, Side, anterior, posterior, and ventral views of a young adult, $\times 1$, hypotype USNM 153842a. [Bone Spring Formation, USNM 728h.]

5-7, Posterior, ventral, and side views of a young ventral valve, $\times 1$, hypotype USNM 153843. [Bone Spring Formation, USNM 728e.]

Antiquatonia planumbona Stehli: 8-13, Posterior, anterior, side, ventral, laterally tilted, and dorsal views of a complete specimen, $\times 1$, showing ridge and spine row adjacent to the ear, hypotype USNM 148988a; 14, 15, interior and exterior of a broken brachial valve, $\times 1$, showing brachial ridges and oblique ridge adjacent to the ear, hypotype USNM 148988b; 16, posterior view of the preceding specimen, $\times 2$, showing the myophore of the cardinal process. [Bone Spring Formation, USNM 728f.]

17-21, Posterior, anterior, laterally tilted, side, and ventral views of a pedicle valve, $\times 1$, showing the spine ridge adjacent to the ear, hypotype USNM 148987. [Bone Spring Formation, USNM 728e.]

22, Immature specimen referred to *Antiquatonia planumbona*, $\times 4$, showing initial attachment ring and early spines, hypotype USNM 153844. [Bone Spring Formation AMNH 629.]

PLATE 390.—*Spinifrons* and *Antiquatonia*

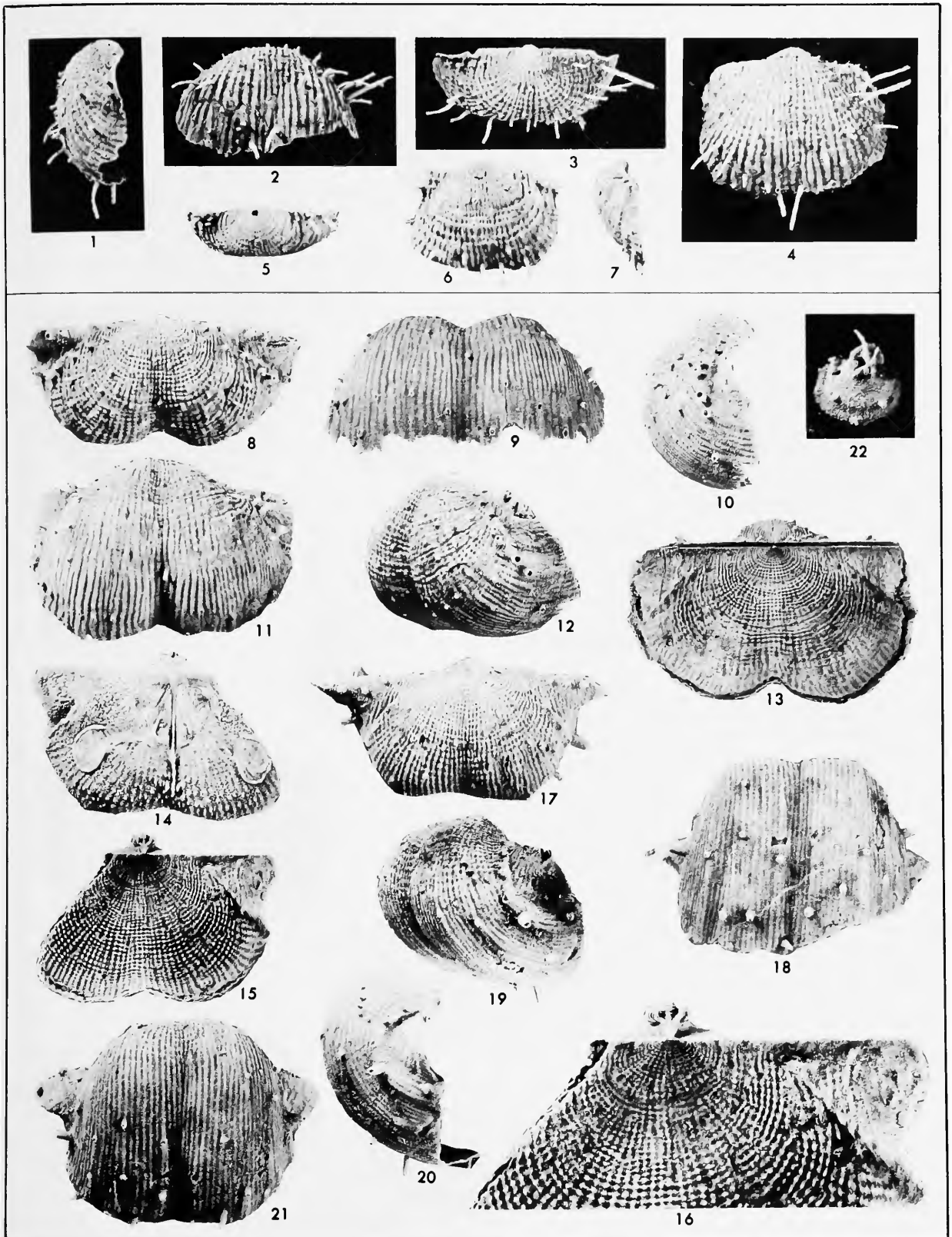


PLATE 391

Antiquatonia

Antiquatonia regularis, new species: 1-5, Ventral, right side, anterior, posterior, and left side views of the holotype, $\times 1$, showing ridge adjacent to ears, USNM 148972a. [Lenox Hills Formation (Ammonite bed), USNM 715.]

Antiquatonia hessensis (R. E. King): 6-9, Ventral, posterior, side, and anterior views, $\times 1$, holotype, YPM 10651 (casts USNM 148982). [Skinner Ranch Formation (base), King locality 160.]

10-13, Anterior, side, ventral, and posterior views of an incomplete specimen, $\times 1$, hypotype USNM 148979; 14, dorsal view of the preceding specimen, $\times 1$, with exterior boundaries restored. [Hess Formation, USNM 719q.]

15-17, Laterally tilted, anterior, and ventral views of the interior of a brachial valve showing the ridge over the ears, $\times 1$, hypotype USNM 148975. [Skinner Ranch Formation (base), USNM 705b.]

PLATE 391.—*Antiquatonia*

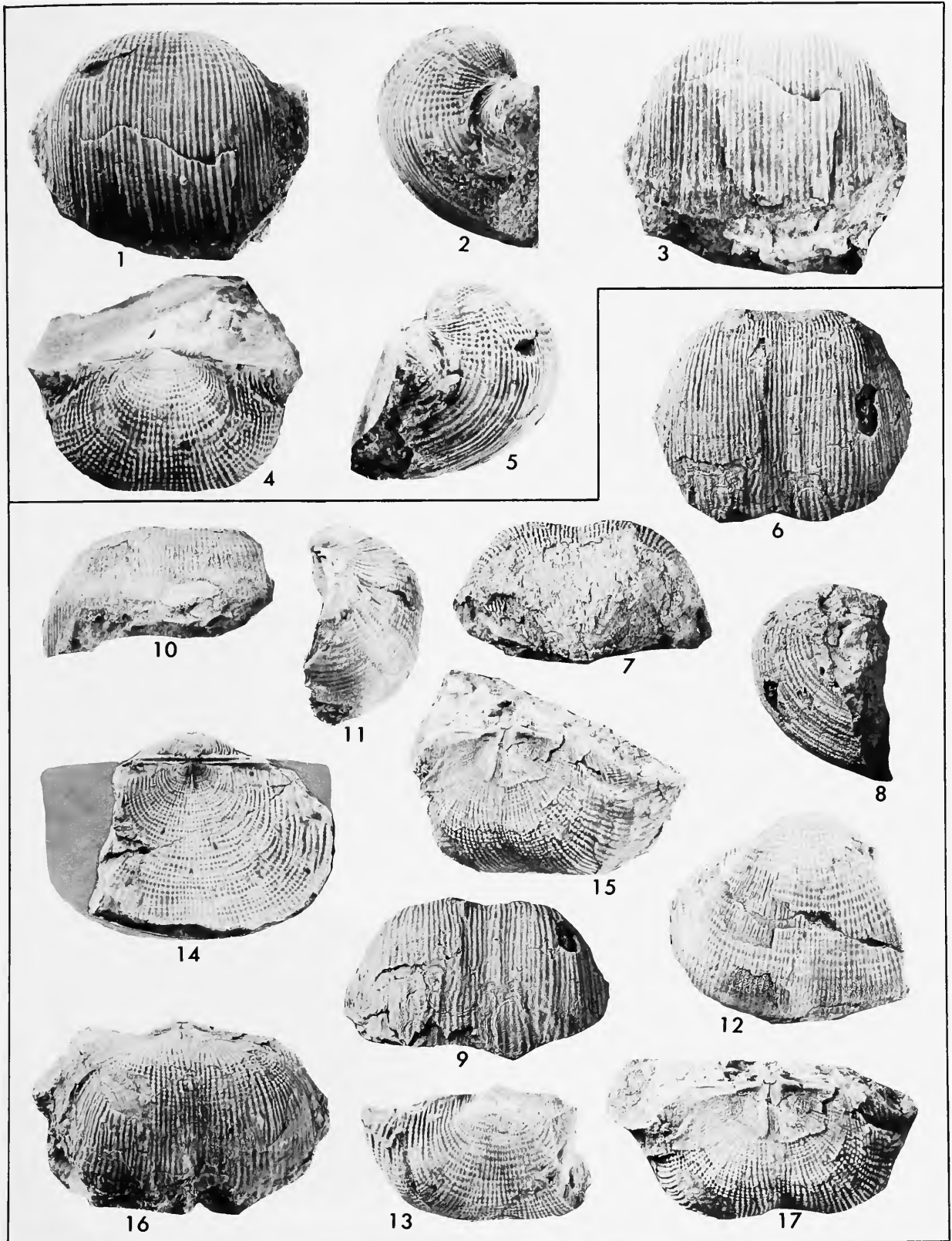


PLATE 392*Reticulatia*

Reticulatia robusta, new species: 1-4, Side, posterior, dorsal, and ventral views, $\times 1$, holotype USNM 148997; 5, 6, dorsal and posterior views of a complete specimen, $\times 1$, paratype USNM 148996. [Neal Ranch Formation (bed 4), USNM 701d.]

Reticulatia species 2: 7-10, Anterior, side, ventral, and posterior views of a large pedicle valve, $\times 1$, figured specimen USNM 149005. [Captank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701p.]

PLATE 392.—*Reticulatia*

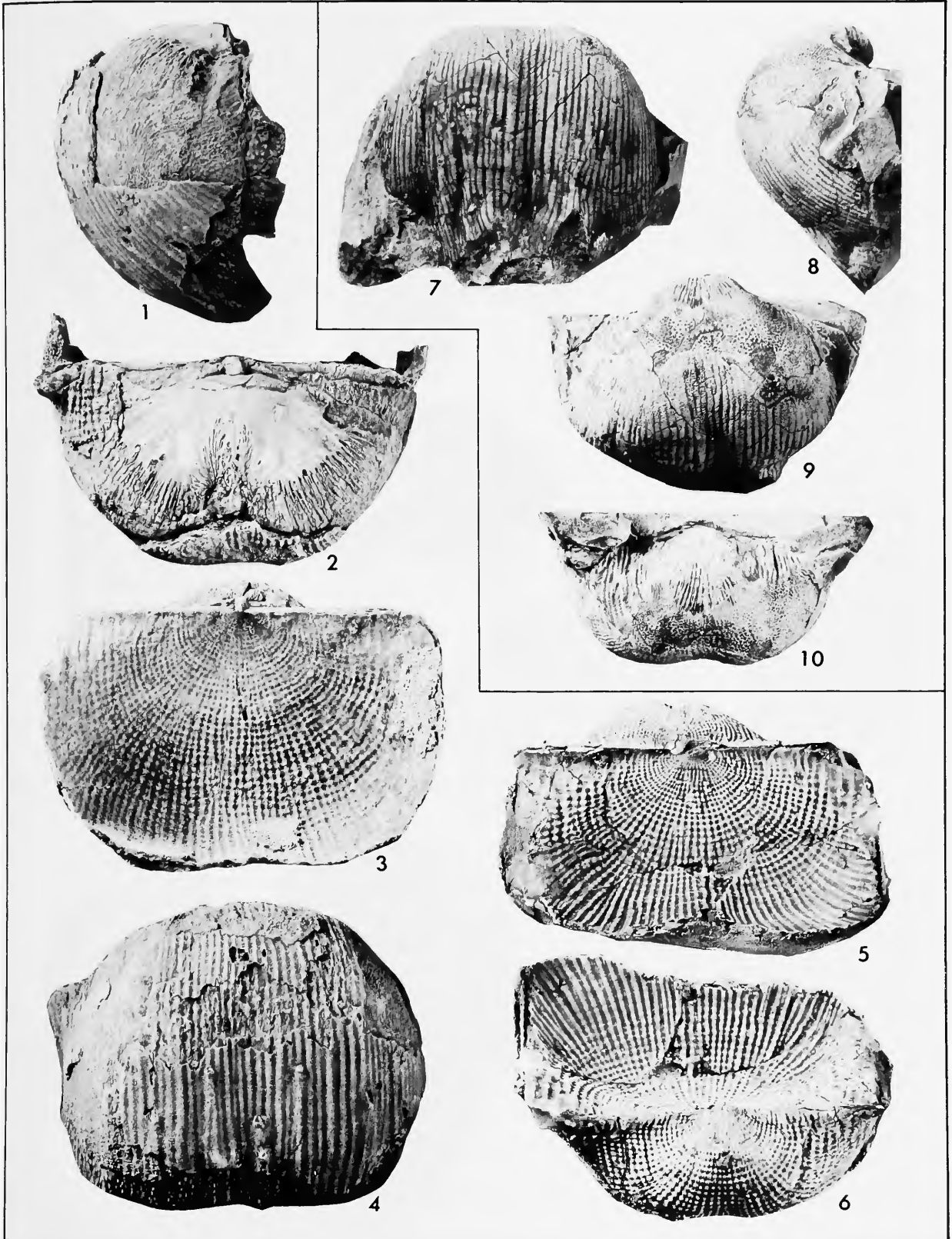


PLATE 393*Reticulatia*

Reticulatia species 1: 1-4, Posterior, ventral, anterior, and side views of a large specimen, $\times 1$, figured specimen USNM 148994a; 5-8, posterior, side, ventral and anterior views of a large pedicle valve, $\times 1$, figured specimen USNM 148994b. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701c.]

9, 10, Side and dorsal views of a specimen with both valves, $\times 1$, figured specimen 149018. [Lenox Hills Formation, USNM 731i.]

PLATE 393.—*Reticulatia*

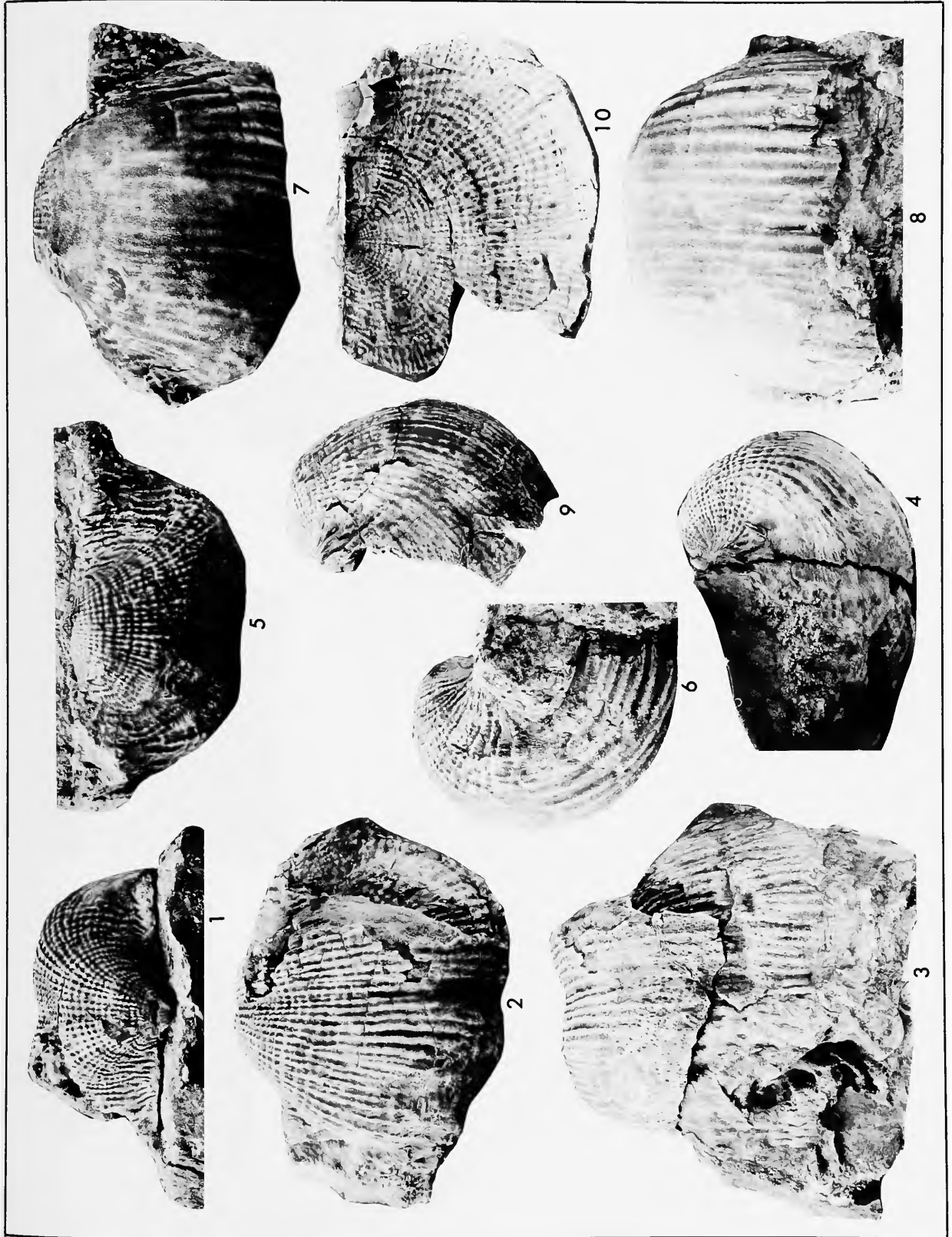


PLATE 394*Peniculauris*

Peniculauris subcostata (R. E. King) : 1, 2, Exterior of a brachial valve, $\times 1$, $\times 2$, showing fine spines, hypotype USNM 148810. [Cathedral Mountain Formation, USNM 703b.]

3, Interior of a fragmentary pedicle valve, $\times 1$, showing thickened adductor ridge and muscle scars, hypotype USNM 152754c; 4-7, ventral, posterior, side, and anterior views of a large pedicle valve, $\times 1$, hypotype USNM 152754b. [Cathedral Mountain Formation, USNM 724i.]

8, Exterior of a pedicle valve, $\times 1$, showing the brush of spines on the ear, paratype of *Peniculauris mckeei* Muir-Wood and Cooper, USNM 123446d. [Cathedral Mountain Formation, USNM 702.]

9, 10, Ventral and dorsal views of an imperfect specimen, $\times 1$, $\times 2$, holotype YPM 11837. [Cathedral Mountain Formation, R. E. King locality 123.]

11, Posterior view of the supposed "cardinal area" (= ginglymus), $\times 2$, paratype T10155a; 12, interior of another fragment, showing part of muscle scar and "cardinal area" (= ginglymus), $\times 2$, paratype T10155b. [Cathedral Mountain Formation, R. E. King locality 119.]

PLATE 394.—*Peniculauris*

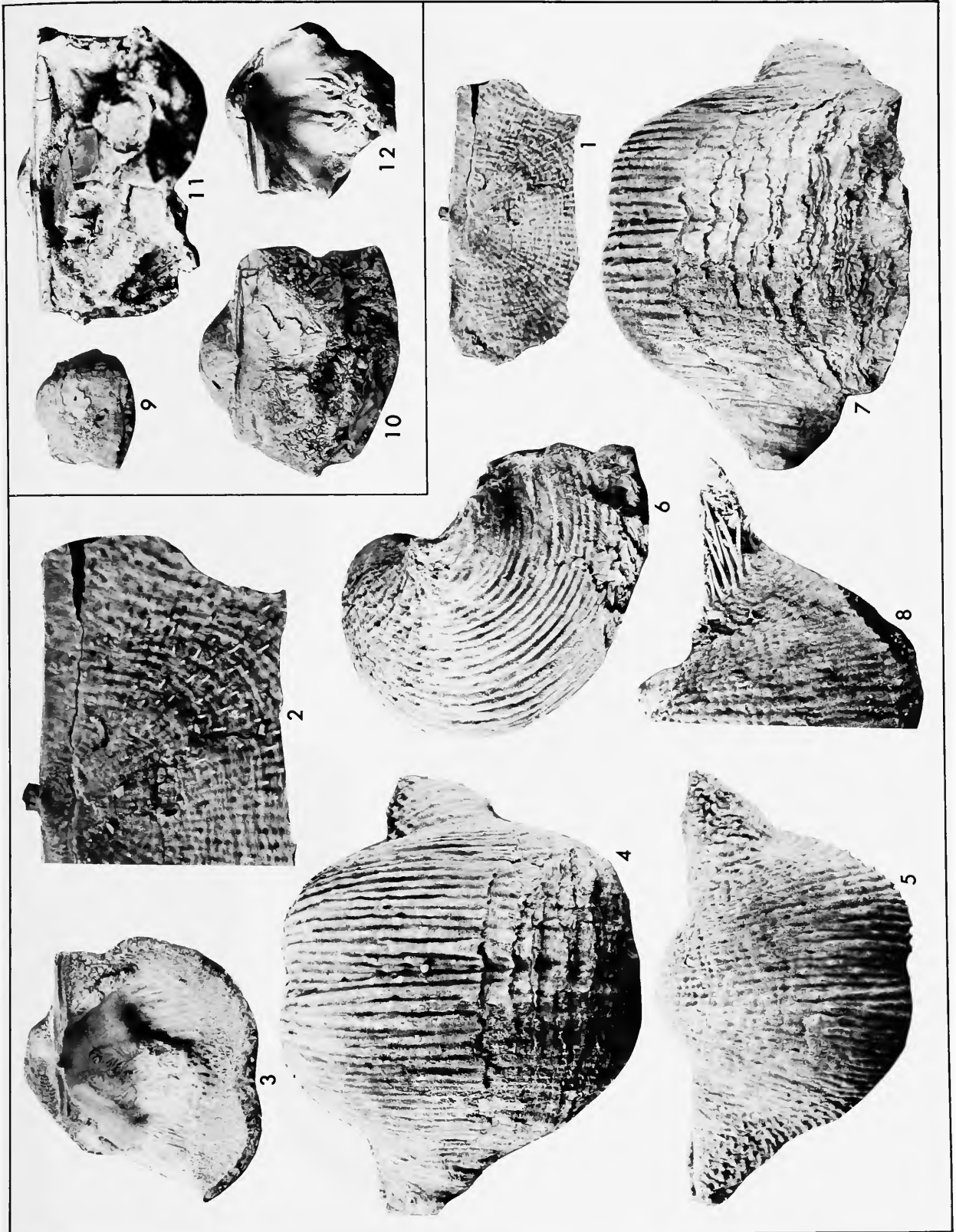


PLATE 395*Peniculauris*

Peniculauris subcostata (R. E. King) : 1, 2, Posterior and ventral views of a pedicle valve with spine-tufted ears, $\times 1$, hypotype USNM 148791. [Cathedral Mountain Formation, USNM 703b.]

3, 4, Side and ventral views of another pedicle valve, $\times 1$, paratype of *P. mckeei* USNM 123446a; 5-8, side, posterior, ventral, and dorsal views of the holotype of *P. mckeei* Muir-Wood and Cooper, $\times 1$, USNM 123445; 9, 10, interior and posterodorsal views of the brachial valve showing the cardinal process, $\times 1$, paratype of *P. mckeei* USNM 123446d (for pedicle valve interior see plate 396: figure 8, [Cathedral Mountain Formation, USNM 702.]

PLATE 395.—*Peniculauris*

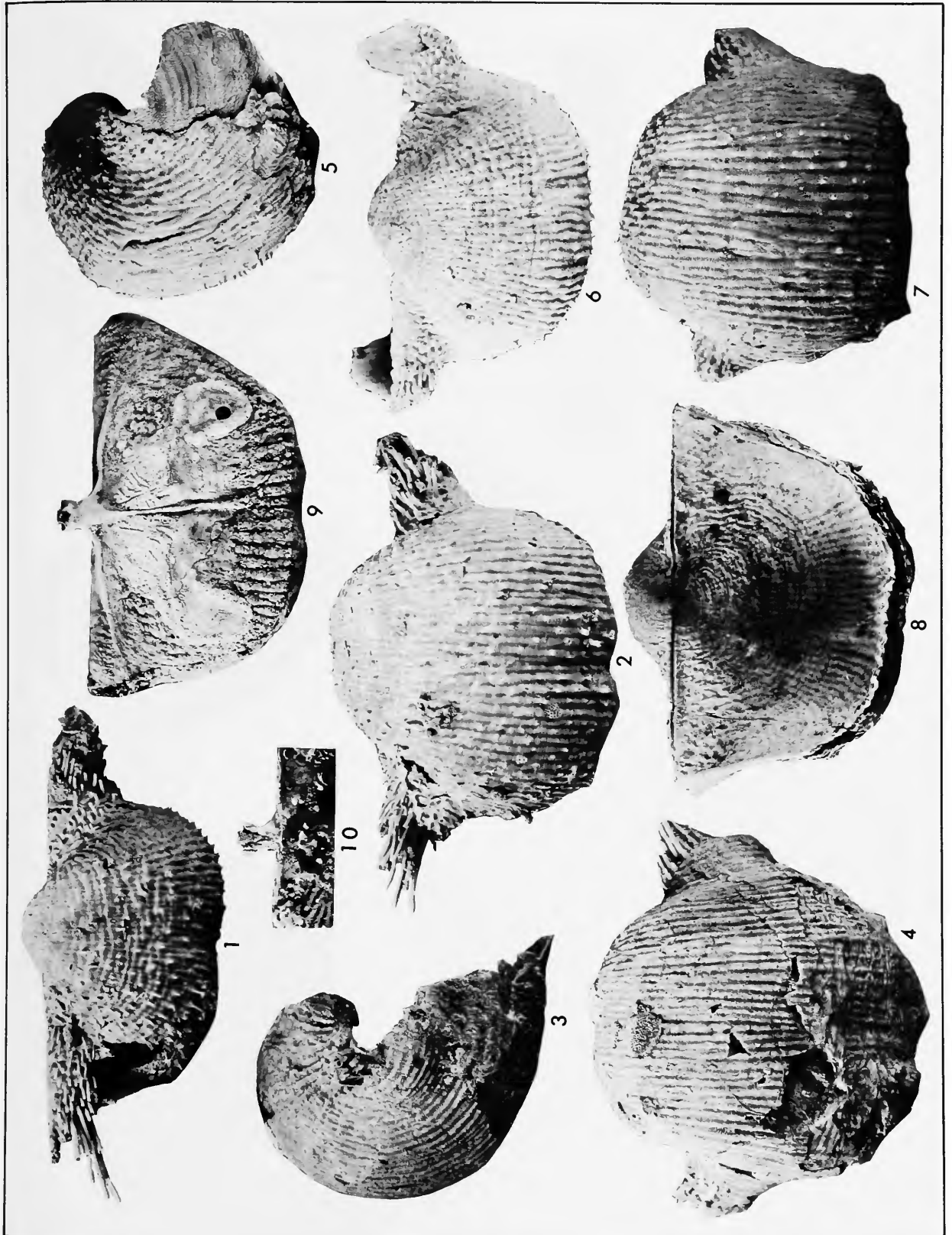


PLATE 396*Peniculauris*

Peniculauris subcostata (R. E. King): 1, 2, Dorsal and side views, $\times 1$, of a complete specimen, hypotype USNM 123446c (= 152753); 3-5, interior, dorsal, and side views of the preceding specimen, $\times 1$, showing brachial ridges, thickened brevisseptum and cardinal process; 6, myophore of the preceding specimen, $\times 2$. [Cathedral Mountain Formation, USNM 702un.]

7, Exterior of a brachial valve, $\times 1$, showing the fine ornament spines, hypotype USNM 148802a; 8, interior of a pedicle valve, $\times 1$, showing muscle scars, paratype of *P. mckeei* USNM 123446d (for brachial valve interior of the specimen, see plate 395: figures 9, 10). [Cathedral Mountain Formation, USNM 702.]

9, Interior of a brachial valve, $\times 1$, showing cardinal process, brevisseptum extended by thickening to the cardinal process, and the large brachial ridges, hypotype USNM 148789; 10, myophore, $\times 2$, of the preceding brachial valve. [Cathedral Mountain Formation, USNM 703b.]

PLATE 396.—*Peniculauris*

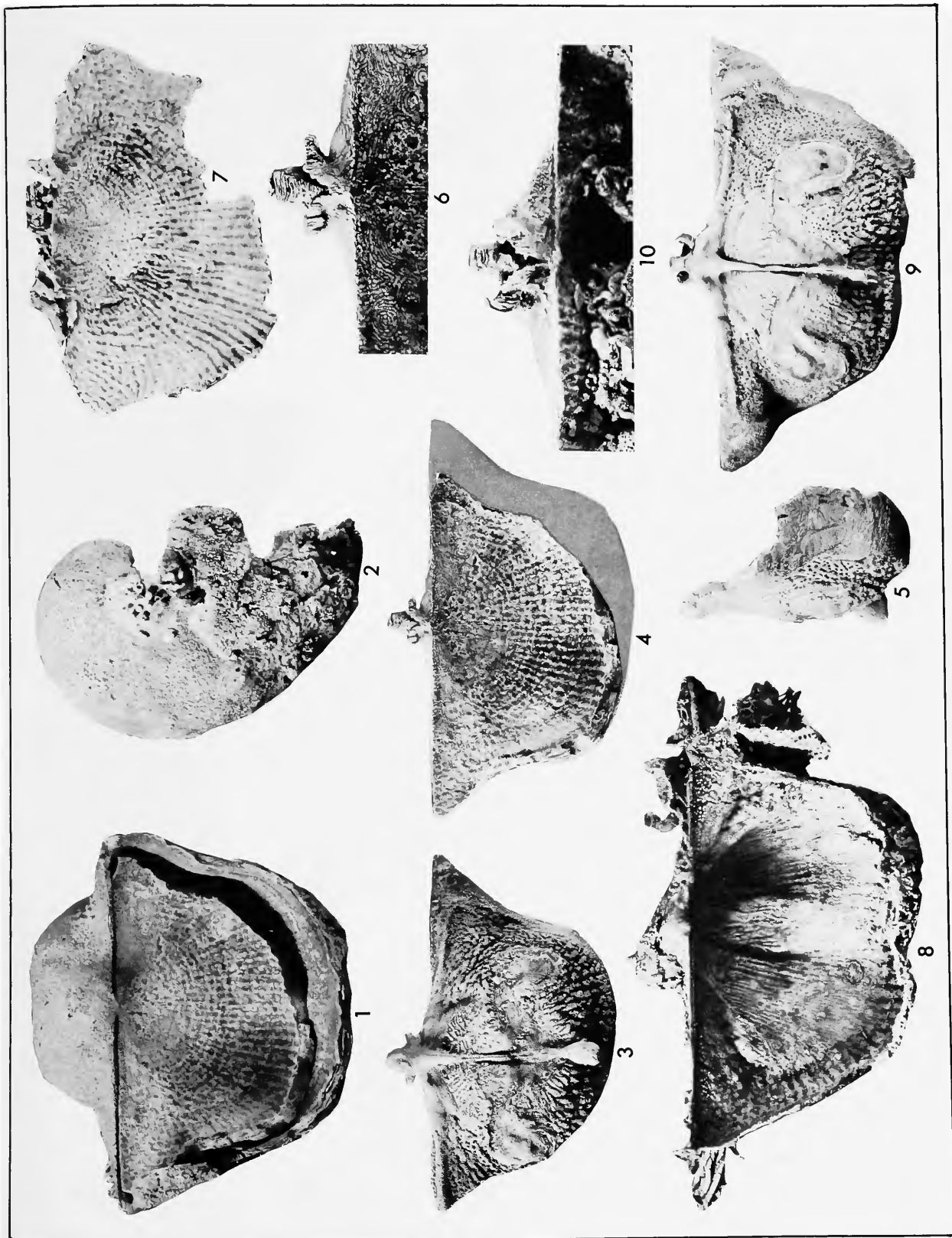


PLATE 397*Peniculauris*

Peniculauris subcostata (R. E. King): 1–5, Posterior, ventral, anterior, side, and dorsal views of a complete specimen, × 1, hypotype USNM 153993; 6, 7, side and interior views of the brachial valve of the preceding specimen, × 1; 8, myophore of the cardinal process, × 2, of the preceding specimen. [Cathedral Mountain Formation, USNM 703b.]

Peniculauris ivesi (Newberry): 9–12, Side, posterior, dorsal, and ventral views of a worn and imperfect specimen, × 1, lectotype USNM 5356a; 13, interior of the brachial valve, × 1, paratype USNM 5356b. [Kaibab Formation, Banks of the Colorado River, near the mouth of Diamond Creek, Grand Canyon of the Colorado, Arizona, according to Newberry (1861). The label with the specimens (probably correct) reads: "Mesa west of Little Colorado (Camp 70)."]

PLATE 397.—*Peniculauris*

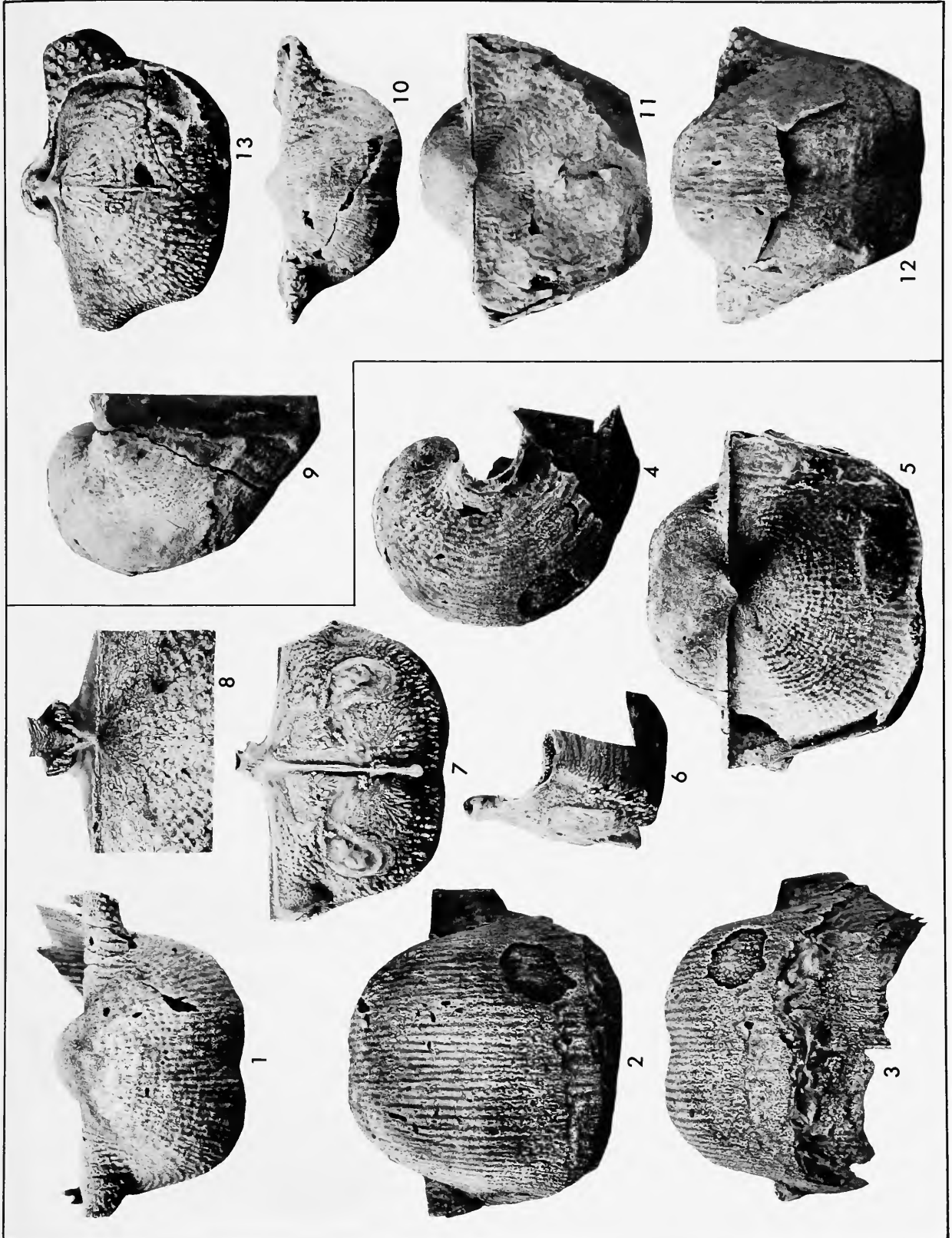


PLATE 398*Peniculauris*

Peniculauris subcostata (R. E. King): 1-5, Dorsal, ventral, side, anterior, and posterior views, $\times 1$, showing part of the spine tuft, hypotype USNM 148809. Cathedral Mountain Formation, USNM 703a¹.]

6, 7, Posterior and ventral views of a pedicle valve, $\times 1$, retaining part of the spine tufts on the ears, hypotype USNM 153994a; 8, 9, interior and exterior of a large brachial valve, $\times 1$, hypotype USNM 153994b (note sponge spicules, a possible source of silica, covering part of the exterior); 10, posterior view of the preceding specimen, $\times 2$, showing the cardinal process, which is in a juvenile condition. [Cathedral Mountain Formation, USNM 721u.]

11, Interior of a pedicle valve, $\times 1$, showing large adductor platform, hypotype USNM 148785. [Cathedral Mountain Formation, USNM 702.]

PLATE 398.—*Peniculauris*

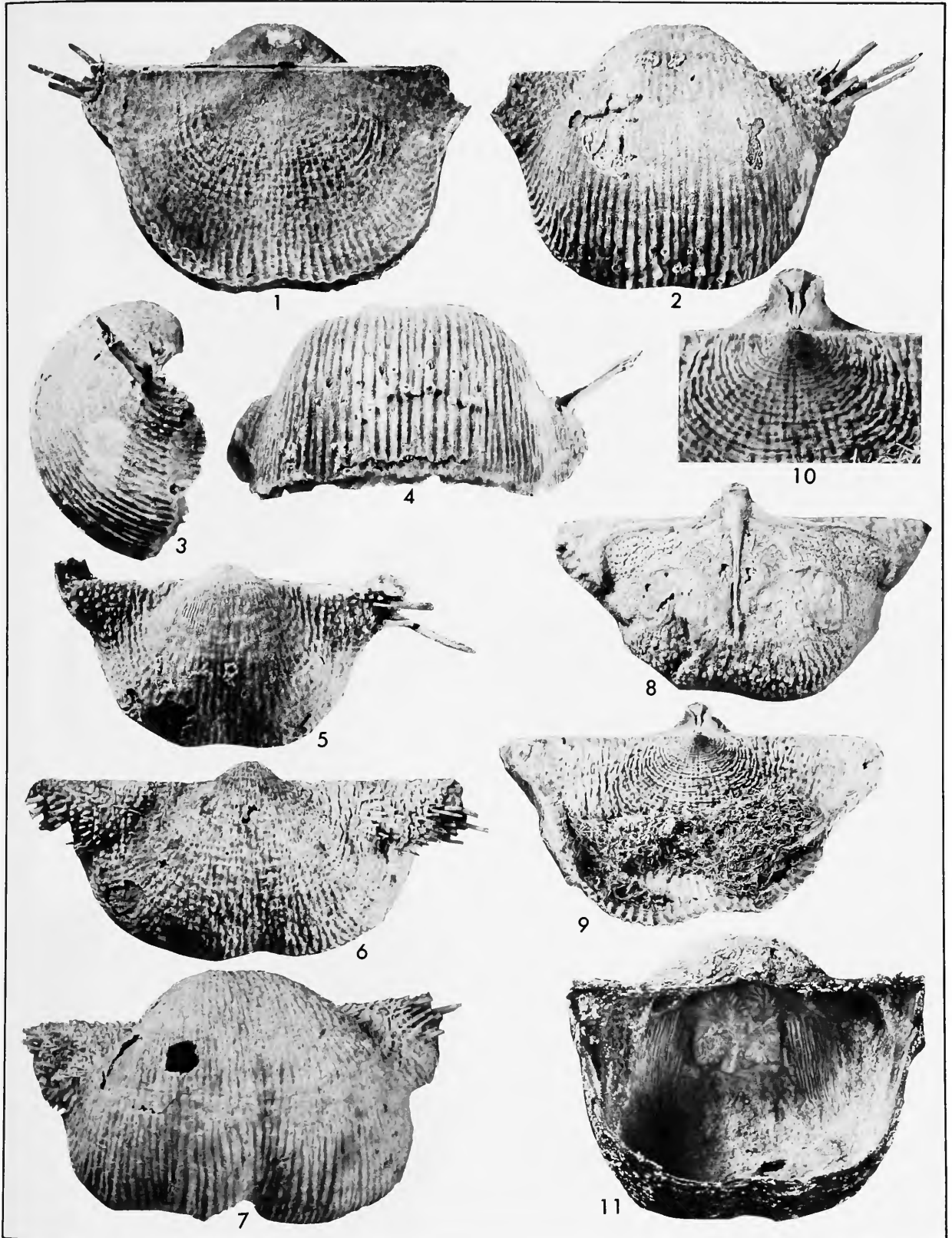


PLATE 399*Peniculauris*

Peniculauris costata, new species: 1, Interior of the brachial valve, \times 1, showing cardinal process and brachial ridges, paratype USNM 148829 (for pedicle valve, see plate 400: figures 6–10). [Road Canyon Formation, USNM 703.]

2, 3, Ventral and side views of a fragment of the pedicle valve showing the small ornament spines, \times 1, paratype USNM 148831d; 4–6, ventral, side, and dorsal views of a specimen with both valves, \times 1, holotype USNM 148831c; 7, interior of the holotype \times 1, showing cardinal process and brachial ridges. [Road Canyon Formation, USNM 703d.]

8–10, Posterior, dorsal, and ventral views of a large, worn and imperfect individual, \times 1, paratype USNM 148832. [Road Canyon Formation, USNM 707e.]

PLATE 399.—*Peniculauris*

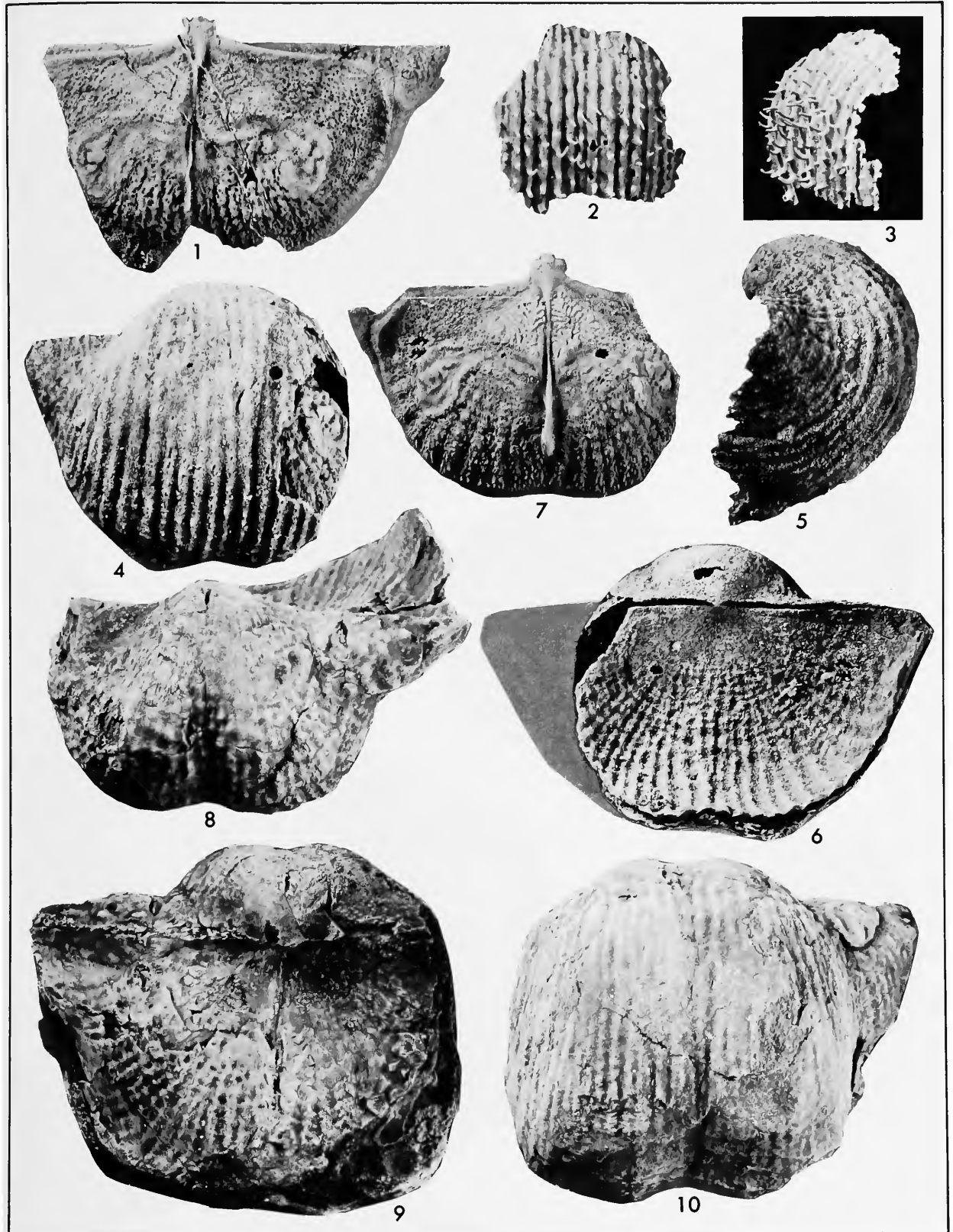


PLATE 400*Peniculauris*

Peniculauris costata, new species: 1-5, Side, ventral, anterior, posterior, and dorsal views, $\times 1$, of a young individual, paratype USNM 148830. [Road Canyon Formation, USNM 703c.]

6-10, Posterior, side, interior, ventral, and anterior views of a large pedicle valve, $\times 1$, paratype USNM 148829 (for dorsal interior, see plate 399: figure 1). [Road Canyon Formation, USNM 703.]

PLATE 400.—*Peniculauris*

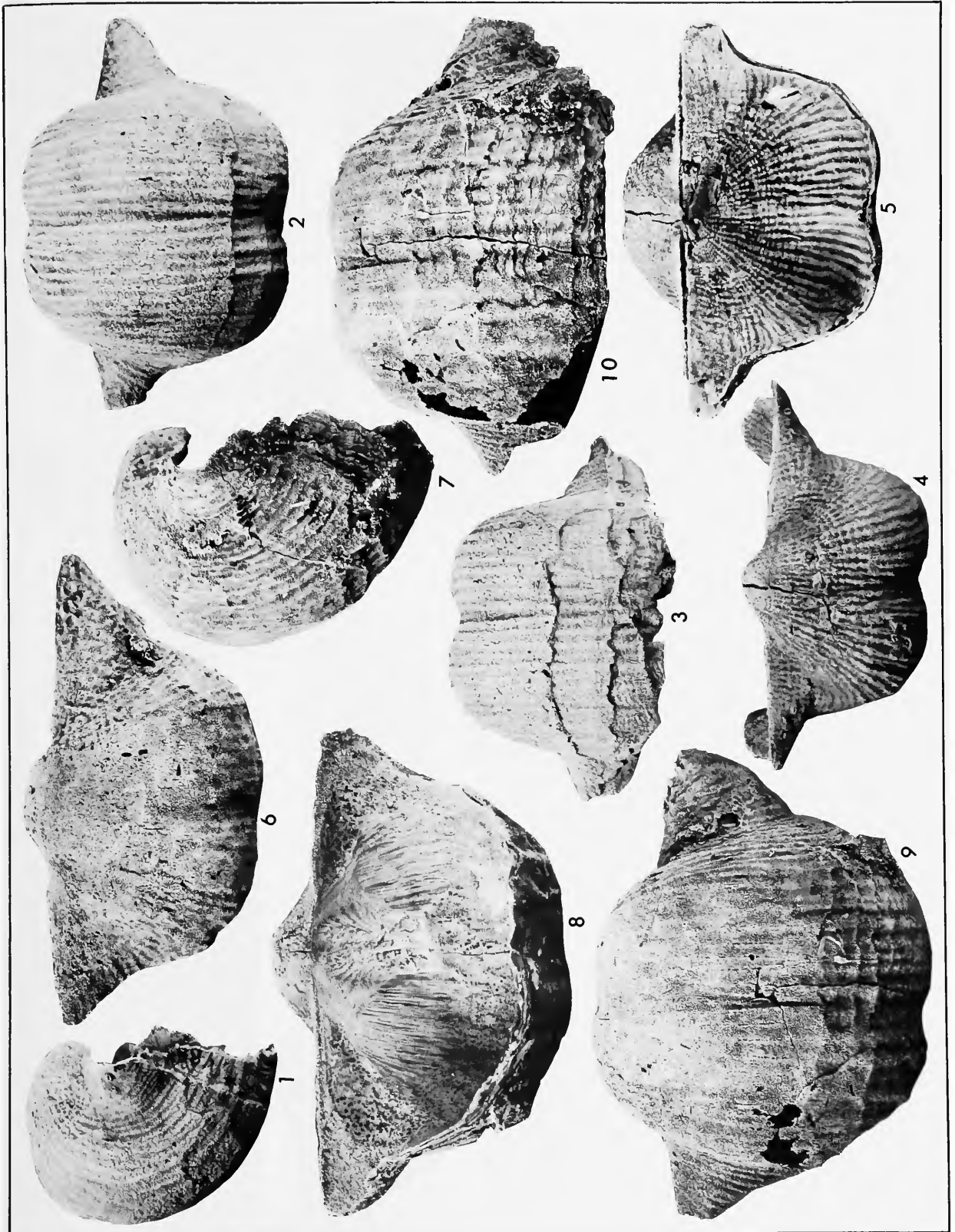


PLATE 401

Peniculauris

Peniculauris costata, new species: 1, 2, Ventral and posterior views of a fragmentary pedicle valve, $\times 1$, showing the short body spines, paratype USNM 148831a; 7, cardinal process, $\times 2$, of the brachial valve of the holotype USNM 148831c (for interior view of this specimen, see plate 399: figure 7); 8, interior of a fragmentary pedicle valve, $\times 1$, showing adductor platform, paratype USNM 148831b. [Road Canyon Formation, USNM 703d.]

3–6, Ventral, dorsal, posterior, and anterior views of a complete but young specimen, $\times 1$, paratype USNM 148833. [Road Canyon Formation, USNM 707e.]

Peniculauris imitata, new species: 9, Posterior of a large pedicle valve, showing its ear spines, $\times 1$, paratype USNM 148792a. [Hess Formation (Taylor Ranch Member), USNM 702d.]

10–12, Posterior, side, and ventral views of a large pedicle valve, $\times 1$, holotype USNM 148823b. [Hess Formation (Taylor Ranch Member), USNM 716o.]

13, Interior of the brachial valve, $\times 1$, paratype USNM 148826a. [Hess Formation (Taylor Ranch Member), USNM 722p.]

PLATE 401.—*Peniculauris*

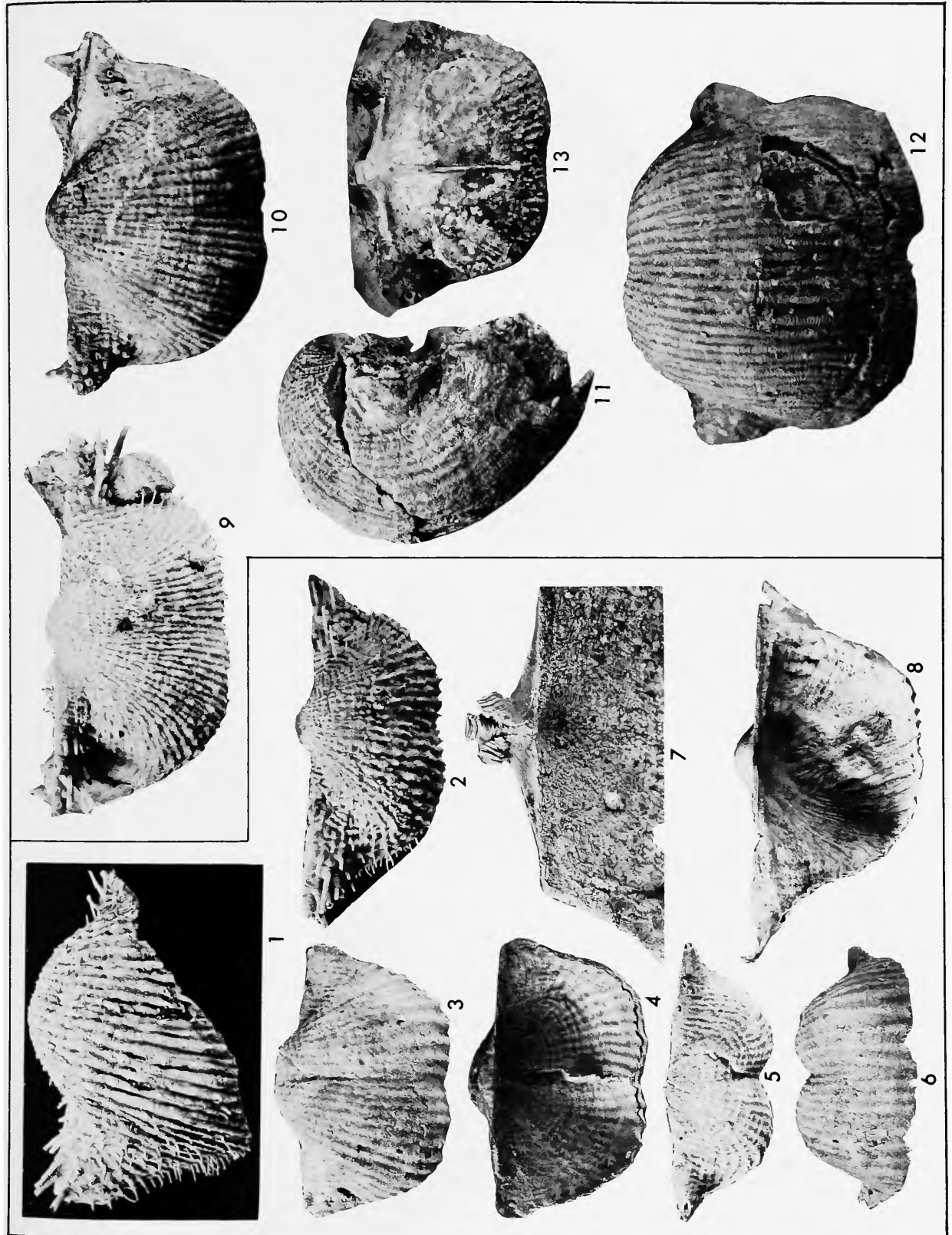


PLATE 402*Peniculauris*

Peniculauris imitata, new species: 1, 2, Interior and exterior of a brachial valve, $\times 1$, paratype USNM 153995b; 3, posterior of the preceding specimen, $\times 2$, showing the myophore; 6-8, posterior, ventral, and side views of a large pedicle valve, $\times 1$, paratype USNM 148792b. [Hess Formation (Taylor Ranch Member), USNM 702d.]

4, 5, Side and ventral views of the internal mold of a pedicle valve, showing the muscle scars, $\times 1$, paratype USNM 148798a, 9-12, ventral, anterior, side, and posterior views of a young narrow, pedicle valve, $\times 1$, paratype USNM 148798b. [Hess Formation (Taylor Ranch Member), USNM 702f.]

PLATE 402.—*Peniculauris*

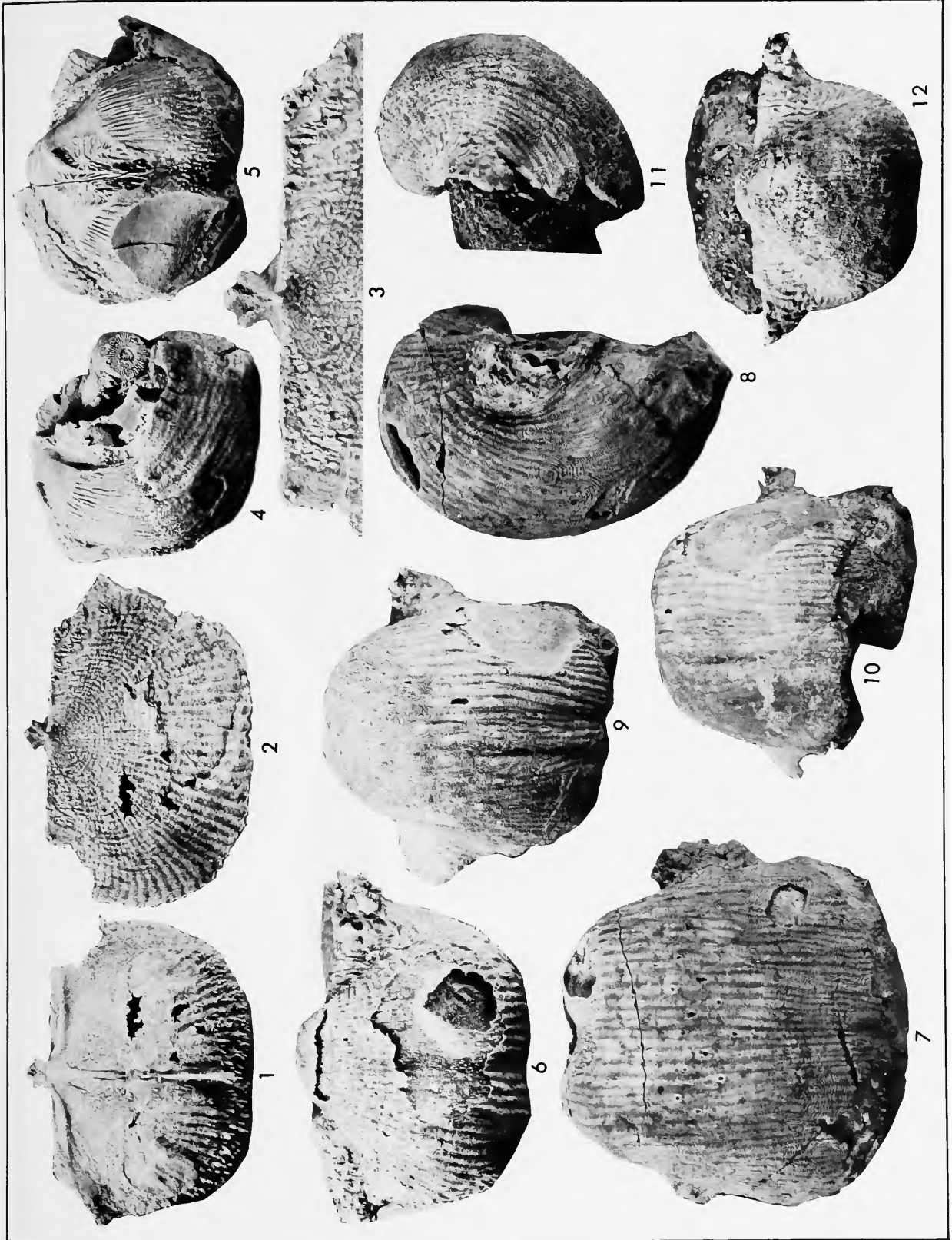


PLATE 403*Peniculauris*

Peniculauris transversa, new species: 1-5, Dorsal, posterior, anterior, side, and ventral views of a young specimen, $\times 1$, paratype USNM 148835e; 6-10, side, dorsal, posterior, anterior, and ventral views, $\times 1$, holotype USNM 148835a; 11, interior of a brachial valve showing cardinal process and brachial ridges, $\times 1$, paratype USNM 148835b; 12, side view of a young adult, $\times 1$, showing the brush of spines on the ear, paratype USNM 148835f (for another view of this specimen, see plate 404: figure 10). [Road Canyon Formation, (base) USNM 702c.]

PLATE 403.—*Peniculauris*

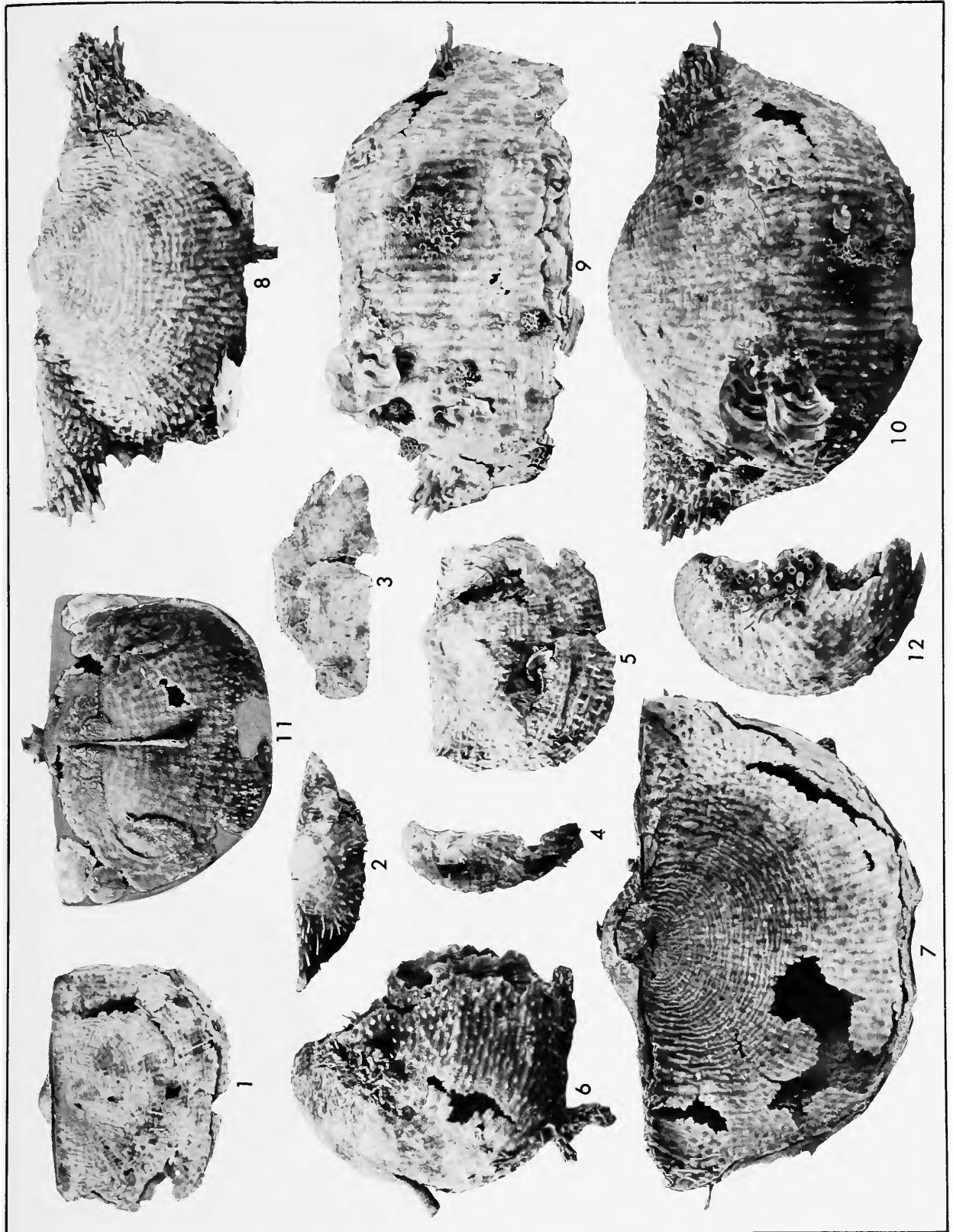


PLATE 404*Peniculauris*

Peniculauris transversa, new species: 1-4, Ventral, posterior, side, and dorsal views of a young adult, × 1, paratype USNM 148835d; 5-9, posterior, ventral, anterior, dorsal and side views of a large, much encrusted specimen, × 1, paratype USNM 148835c; 10, ventral view of a specimen, showing the spine brush on the car and short body spines, × 1, paratype USNM 148835f (for an additional view of this specimen, see plate 403: figure 12). [Road Canyon Formation, USNM 702c.]

PLATE 404.—*Peniculauris*

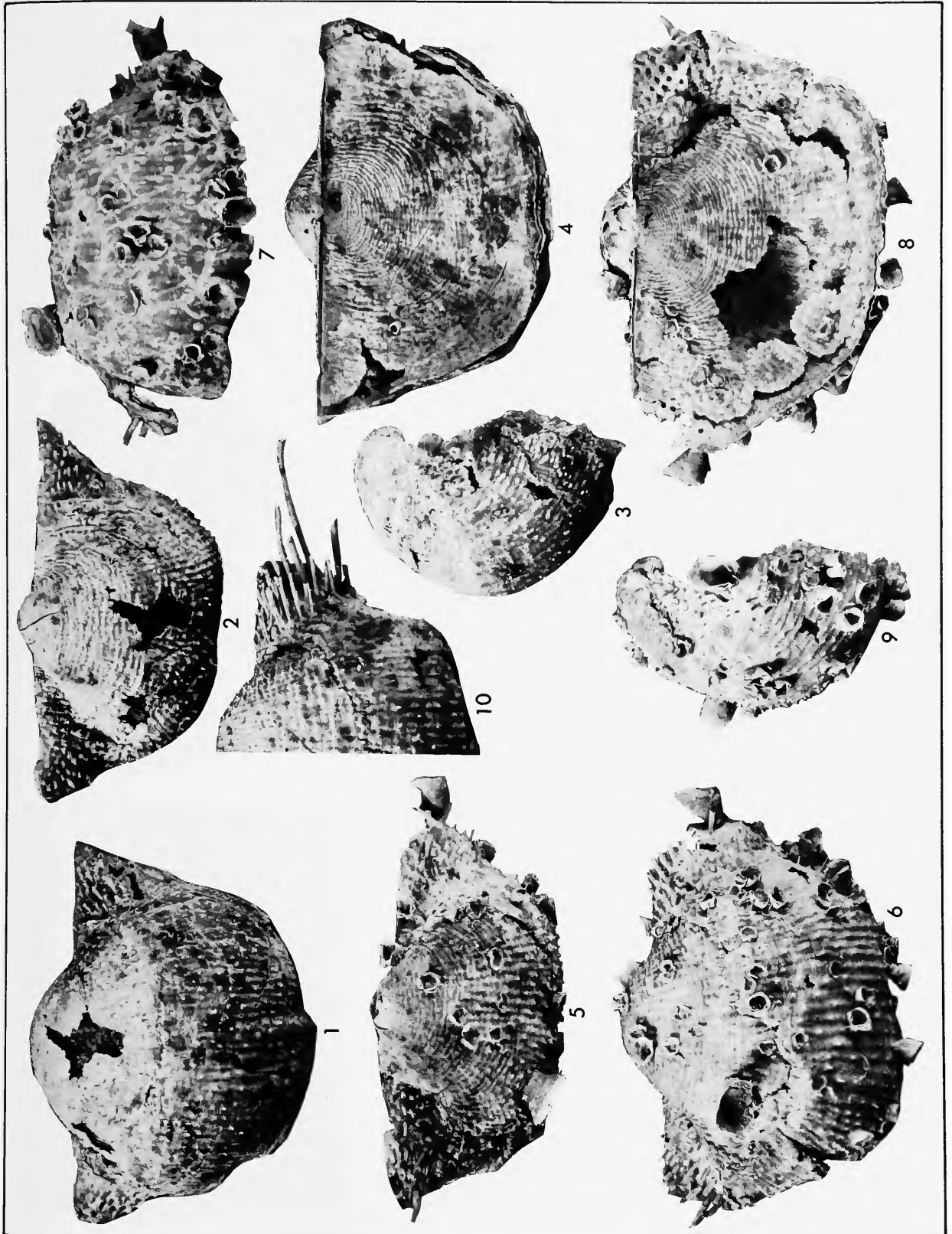


PLATE 405*Peniculauris*

Peniculauris transversa, new species: 1-5, Ventral, dorsal, anterior, posterior, and side views of a large pedicle valve, $\times 1$, paratype USNM 148837b; 6, dorsal view of the cardinal process, $\times 2$, paratype USNM 148837c (for interior and exterior, see plate 406: figures 10, 11). [Road Canyon Formation, USNM 721o.]

7-11, Anterior, posterior, ventral, side, and dorsal views of a complete specimen, $\times 1$, showing the short and delicate ornament spines, $\times 1$, paratype USNM 153996. [Road Canyon Formation, USNM 721s.]

PLATE 405.—*Peniculauris*

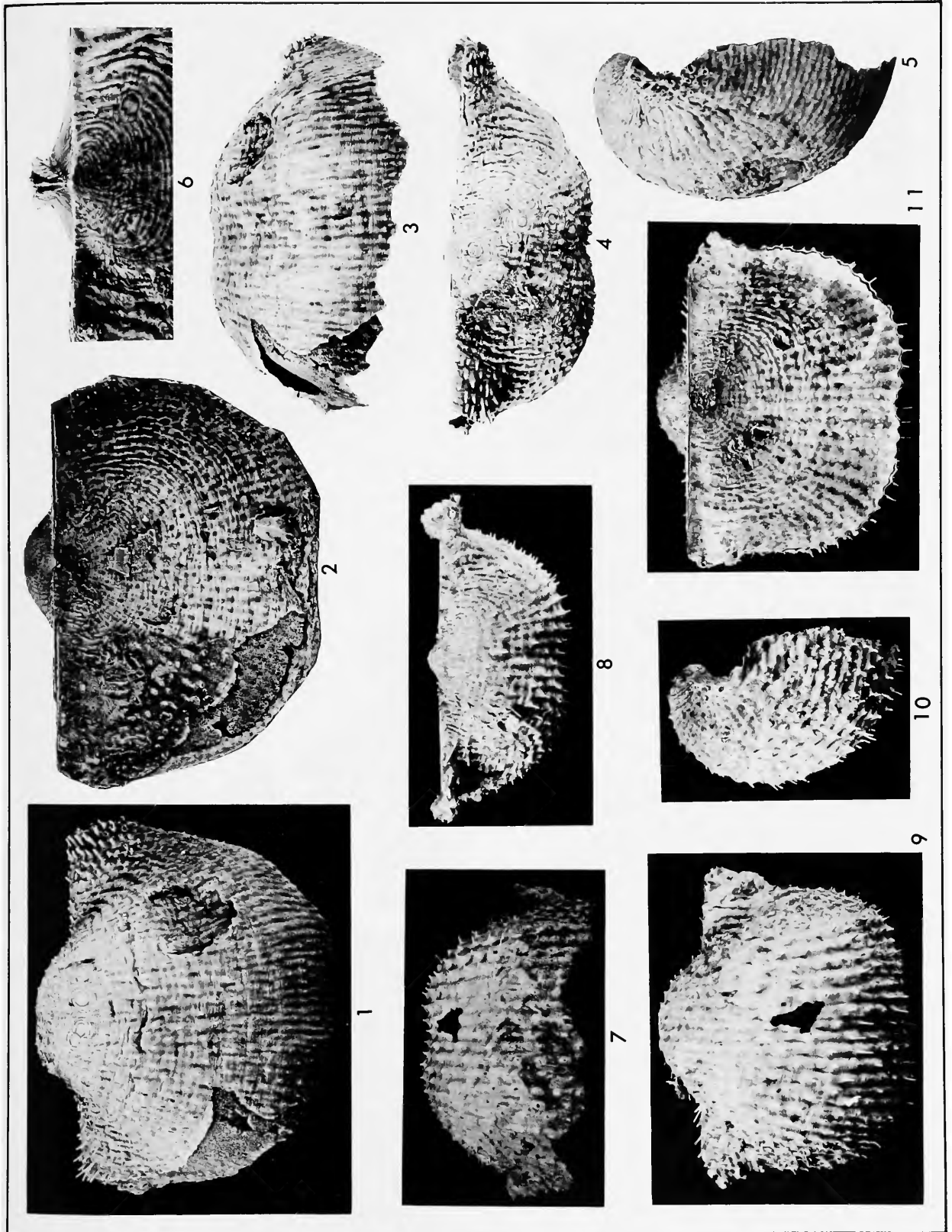


PLATE 406*Peniculauris*

Peniculauris peniculifera, new species: 1-3, Dorsal, ventral, and side views of the holotype, $\times 1$, USNM 148840a; 4, 5, side and interior views of the brachial valve of the holotype, $\times 1$; 6, myophore of the cardinal process of the holotype, $\times 2$; 7, 8, exterior and interior of another brachial valve, $\times 1$, paratype USNM 148840b; 9, ventral view of a young pedicle valve, showing the numerous, slender body spines, $\times 1$, paratype USNM 153997. [Road Canyon Formation (base), USNM 703a.]

Peniculauris transversa, new species: 10, 11, Exterior and posterior part of a brachial valve, $\times 1$, paratype USNM 148837e (for posterior view see plate 405: figure 6). [Road Canyon Formation (base), USNM 702c.]

PLATE 406.—*Peniculauris*

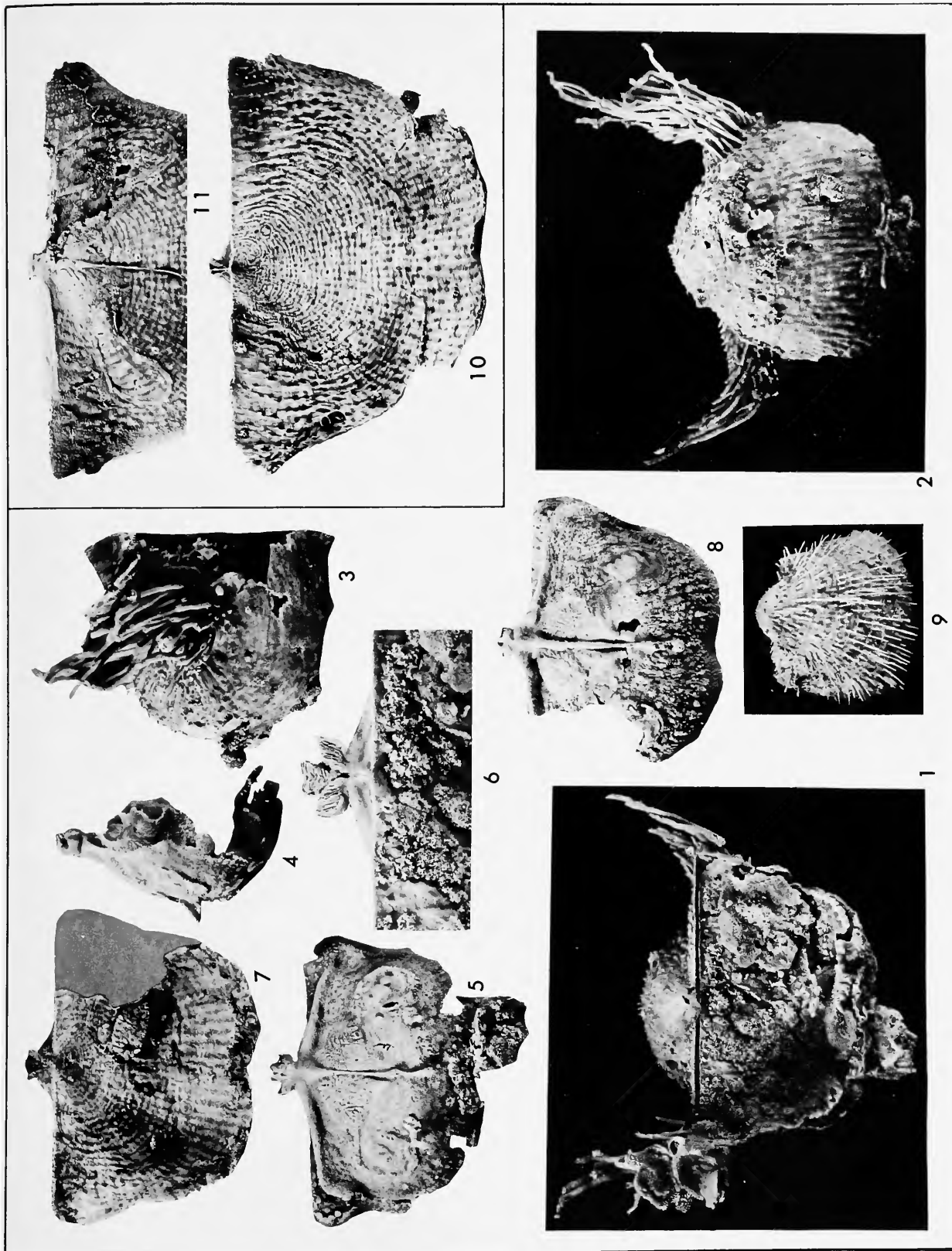


PLATE 407*Peniculauris*

Peniculauris peniculifera, new species: 1–4, Ventral, anterior, posterior, and dorsal views, $\times 1$, of a specimen preserving an enormous spine brush on the ear, paratype USNM 148839a; 5, fabricated dorsal view of the preceding specimen showing restoration with spine brush on both ears, $\times 1$. [Road Canyon Formation, USNM 703a.]

PLATE 407.—*Peniculauris*

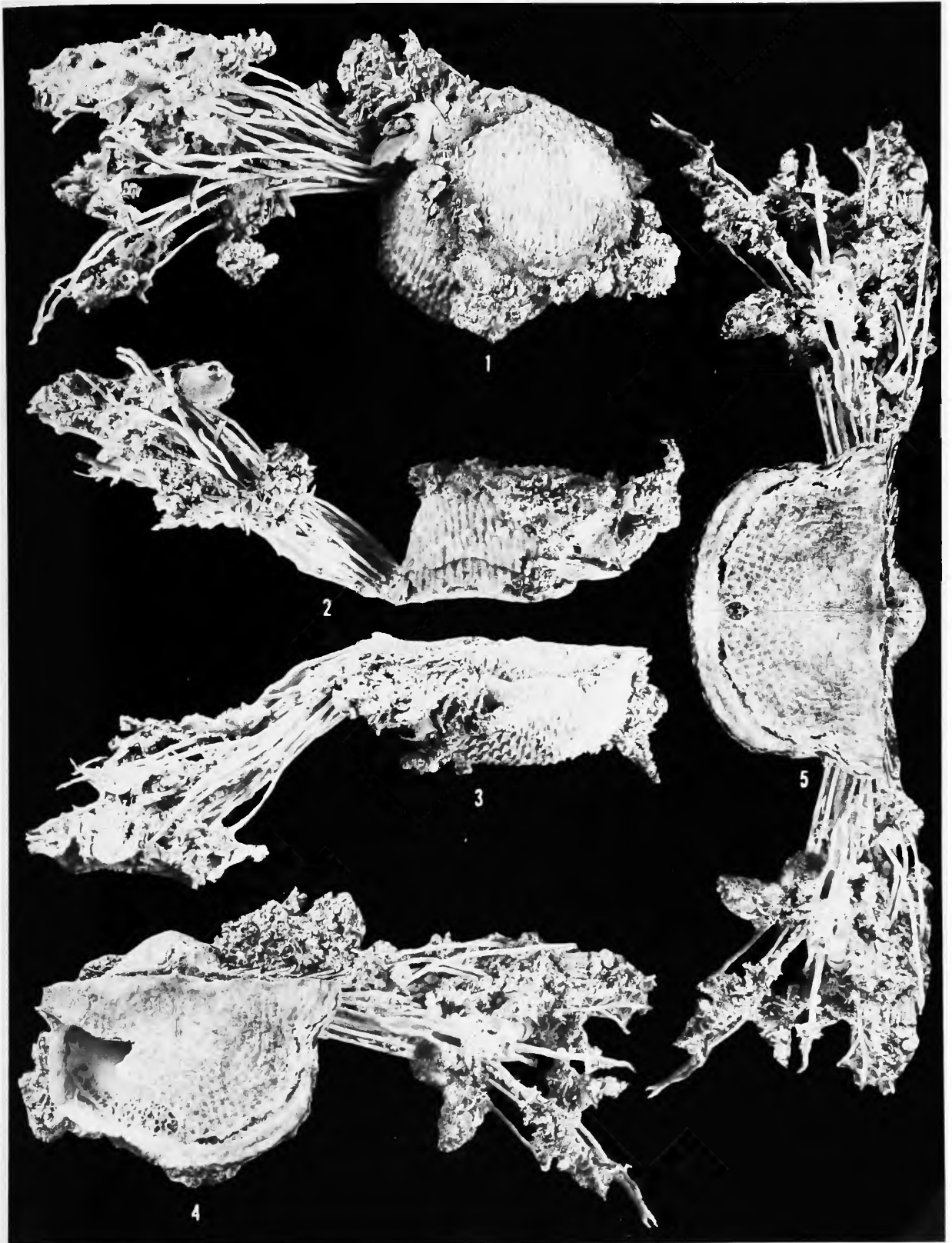


PLATE 408

Anemonaria

Anemonaria sublaevis (R. E. King): 1, Exterior of a pedicle valve, $\times 1$, showing halteroid spines and obscure costae, hypotype USNM 1538838. [Cathedral Mountain Formation, USNM 703b.]

2, Exterior of a large pedicle valve, $\times 1$, hypotype USNM 1538839. [Cathedral Mountain Formation, USNM 702un.]

3-6, Anterior, ventral, posterior, and side views of a pedicle valve, $\times 1$, showing some of the spines and obscure radii, hypotype USNM 153883a (= holotype of *A. inflata* Cooper and Grant, 1969); 7, 8, dorsal and anterior views of a complete specimen, $\times 1$, hypotype USNM 152771a; 9, 10, ventral and posterior views of large pedicle valve, $\times 1.5$, showing boring, hypotype USNM 153883b (paratype of *A. inflata* Cooper and Grant); 11, 12, dorsal and interior views of a specimen, $\times 2$, with part of the pedicle valve broken away to show the median septum, brachial ridges and endospines, hypotype USNM 153883c; 13, partial side view of a broken pedicle valve, $\times 2$, showing the lateral halteroid spines, hypotype USNM 153883d; 14, interior of part of a pedicle valve, $\times 2$, showing muscles and corrugated ridgelike baffle, hypotype USNM 153883e; 15, interior of another pedicle valve, $\times 2$, showing the muscle scars, hypotype USNM 153883f; 16, interior of an imperfect brachial valve, $\times 2$, showing the brevisseptum and fine endospines, hypotype USNM 153883g; 17, posterior of the preceding specimen showing the cardinal process, $\times 4$; 18, another brachial valve interior, $\times 2$, showing the brachial ridges, hypotype USNM 153883h; 19, posterior of the preceding in full view, $\times 4$, to show the cardinal process; 20, posterior of the same specimen slightly tilted and showing the small zygidium, $\times 4$; 21, interior of a brachial valve with few endospines, $\times 2$, hypotype USNM 153883i; 22, large pedicle valve exterior showing spines, $\times 2$, hypotype USNM 153883j. [Cathedral Mountain Formation, USNM 721u.]

23-25, Side, anterior, and posterior views, $\times 1$, of a specimen preserving some of the spines, hypotype USNM 152770a; 26, dorsal view of the preceding specimen, $\times 2$, showing brachial valve in place. [Cathedral Mountain Formation, USNM 702.]

PLATE 408.—*Anemonaria*

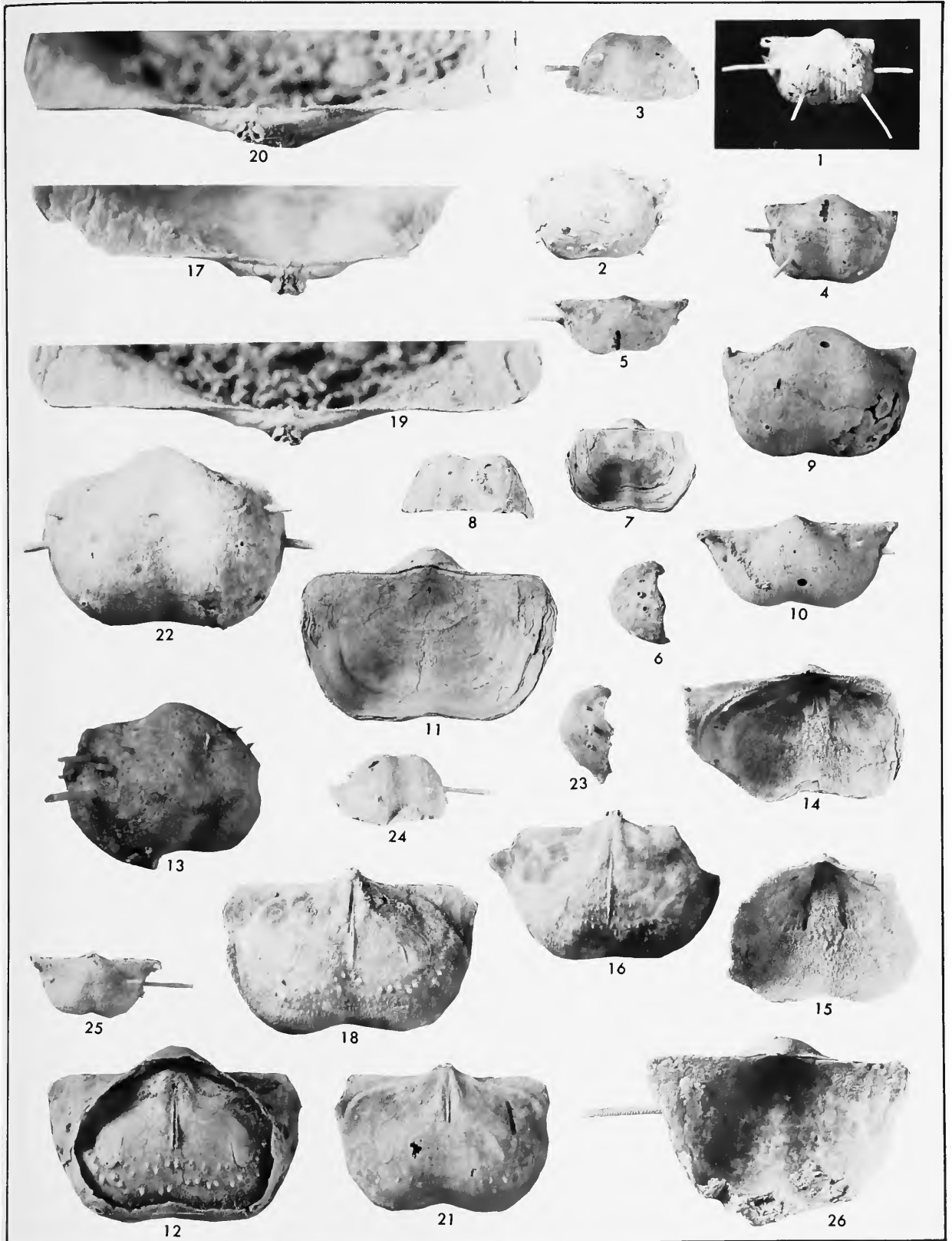


PLATE 409

Liosotella

Liosotella costata, new species: 1, 2, Ventral and dorsal views of an immature specimen preserving one of the long halteroid spines, \times 1, paratype USNM 153946a; 3–6, ventral, dorsal, anterior, and posterior views of a complete specimen preserving some of its halteroid spines, \times 1, paratype USNM 149576a; 7, 8, dorsal and ventral views of a young adult not yet having become costate, \times 1, paratype USNM 153946b; 9–13, ventral, posterior, anterior, dorsal, and side views of another young, compressed adult with early costation, \times 1, paratype USNM 149576b; 14, ventral view of the preceding specimen, \times 2; 16, 17, ventral view of a large adult preserving the bases of some of its spines \times 1, \times 2, paratype USNM 149576e; 18–22, dorsal, anterior, posterior, side, and ventral views of a large costate adult, \times 1, paratype USNM 149576d; 23, ventral view of the preceding specimen, \times 2, showing spine arrangement; 30–34, posterior, side, anterior, dorsal, and ventral views of a costate specimen, with some halteroid spines, \times 1, paratype USNM 149576f; 35–39, dorsal, side, anterior, ventral, and posterior views, \times 1, holotype, USNM 149578; 40, ventral view of the holotype, \times 2; 41–45, dorsal, ventral, anterior, posterior, and side views of a strongly costate paratype, \times 1, USNM 149576g; 46, dorsal view of an immature specimen without costae, \times 1, paratype USNM 153946c; 47, ventral view of a smooth immature specimen with halteroid spines, \times 1, paratype USNM 153946d; 48, ventral view of another immature specimen, \times 1, paratype USNM 153946e; 49–50, interior and exterior of a brachial valve, \times 1, paratype USNM 149576i; 51, 52, interior and exterior of the preceding specimen, \times 2, showing endospines and brachial ridges; 53, 54, interior and exterior of another brachial valve, \times 1, paratype USNM 149576h; 55, 56, interior and exterior of the preceding specimen, \times 2, showing endospines and zygidium. [Road Canyon Formation, USNM 707c.]

15, Dorsal view of a costate adult, \times 1, paratype USNM 153947a; 27–29, ventral, side, and dorsal views of a finely costate specimen, \times 1, paratype USNM 153947b. [Road Canyon Formation, USNM 724a.]

24–26, Ventral, side, and dorsal views of a large costate specimen, \times 1, paratype USNM 153948. [Road Canyon Formation, USNM 724c.]

PLATE 409.—*Liosotella*

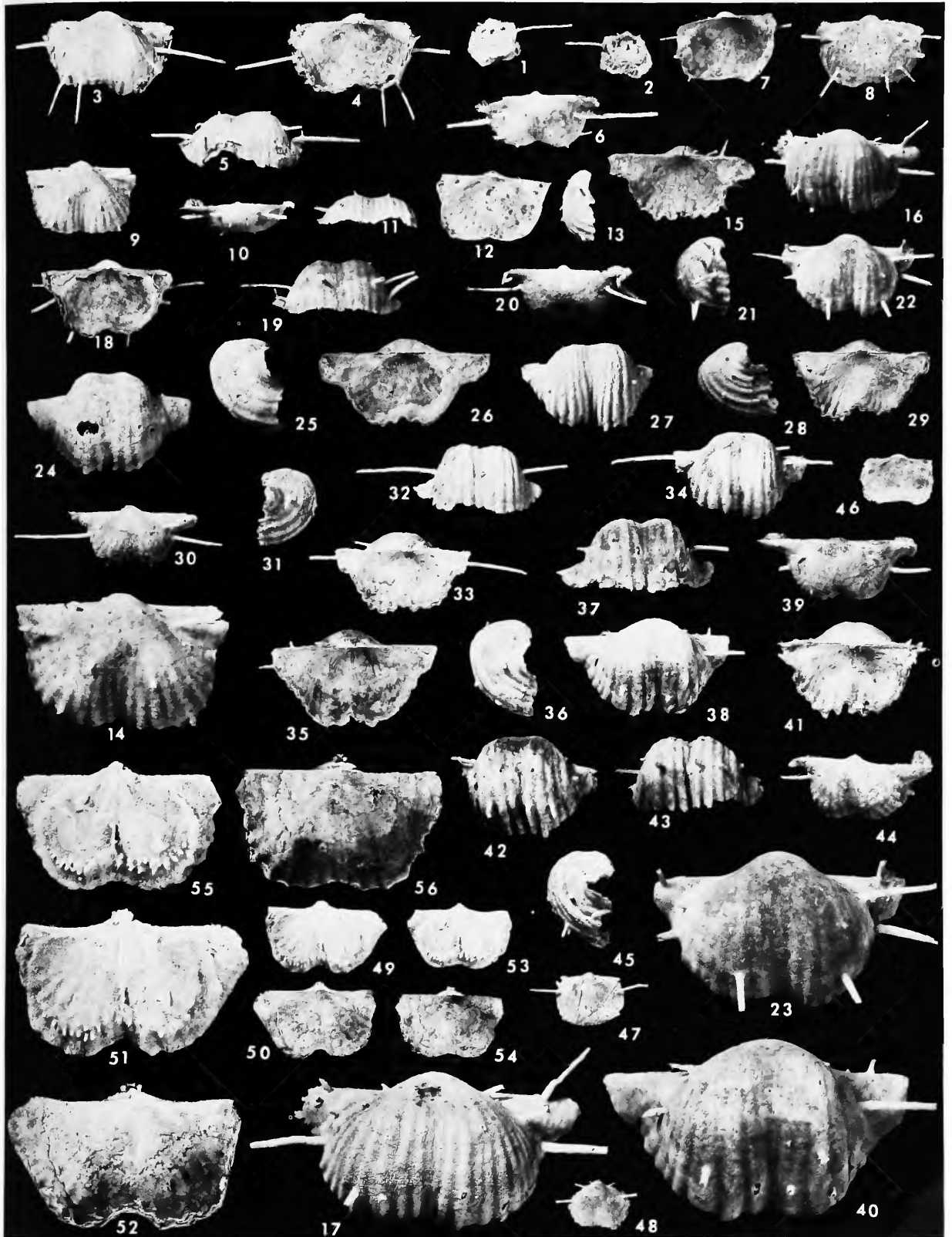


PLATE 410

Nudauris, *Echinauris*, and *Liosotella*

Nudauris linoospina, new species: 1–4, Dorsal, anterior, side, and ventral views of a complete specimen, × 1, paratype USNM 153944a; 5–8, ventral, dorsal, side, and anterior views of a specimen with well developed cardinal extremities, × 1, paratype USNM 153944b. [Cathedral Mountain Formation, USNM 726u.]

Echinauris bella, new species: 9, 10, Dorsal and ventral views of a specimen preserving some of its spines, × 1, paratype USNM 153942a; 11, small specimen preserving its body and halteroid spines, × 1, paratype USNM 153942b; 12, ventral view of another small specimen stripped of most of its spines, × 1, paratype USNM 153942c. [Cibolo Formation (Thin-bedded Zone of Udden), USNM 738–1.]

13, Posterior view of a specimen preserving two of its long halteroid spines, × 1, paratype USNM 153943. [Cibolo Formation (Thin-bedded Zone of Udden), USNM 738g.]

Liosotella costata, new species: 14, Ventral view of two immature pedicle valves, × 1, paratypes USNM 153945a, b; 15, ventral view, × 2, of paratype USNM 153945a, showing the initial attachment ring; 16, ventral view, × 2, of paratype USNM 153945b; 17, 18, ventral and dorsal views of a small adult, × 1, paratype USNM 153945c; 19–22, anterior, ventral, dorsal, and side views of a slightly distorted specimen preserving some of its halteroid spines, × 1, paratype USNM 153945d; 23, interior of a pedicle valve, × 1, showing narrowly thickened adductors track, paratype USNM 153945e; 24–27, posterior, side, dorsal, and anterior views of a strongly costate specimen, × 1, paratype USNM 153945f; 28, ventral view of a broken specimen showing part of the brachial valve with long, slender endospines, × 1, paratype USNM 153945g; 29–32, side, anterior, dorsal, and posterior views of a strongly costate individual, × 1, paratype USNM 153945h; 33–36, anterior, side, dorsal, and posterior views of a specimen with some halteroid spines, × 1, paratype USNM 153945i; 37–40, posterior, dorsal, anterior, and side views of a complete specimen with some of its halteroid spines, × 1, paratype USNM 153945j; 41, 42, dorsal and ventral views of a young specimen nearly flat and without costae, × 1, paratype USNM 153945k; 43, 44, interior of a brachial valve, × 1, × 2, showing brachial ridges and endospines, paratype USNM 153945–l; 45, dorsal view of the preceding specimen, × 2, showing the myophore of the cardinal process and zygidium; 46, interior of another brachial valve, × 1, paratype USNM 153945m; 47, 48, interior and exterior of the preceding specimen, × 2, showing median septum and endospines; 49, exterior of another brachial valve, × 2, showing the small cardinal process and zygidium, paratype USNM 153945n. [Cibolo Formation (Thin-bedded Zone of Udden), USNM 738–1.]

PLATE 410.—*Nudauris*, *Echinauris* and *Liosotella*

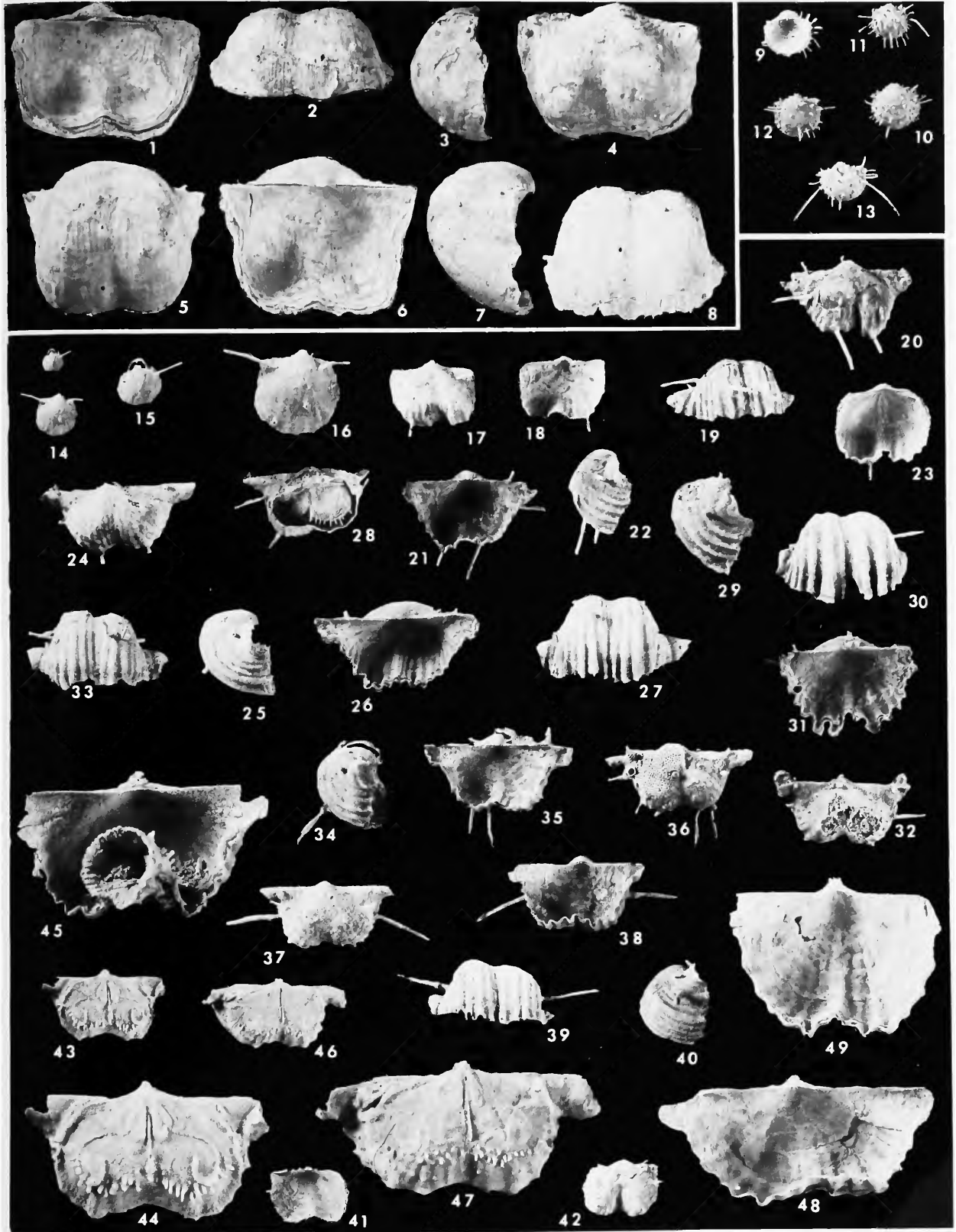


PLATE 411

Liosotella

Liosotella wordensis (R. E. King): 1–5, Side, anterior, posterior, ventral, and dorsal views of an immature individual, × 1, hypotype USNM 149595i; 6–8, side, ventral and posterior views of a large and strongly costate individual, × 1, hypotype USNM 149595v; 9–13, side, anterior, dorsal, posterior, and ventral views of another immature specimen, × 1, showing the flattened form, hypotype USNM 149595j; 14–18, dorsal, side, ventral, posterior, and anterior views of a complete specimen, × 1, hypotype USNM 149595s; 19–21, side, posterior and anterior views, × 1, of a large hypotype, USNM 149595d; 22–25, posterior, side, dorsal, and ventral views of a complete specimen preserving some of its body spines, × 1, hypotype USNM 149595w; 26, ventral view of a small individual, × 1, hypotype USNM 149595h; 37–39, anterior and exterior, × 1, and interior, × 2, views of a brachial valve, showing long, crowded endospines, hypotype USNM 153935a; 40–43, exterior, × 1, and interior, × 1, × 2, views of a brachial valve, hypotype USNM 153935e; 44–46, anterior, × 1, and posterior and interior, × 2, views of a brachial valve, showing brachial ridges, hypotype USNM 153935c; 47, 48, posterior and interior views of a brachial valve, × 2, showing the cardinal process, hypotype USNM 153935d; 49–52, exterior and tilted interior, × 1, and posterior and interior, × 2, views of another brachial valve, showing cardinal process, zygidium, and large development of endospines, hypotype USNM 153935b; 53, ventral view of a small pedicle valve preserving halteroid and body spines, × 1, hypotype USNM 153937b; 54–56, ventral, posterior, and anterior views of an adult with halteroid spines, × 1, hypotype USNM 153937a; 57–59, ventral, posterior, and anterior views of another pedicle valve with some of its spines, × 1, hypotype USNM 153937c; 60, ventral view of an immature pedicle valve with initial attachment ring, × 3, hypotype USNM 153938a; 61, 62, ventral view of two immature hypotypes having attachment rings, × 3, USNM 153938b, c; 63, extremely small pedicle valve with attachment ring, × 3, hypotype USNM 153938d; 64, ventral view of the four preceding hypotypes, × 1; 65, ventral view of two immature pedicle valves, × 1, hypotypes, USNM 153938e (lower left), USNM 153938f (lower right), and (center) view of lower right specimen, × 3. [Word Formation (Willis Ranch Member), USNM 706e.]

27–31, Posterior, dorsal, anterior, ventral, and side views of a complete specimen, × 1, USNM 149593e; 32, dorsal view of the same specimen, × 2, showing ears. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

33–36, Anterior, side, dorsal, and ventral views of a complete specimen, × 1, hypotype USNM 153936a; 66, 67, interior and posterior views of a brachial valve, × 2, showing zygidium, hypotype USNM 153936d. [Word Formation (Willis Ranch Member), USNM 706.]

68–70, Posterior, ventral, and side views of the lectotype, × 1, T9998a; 71, ventral view of a paratype, × 1, T9998b. [Word Formation (Willis Ranch Member), R. E. King locality 240.]

PLATE 411.—*Liosotella*

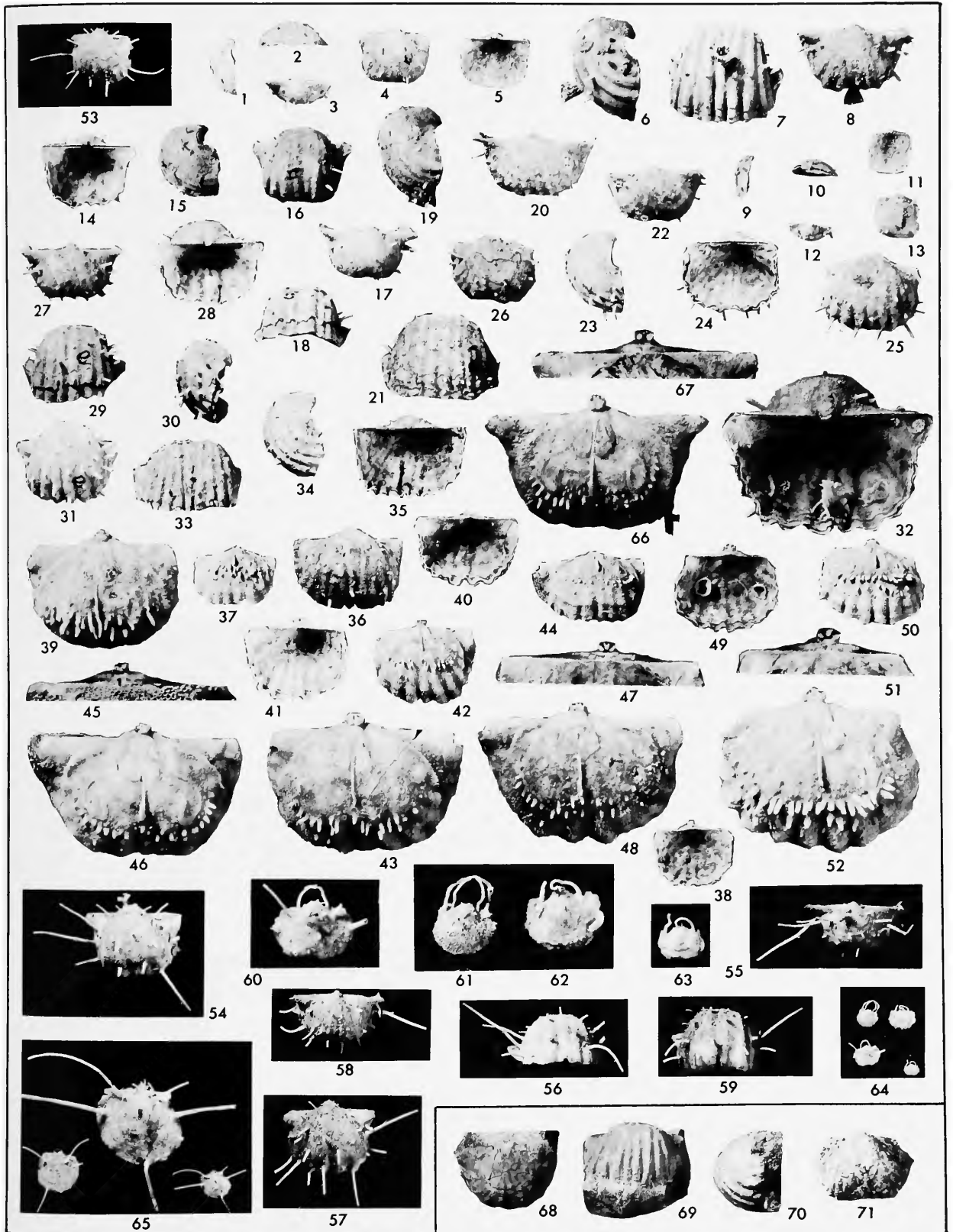


PLATE 412

Liosotella and *Grandaurispina*

Liosotella popei (Shumard): 1–3, Posterior, ventral, and dorsal views of a specimen preserving both valves, $\times 1$, hypotype USNM 151611f; 4–7, posterior, ventral, anterior, and side views of a pedicle valve, $\times 1$, hypotype USNM 151611c; 8–11, side, posterior, anterior, and ventral views of another strongly marked pedicle valve, $\times 1$, hypotype USNM 151611b. [Capitan Formation, USNM 725k.]

Grandaurispina species 6: 12, 13, Exterior and interior of a brachial valve, $\times 1$, figured specimen USNM 150015a; 14–18, ventral, posterior, anterior, side, and interior views of the elongate pedicle valve, $\times 1$, figured specimen USNM 150015b. [Cherry Canyon Formation (Getaway Member), AMNH 600.]

Liosotella wordensis (R. E. King): 19–21, Interior, exterior, and visceral disc region of a brachial valve, $\times 1$, hypotype USNM 153933b; 22–26, posterior, anterior, ventral, dorsal, and side views of a complete specimen, $\times 1$, hypotype USNM 153933a. [Cherry Canyon Formation (Getaway Member), USNM 728.]

27–31, Anterior, posterior, dorsal, side, and ventral views of a strongly ribbed individual, $\times 1$, hypotype USNM 149613a; 32, 33, exterior, $\times 1$, and interior, $\times 2$, of the brachial valve, hypotype USNM 149613b. [Cherry Canyon Formation (Getaway Member), AMNH 519.]

34, Ventral view of an immature specimen preserving halteroid and body spines, $\times 2$, hypotype USNM 153934a; 35, ventral view of four immature pedicle valves, $\times 1$, hypotypes 153934b (upper left), 153934c (upper right), 153934d (lower left), 153934e (lower right); 36, same specimens as preceding view but enlarged, $\times 2$, and including a small individual with initial attachment ring in the center, hypotype 153934f; 37, 38, exterior and interior of a brachial valve, $\times 2$, showing the cardinal process, zygidium brachial ridges, and endospines, hypotype USNM 153934g; 39, 40, interior and exterior of another brachial valve, $\times 2$, hypotype USNM 153934h; 41, 42, exterior and interior of a thickened brachial valve with enlarged cardinal process, $\times 2$, hypotype USNM 153934i. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 412.—*Liosotella* and *Grandaurispina*

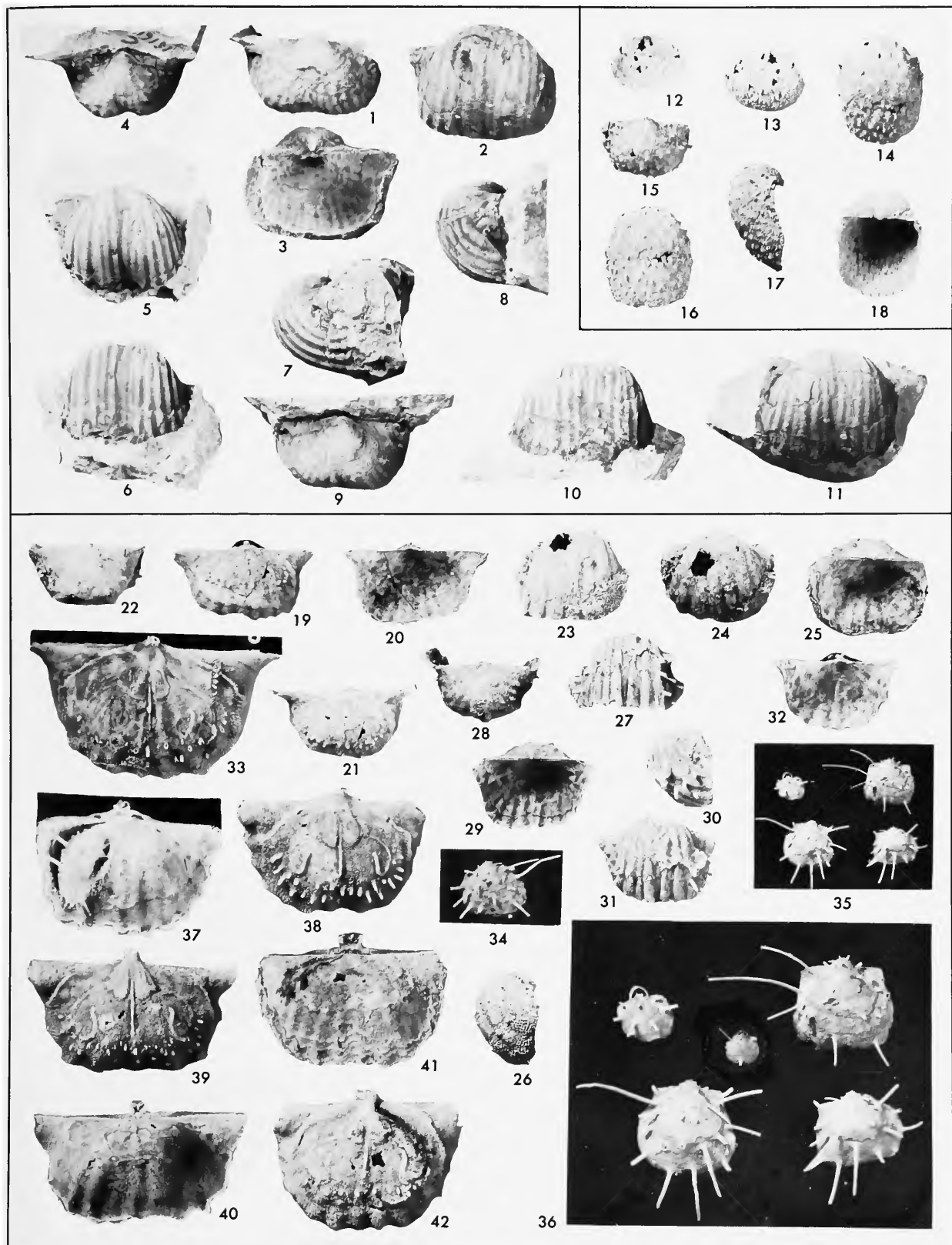


PLATE 413

Liosotella

Liosotella tetragonalis, new species: 1-4, Ventral, posterior, side, and anterior views of a pedicle valve, $\times 1$, preserving some of its halteroid spines, paratype USNM 149591s; 5-7, anterior, posterior, and ventral views, $\times 1$, of an immature specimen, paratype USNM 149591o; 8-11, dorsal, ventral, anterior, and posterior views of another immature specimen, $\times 1$, paratype USNM 149591p; 12-15, posterior, anterior, side, and ventral views of a pedicle valve, $\times 1$, showing some of its strong halteroid spines, paratype USNM 149591r; 16-19, side, ventral, anterior, and posterior views of a paratype preserving several halteroid spines, $\times 1$, paratype USNM 149591q; 20-23, ventral, side, posterior, and dorsal views of a complete specimen, $\times 1$, paratype USNM 149591b; 24-27, ventral, side, posterior, and dorsal views, $\times 1$, holotype USNM 149591a; 28, 29, interior of a fragmentary pedicle valve, $\times 1$, $\times 2$, showing muscle scars, paratype USNM 149590b; 30, exterior of a brachial valve, $\times 1$, showing zygidium, paratype USNM 149591u; 31, 32, postero-dorsal and interior views of the preceding specimen, $\times 2$, showing brachial ridges; 33-35, exterior, interior, tilted, and interior views of another brachial valve, $\times 1$, showing brachial ridges and endospines, paratype USNM 149591w; 36, 37, interior tilted and interior views of the preceding brachial valve, $\times 2$, showing endospines and thickened brachial ridges; 38, 39, anterior and interior views of another brachial valve interior, $\times 2$, showing thickened adductor scars and brachial ridges, paratype USNM 149591v. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 413.—*Liosotella*

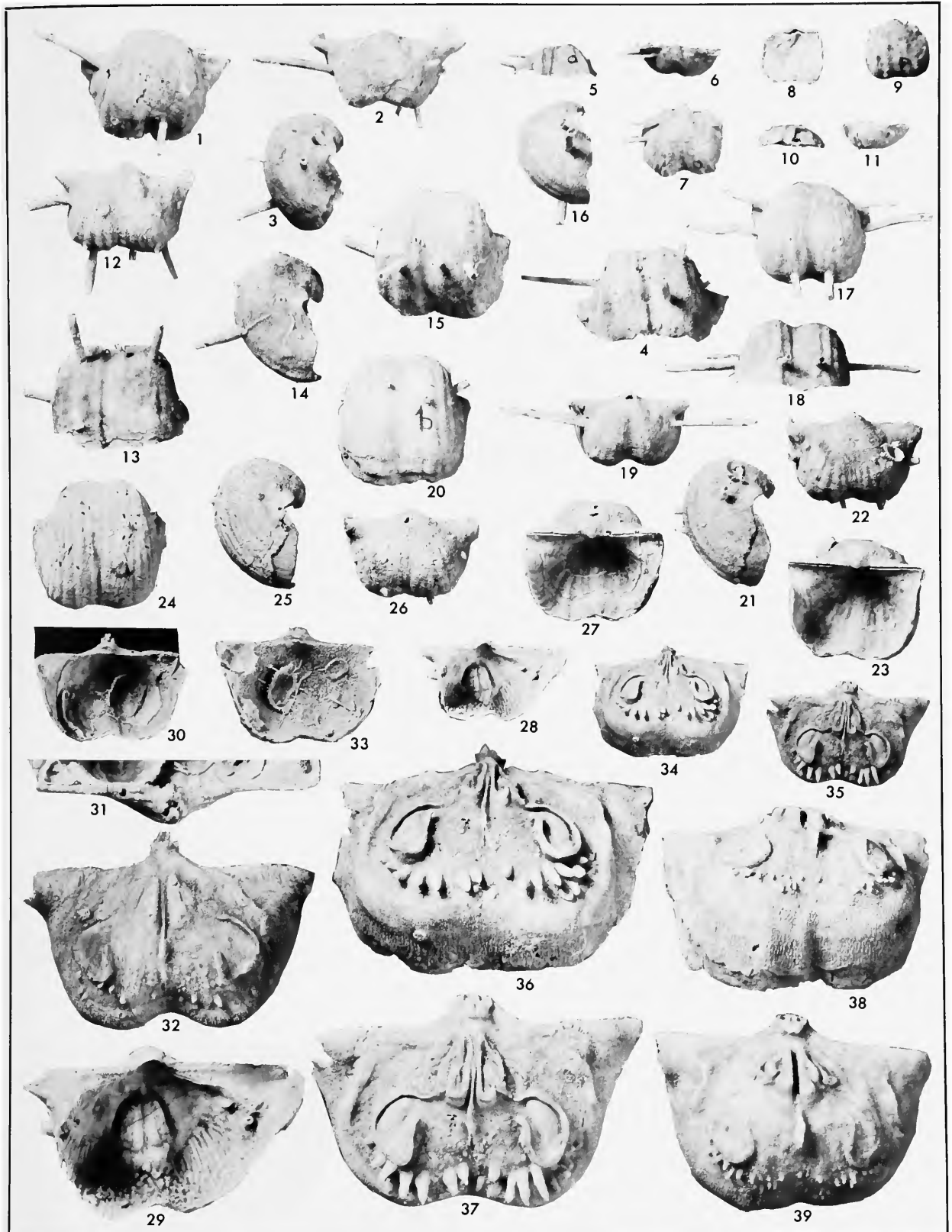


PLATE 414

Liosotella

Liosotella spinumbona, new species: 1–5, Ventral, dorsal, anterior, and side views of a complete but small specimen, × 1, paratype USNM 149586j; 6–10, side, dorsal, posterior, ventral, and anterior views of a large complete specimen, × 1, paratype USNM 149586e; 11–15, ventral, side, anterior, dorsal, and posterior views of another complete specimen, × 1, paratype USNM 149586k; 16, dorsal view, × 1, of an immature, compressed and noncostate specimen, paratype USNM 149586p; 17, 18, interior and ventral views, × 1, of an immature pedicle valve, paratype USNM 149586q; 19, 20, ventral and dorsal views, × 1, of an immature specimen without costae, paratype USNM 149586s; 21–25, posterior, dorsal, anterior, ventral, and side views, × 1, holotype USNM 149586c; 26–29, anterior, ventral, side, and posterior views of a strongly costate pedicle valve with stout halteroid spines on one side, × 1, paratype USNM 149586t; 30, interior of a brachial valve with distorted and overgrown cardinal process, × 1, paratype USNM 149586u; 31, 32, posterior and interior of the preceding specimen, × 2, showing distorted cardinal process, zygidium, and brachial ridges; 33, interior of a brachial valve, × 1, paratype USNM 149586v; 34, 35, interior and posterodorsal views of the preceding specimen, × 2, showing brachial ridges, cardinal process and endospines; 36, interior of another brachial valve, × 1, paratype USNM 149586w; 37, 38, posterodorsal and interior views of the preceding paratype, × 2, showing zygidium, ear baffles, endospines, and brachial ridges. [Cherry Canyon Formation (Getaway Member), USNM 728.]

Liosotella tetragonalis, new species: 39, 40, Posterodorsal and interior views of a brachial valve, × 2, showing cardinal process and zygidium, paratype USNM 149590a. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 414.—*Liosotella*

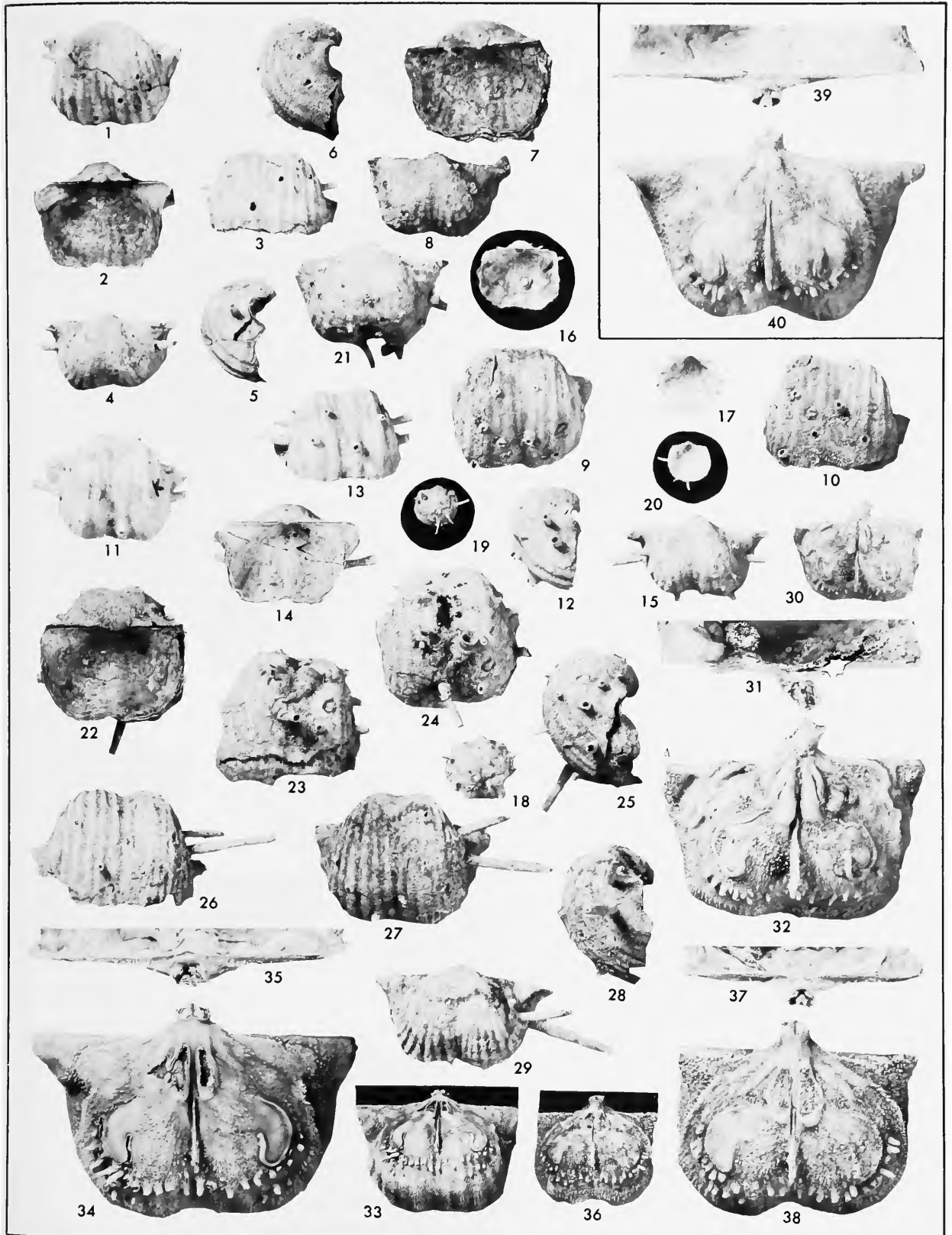


PLATE 415

Liosotella

Liosotella irregularis, new species: 1, Immature specimen, $\times 1$, preserving its initial spines but not the attachment ring, paratype USNM 153939a; 2-4, ventral, anterior, and posterior views of a pedicle valve preserving one of the long halteroid spines on which is attached a pedicle valve of *Ctenalasia*, $\times 1$, paratype USNM 151601a; 5-7, ventral, anterior, and posterior views of another pedicle valve with most of its halteroid spines, $\times 1$, paratype USNM 151601b; 21, interior of a brachial valve, $\times 1$, paratype USNM 153941a; 22-24, anterior, interior, and exterior views of a brachial valve, $\times 1$, paratype USNM 153941b; 25, interior of the preceding specimen, $\times 2$, showing the brachial ridges and cardinal process; 30, ventral view of a small nongeniculated pedicle valve, $\times 1$, paratype USNM 153939b; 31, 32, ventral view of two immature pedicle valves, $\times 3$, showing the initial attachment rings, paratypes USNM 151601e, f; 33, interior of a young pedicle valve, $\times 1$, paratype USNM 153939c; 34, dorsal view of an immature specimen, $\times 1$, showing a distorted form, paratype USNM 153939d; 35, exterior of a small pedicle valve, $\times 1$, paratype USNM 153939e. [Word Formation (Appel Ranch Member), USNM 719z.]

8-10, Anterior, posterior, and ventral views of a large pedicle valve preserving part of its halteroid spines, $\times 1$, paratype USNM 149583c; 11-13, anterior, ventral, and posterior views of a pedicle valve with an exceptionally long halteroid spine on one side, $\times 1$, paratype USNM 149583p; 16-20, side, ventral, dorsal, posterior and anterior views of a complete specimen, $\times 1$, holotype USNM 149583d. [Word Formation (Appel Ranch Member), USNM 715i.]

14, 15, Dorsal and ventral views of a specimen with long halteroid spines, $\times 1$, paratype USNM 153940a; 26-27, interior and tilted interior views of a brachial valve, $\times 1$, paratype USNM 153940b; 28, interior of the preceding specimen, $\times 2$, showing brachial ridges, and endospines; 29, posterior and dorsal views of the preceding specimen, $\times 3$, showing the myophore and zygidium. [Word Formation (Appel Ranch Member), USNM 722t.]

PLATE 415.—*Liosotella*

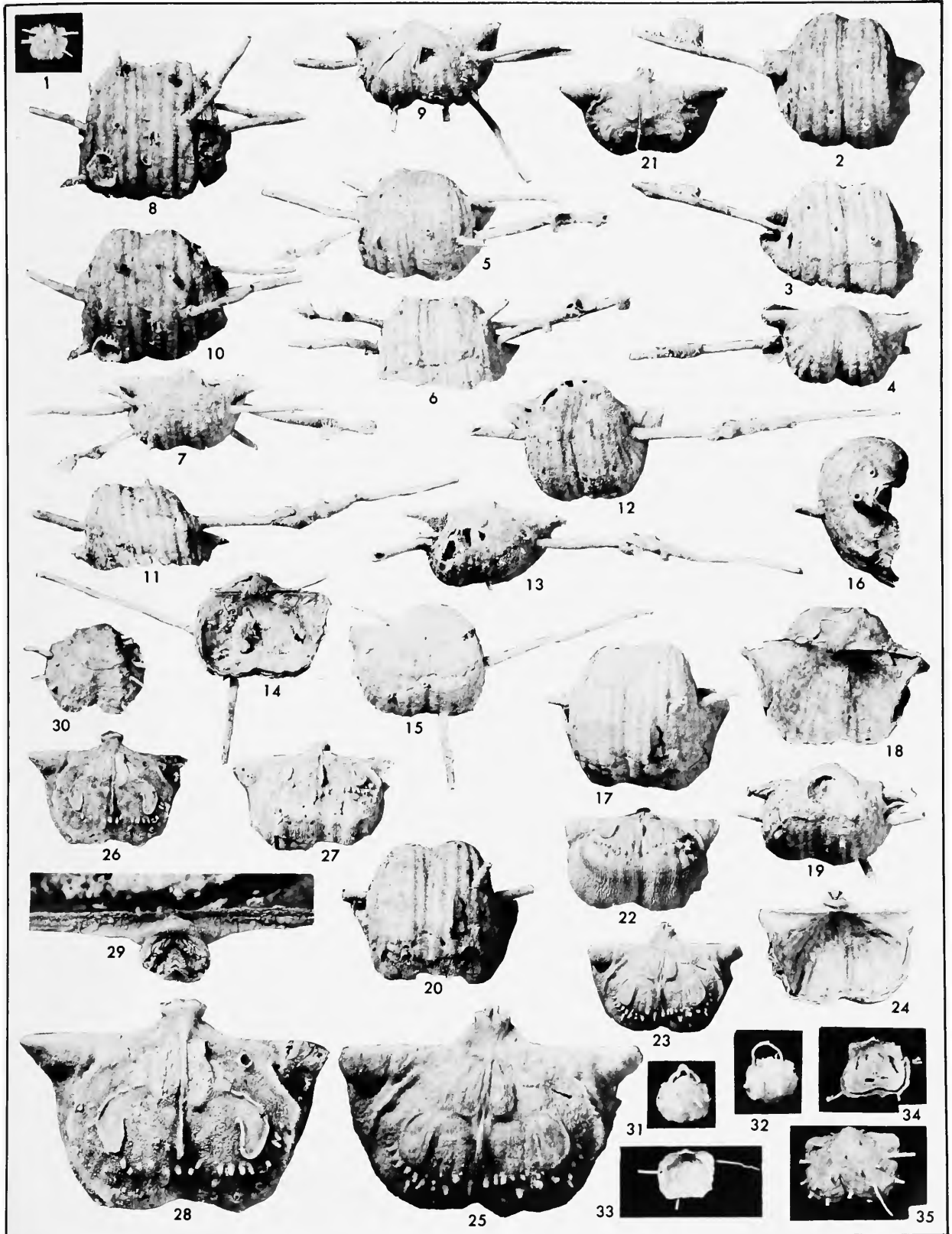


PLATE 416

Liosotella

Liosotella opima (Girty): 1-5, Posterior, anterior, dorsal, side, and ventral views of a complete specimen, \times 1, hypotype USNM 152766a; 6-10, ventral, dorsal, anterior, side, and posterior views of another complete specimen, \times 1, hypotype USNM 152766b. [Bell Canyon Formation (Hegler Member), AMNH 635.]

11-15, Dorsal, ventral, posterior, side, and anterior views of a young individual, \times 1, hypotype USNM 152765d; 16-19, tilted interior, exterior, side, and interior views of a brachial valve, \times 1, hypotype USNM 152765f; 20, 21 interior and exterior, views of the preceding specimen, \times 2, showing brachial ridges, cardinal process and zygidium; 22-24, side, tilted interior, and interior views of another brachial valve, \times 1, hypotype USNM 152765e; 25, interior of the preceding specimen, \times 2, showing strong endospines. [Bell Canyon Formation (Hegler Member), USNM 731.]

Liosotella parva, new species: 26-30, Ventral, anterior, side, dorsal, and posterior views of a complete specimen having one stout halteroid spine preserved, \times 1, paratype USNM 153951. [Word Formation (China Tank Member), USNM 726r.]

31, 32, Ventral and interior views of a pedicle valve, \times 1, showing thick adductor platform, paratype USNM 149589a; 33, 34, posterior and interior views of another small pedicle valve, showing the muscle platform, \times 1, paratype USNM 149589m; 35-39, side, anterior, posterior, dorsal, and ventral views of a complete specimen with halteroid spine preserved, \times 1, holotype USNM 149589g; 40, dorsal view, \times 2, of the holotype; 41-45, ventral, dorsal, anterior, posterior, and side views of a complete paratype, \times 1, USNM 149589f; 46, dorsal view of an immature specimen, \times 1, paratype USNM 149589n; 47, dorsal view of a still more immature individual, \times 1, paratype USNM 149589o; 48, exterior of a brachial valve, \times 1, paratype USNM 149589q; 49, 50, posterior and interior views of the preceding specimen, \times 2, showing brachial ridges and endospines; 51, 52, exterior and interior of another brachial valve, \times 1, paratype USNM 149589r; 53, 54, posterior and interior views of the preceding specimen, \times 2, showing details of the interior. [Word Formation (China Tank Member), USNM 706c.]

PLATE 416.—*Liosotella*

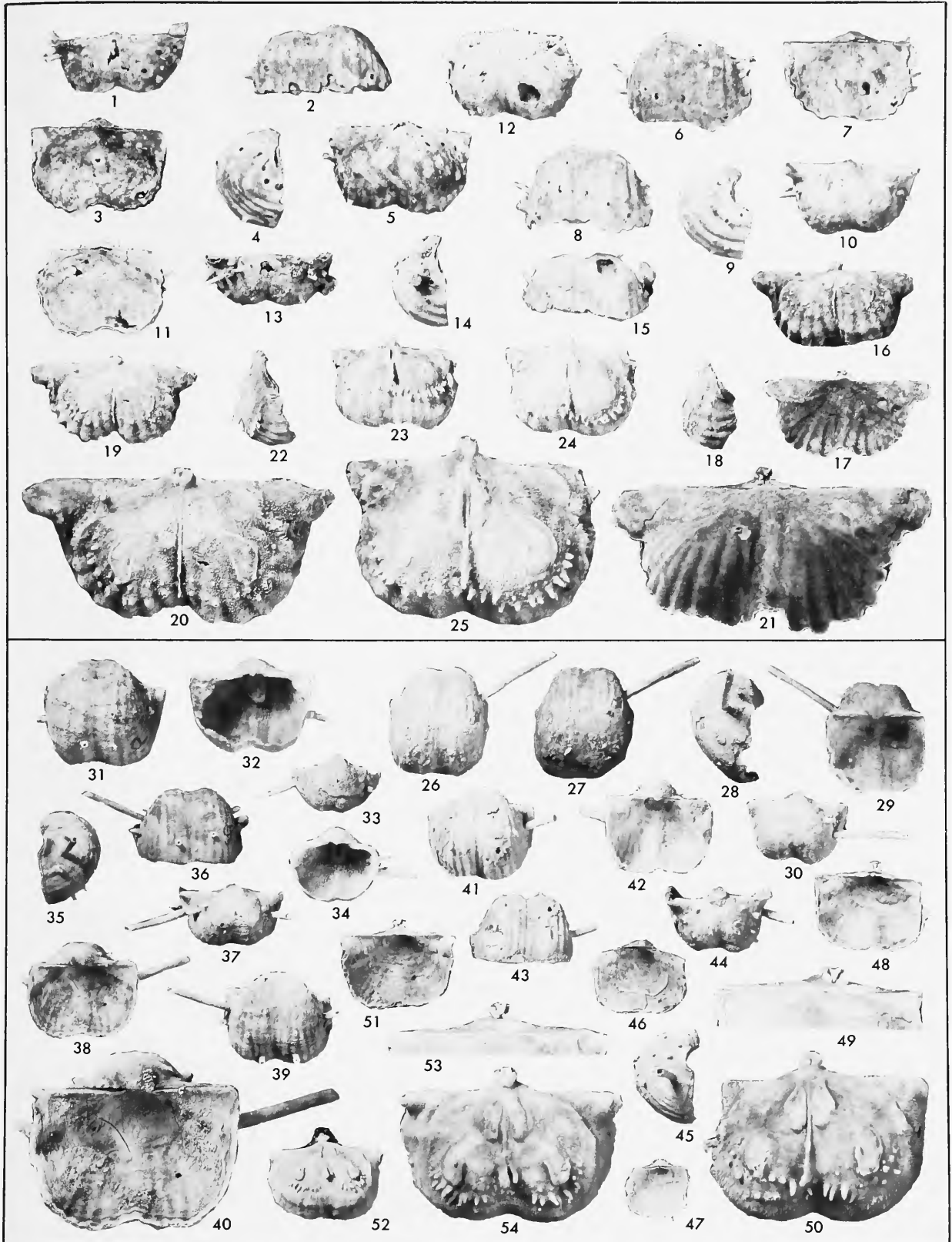


PLATE 417

Paucispinifera

Paucispinifera quadrata, new species: 1-3, Tilted interior, interior, and exterior views of a thickened brachial valve, $\times 1$, showing zygidium, cardinal process, and brachial ridges, paratype USNM 153949a; 4, 5, exterior, $\times 1$, and interior, $\times 2$, of a very young brachial valve, showing slight development of internal features, paratype USNM 153949b. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

Paucispinifera spinosa, new species: 6-9, Anterior, side, ventral, and posterior views of a specimen preserving some halteroid spines, $\times 1$, holotype USNM 152769a; 10-13, ventral, anterior, side, and posterior views of another pedicle valve preserving some of its spines, $\times 1$, paratype USNM 152769b; 14-17, anterior, ventral, side, and posterior views of another pedicle valve preserving some of its spines, $\times 1$, paratype USNM 152769c; 18, 19, interior of the brachial valve, $\times 1$, $\times 2$, paratype USNM 153950. [Bell Canyon Formation (Pinery Member), AMNH 398.]

Paucispinifera magnispina, new species: 20-24, Ventral, side, anterior, and posterior views of a small complete specimen, $\times 1$, paratype USNM 149563d; 25-29, dorsal, posterior, ventral, side, and anterior views of another complete specimen, $\times 1$, paratype USNM 149563e; 30-33, ventral, side, posterior, and interior views of a pedicle valve, $\times 1$, showing ear baffles on the interior, paratype USNM 149563b (for enlarged view, see plate 475: figure 6); 34-38, anterior, posterior, ventral, side, and dorsal views of the holotype, $\times 1$, showing massive halteroid spines, USNM 149563a; 39, 40, exterior and interior of the brachial valve, $\times 1$, paratype USNM 149563g; 41, interior of the preceding specimen, $\times 2$; 42, 43, exterior and interior of another brachial valve, $\times 1$, paratype USNM 149563h; 44, interior of the preceding specimen, $\times 2$, showing brachial ridges and cardinal process. [Word Formation (China Tank Member), USNM 706c.]

PLATE 417.—*Paucispinifera*

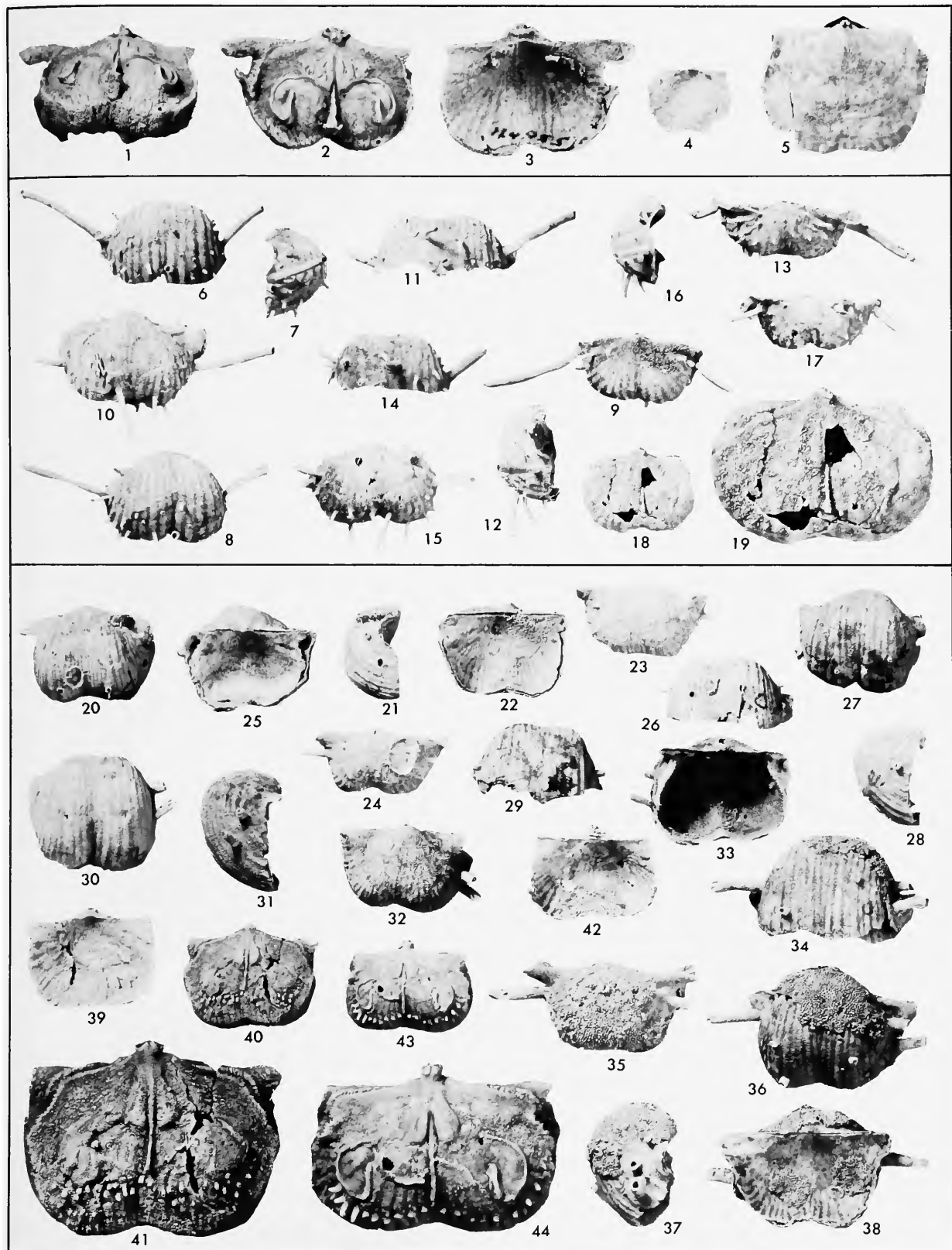


PLATE 418

Paucispinifera

Paucispinifera sulcata, new species: 1, 2, Dorsal and ventral views of a complete specimen with part of its halteroid spines, \times 1, paratype USNM 149566a; 3, 4, ventral and dorsal views of another complete specimen, \times 1, paratype USNM 149566b; 5-9, dorsal, ventral, side, posterior, and anterior views of an immature individual, \times 1, paratype USNM 149567r; 10, 11, ventral and dorsal views of a complete specimen with most of its spines, \times 1, paratype USNM 149566c; 12-16, dorsal, ventral, posterior, side, and anterior views of a specimen stripped of its spines, \times 1, paratype USNM 149567m; 17, ventral view of an immature individual, \times 1, paratype USNM 149566f; 18-21, ventral, posterior, dorsal, and side views of a complete specimen preserving one long halteroid spine, \times 1, paratype USNM 149566g; 22-24, side, dorsal, and posterior views of a large adult, \times 1, paratype USNM 149567a; 25-27, ventral, dorsal, and side views of a spiny specimen with gastropod (?) boring, \times 1, paratype USNM 149566i; 28-31, ventral, anterior, dorsal, and side views of a complete specimen, \times 1, holotype USNM 149566h; 32-36, dorsal, anterior, side, ventral, and posterior views of a complete, small adult, \times 1, paratype USNM 149566j; 37, 38, interior and exterior, views of an imperfect brachial valve, \times 1, paratype USNM 153926c; 39, 40, exterior and interior views of a brachial valve, \times 1, paratype USNM 153926b; 41, interior of the preceding specimen, \times 2, showing brevisseptum and muscle scars; 42, 43, dorsal and interior views of a brachial valve showing the zygidium, \times 1, paratype USNM 153926a (for enlarged views of this and the preceding specimen, see plate 475: figures 21, 22); 44, interior of the preceding specimen, \times 2, showing ear baffles; 45-51, ventral view of seven immature pedicle valves, showing initial attachment rings and other early characters, \times 1, paratypes USNM 149566d, k-p. [Road Canyon Formation (base), USNM 702c.]

PLATE 418.—*Paucispinifera*

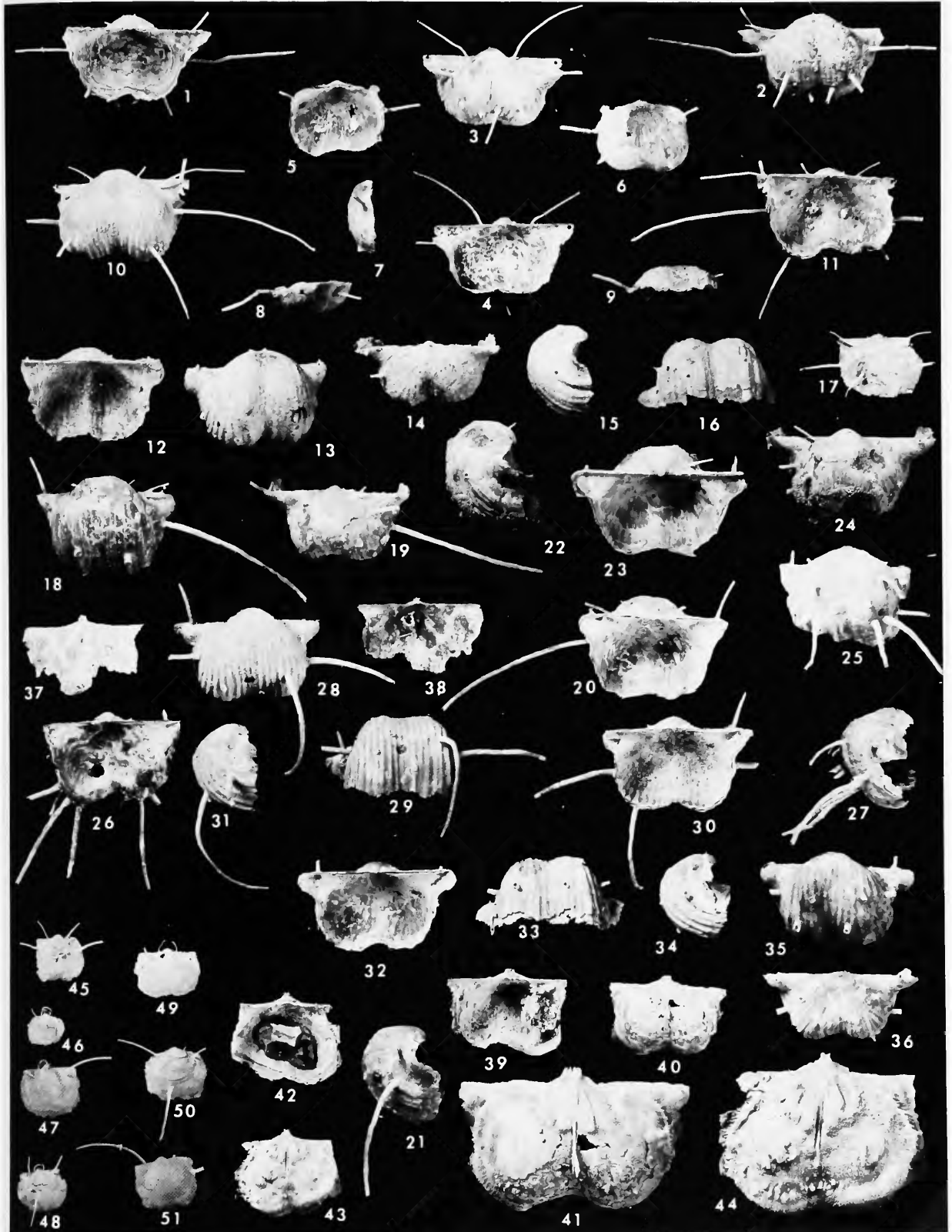


PLATE 419

Paucispinifera and *Oncosarina*

Paucispinifera transversa, new species: 1-5, Anterior, ventral, posterior, side, and dorsal views, $\times 1$, of a complete specimen, paratype USNM 149558a; 6-10, dorsal, side, ventral, posterior, and anterior views, $\times 1$, of another complete specimen with large ears, holotype USNM 149558b; 11-15, side, posterior, dorsal, anterior, and ventral views of a complete specimen, $\times 1$, paratype USNM 149558-1; 16-20, anterior, side, dorsal, ventral, and posterior views of a complete specimen, $\times 1$, paratype USNM 149558e; 21-24, posterior, ventral, interior, and anterior views of a pedicle valve preserving one long halteroid spine, $\times 1$, paratype USNM 149558d; 25-29, interior, ventral, posterior, side, and anterior views of a strongly marked pedicle valve, $\times 1$, paratype USNM 149558c; 30-32, side, dorsal, and interior views of a brachial valve, $\times 1$, paratype USNM 149558m; 33-35, side, dorsal, and interior views of a brachial valve, $\times 1$, paratype USNM 149558o; 36-38, side, dorsal, and interior views of a brachial valve, $\times 1$, showing the brachial ridges, paratype USNM 149558n. [Word Formation (Willis Ranch Member), USNM 706.]

39-43, Anterior, side, posterior, dorsal, and ventral views, $\times 1$, paratype USNM 153992. [Road Canyon Formation, USNM 716xa.]

Oncosarina spinicostata Cooper and Grant: 44-47, Posterior, anterior, ventral, and side views of a strongly marked specimen, $\times 1$, hypotype USNM 149827p. [Skinner Ranch Formation (Poplar Tank Member), USNM 708e.]

PLATE 419.—*Paucispinifera* and *Oncosarina*

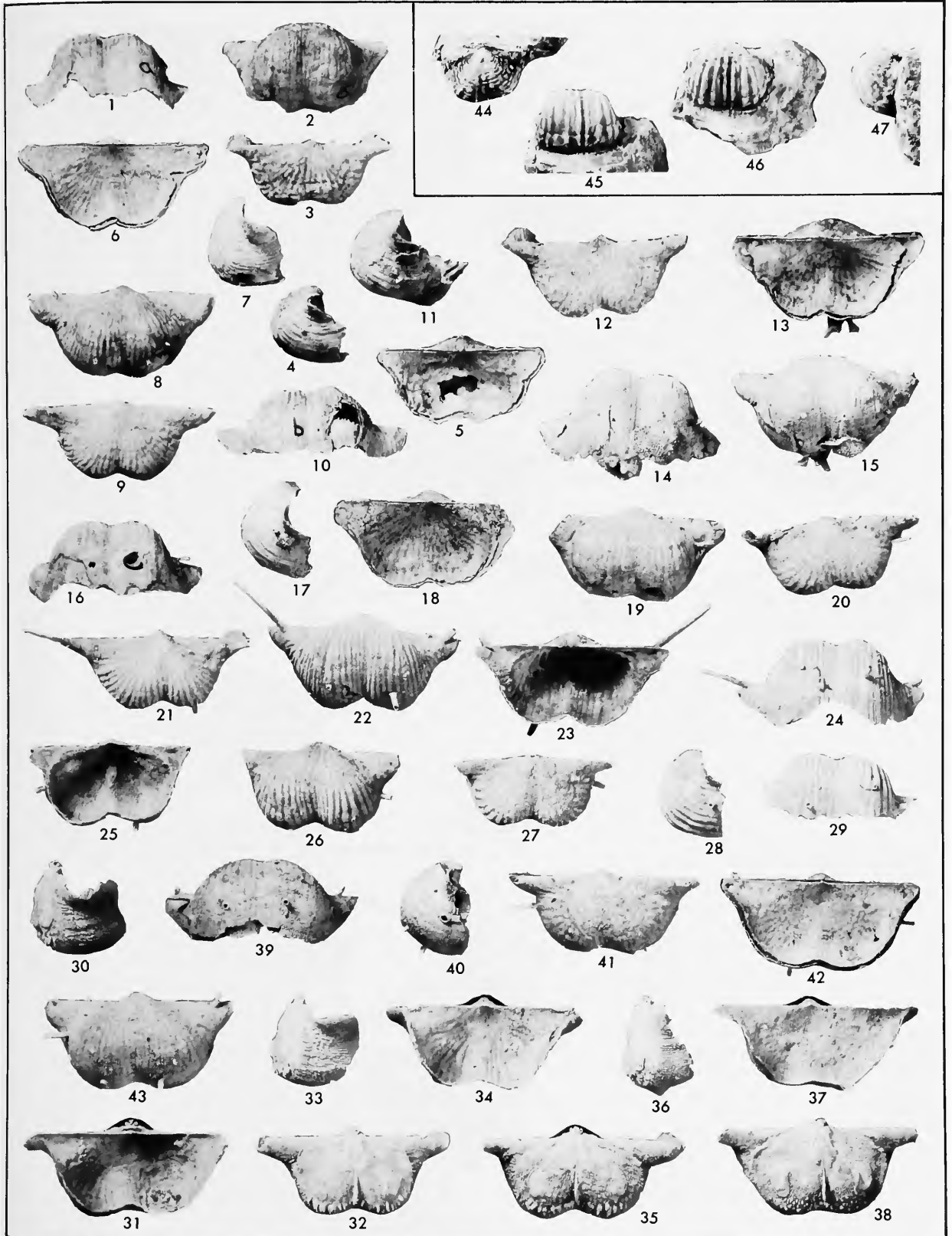


PLATE 420*Paucispinifera*

Paucispinifera auriculata Muir-Wood and Cooper: 1-5, Dorsal, anterior, ventral, posterior, and side views of a complete specimen with broken spines, $\times 1$, hypotype USNM 149548d; 6-9, posterior, ventral, tilted ventral, and anterior views of a specimen having very long halteroid spines, $\times 1$, hypotype USNM 153989a; 10, 11, exterior and interior of an immature brachial valve, $\times 1$, showing minute cardinal process, hypotype USNM 153588h; 12, 13, interior and exterior of an immature brachial valve, showing absence of a median septum, $\times 1$, hypotype USNM 153588i; 14, 15, ventral and anterior views of a specimen with most of its spines, $\times 1$, hypotype USNM 153989b; 16-18, ventral, posterior, and side views of another spiny pedicle valve, $\times 1$, hypotype USNM 153989c; 19-21, anterior, ventral, and posterior views of a pedicle valve with long halteroid spines, $\times 1$, hypotype USNM 153989d; 22-26, dorsal, ventral, anterior, posterior, and side views of an immature specimen with both valves, $\times 1$, hypotype USNM 149548g; 27-30, ventral, posterior, side, and anterior views of another spiny pedicle valve, $\times 1$, hypotype USNM 153989e; 31-34, posterior, side, anterior, and ventral views of a pedicle valve with well developed spines on the trail, $\times 1$, hypotype USNM 153989f. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 420.—*Paucispiniifera*

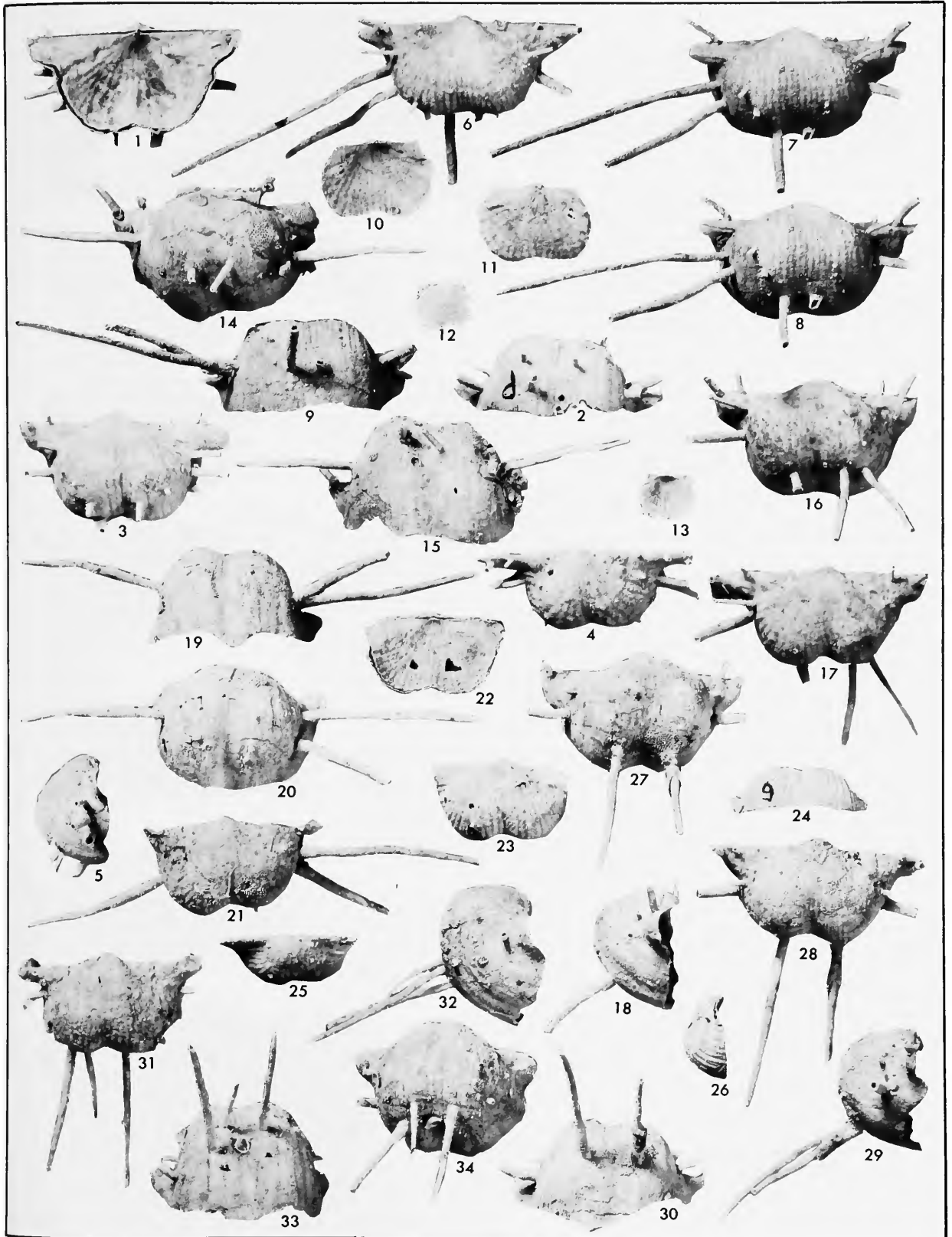


PLATE 421

Paucispinifera

Paucispinifera auriculata Muir-Wood and Cooper: 1, Immature specimens with attachment rings or traces of the rings, $\times 1$, hypotypes 149545a, b, d, e (top row); 149545g, f, c (bottom row); 2-6, anterior, side, dorsal, posterior, and ventral views of a complete specimen, $\times 1$, hypotype USNM 149548a; 7-10, dorsal, anterior, posterior, and side views, $\times 1$, showing spines and trail, hypotype USNM 153988a; 11, interior of a pedicle valve showing muscle scars, $\times 1$, hypotype USNM 153988b; 12, left side of the preceding specimen, $\times 2$, showing ear baffle and inner rims of spines; 13, 14, interior of a young brachial valve, $\times 1$, $\times 2$, showing small cardinal process, slender brevisseptum and delicate endospines, hypotype USNM 153988c; 15-17, interior side and anterior views of a brachial valve, $\times 1$, hypotype USNM 153988d; 18, 19, side and interior views of the preceding specimen, $\times 2$, showing anterior growth of the cardinal process, long trail, and brachial ridges; 20, view of the cardinal process of the preceding specimen, $\times 4$, showing its unusual anterior development; 21-23, interior, posterior, and anterior views of a brachial valve, $\times 1$, hypotype USNM 153988e; 24, side view of the preceding specimen, $\times 2$, showing fluted baffles; 25, posterior view of the preceding specimen, $\times 3$, showing myophore and zygidium; 26, 27, exterior and interior of a young brachial valve, $\times 1$, hypotype USNM 153988g. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 421.—*Paucispinifera*

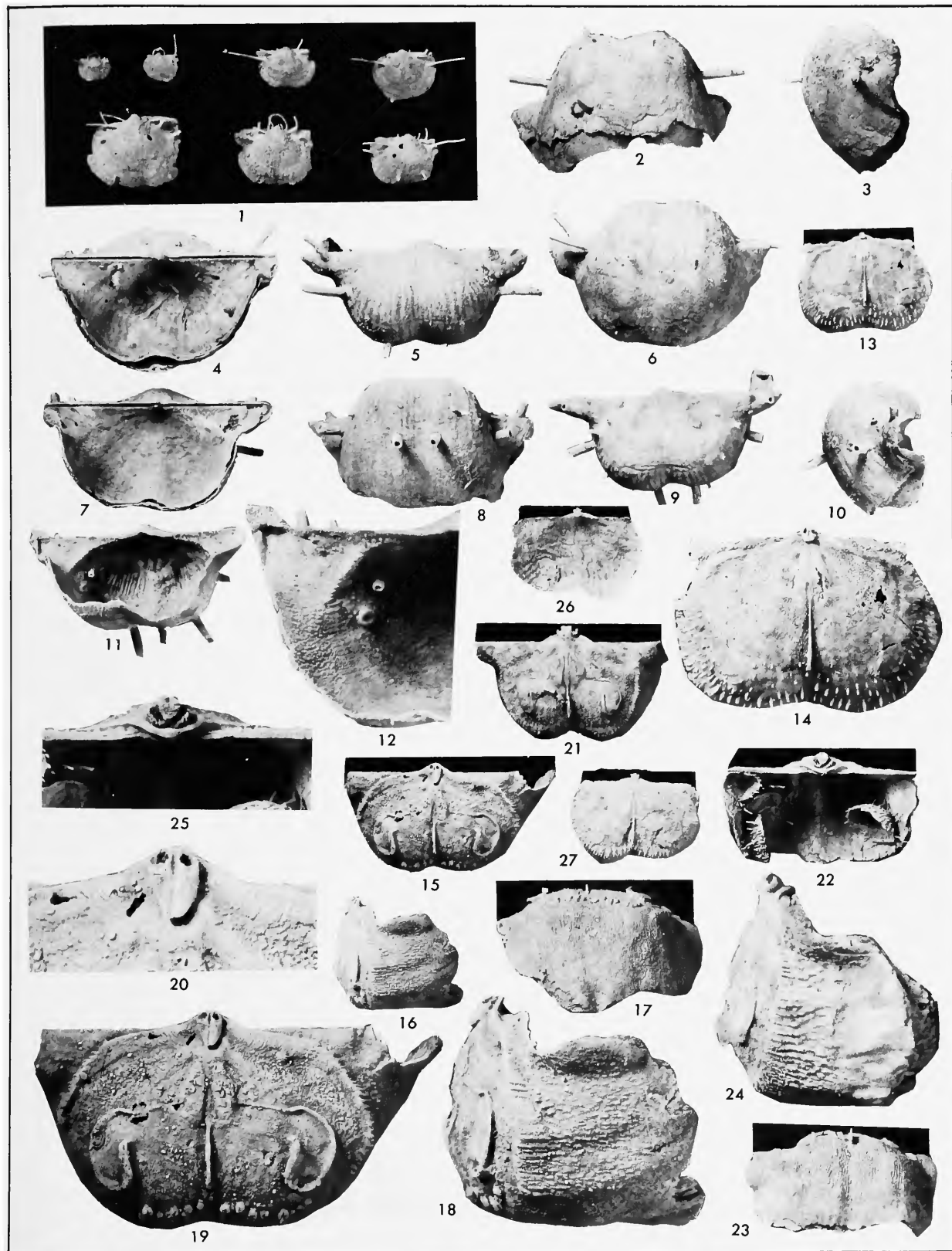


PLATE 422*Paucispinifera*

Paucispinifera auriculata Muir-Wood and Cooper: 1-5, Side, ventral, posterior, dorsal, and anterior views of a complete specimen, $\times 1$, hypotype USNM 149542a; 6, 7, exterior and interior of a brachial valve, $\times 1$, hypotype USNM 149542b; 8, posterior of the preceding brachial valve, $\times 2$, showing cardinal process and zygidium. [Word Formation (Willis Ranch Member), USNM 706.]

9, 10, Exterior, $\times 1$, and interior $\times 2$, of a brachial valve, hypotype USNM 153990; 11, postero-interior of the preceding specimen, $\times 4$, showing ear baffles with endospines and a peculiar anterior growth of the cardinal process; 12, interior of an immature brachial valve, $\times 2$, showing incipient brevisseptum, small cardinal process and fine endospines, hypotype USNM 153988f; 13-15, ventral view of three immature pedicle valves, $\times 1$, hypotypes USNM 153991a-c; 16-19, anterior, posterior, side, and ventral views of a spiny pedicle valve, $\times 1$, paratype USNM 124054j; 20, posterior view of another pedicle valve with long spines, $\times 1$, paratype USNM 124054f. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 422.—*Paucispinifera*

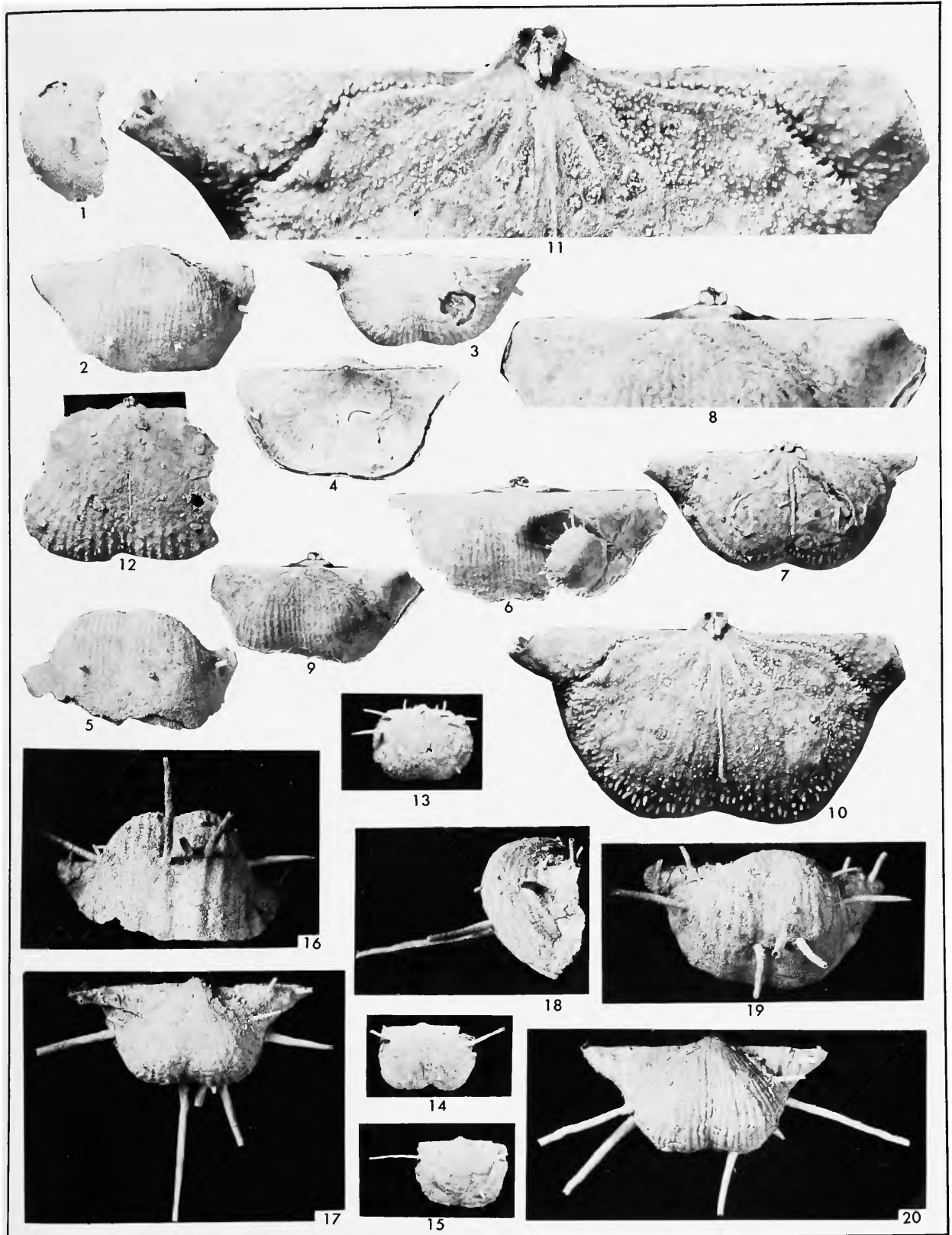


PLATE 423*Paucispinifera*

Paucispinifera quadrata, new species: 1-5, Dorsal, side, anterior, posterior, and ventral views, $\times 1$, of the holotype, USNM 153986a; 6-10, anterior, side, ventral, posterior, and dorsal views of a larger, complete specimen, $\times 1$, paratype USNM 153986b; 11-15, side, ventral, anterior, dorsal, and posterior views, $\times 1$, of a large adult, paratype USNM 149550e; 16, 17, dorsal and interior views, $\times 1$, of a young brachial valve, paratype USNM 153987a; 18, partial side view of a brachial valve, $\times 2$, showing fluted ear baffles, brevisseptum, and brachial ridges, paratype USNM 153987f (for additional views of this specimen, see plate 424: figures 30-33); 19-20, dorsal and interior views of a brachial valve with unusually wide cardinal process, $\times 1$, paratype USNM 124055a; 21, 22, interior and exterior of the preceding specimen, $\times 2$, showing the remarkable development of the cardinal process; 23, interior of a brachial valve, $\times 2$, showing unusual development of the zygidium, almost burying the cardinal process, paratype USNM 153987b. [Word Formation (lens between the Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 423.—*Paucispinifera*

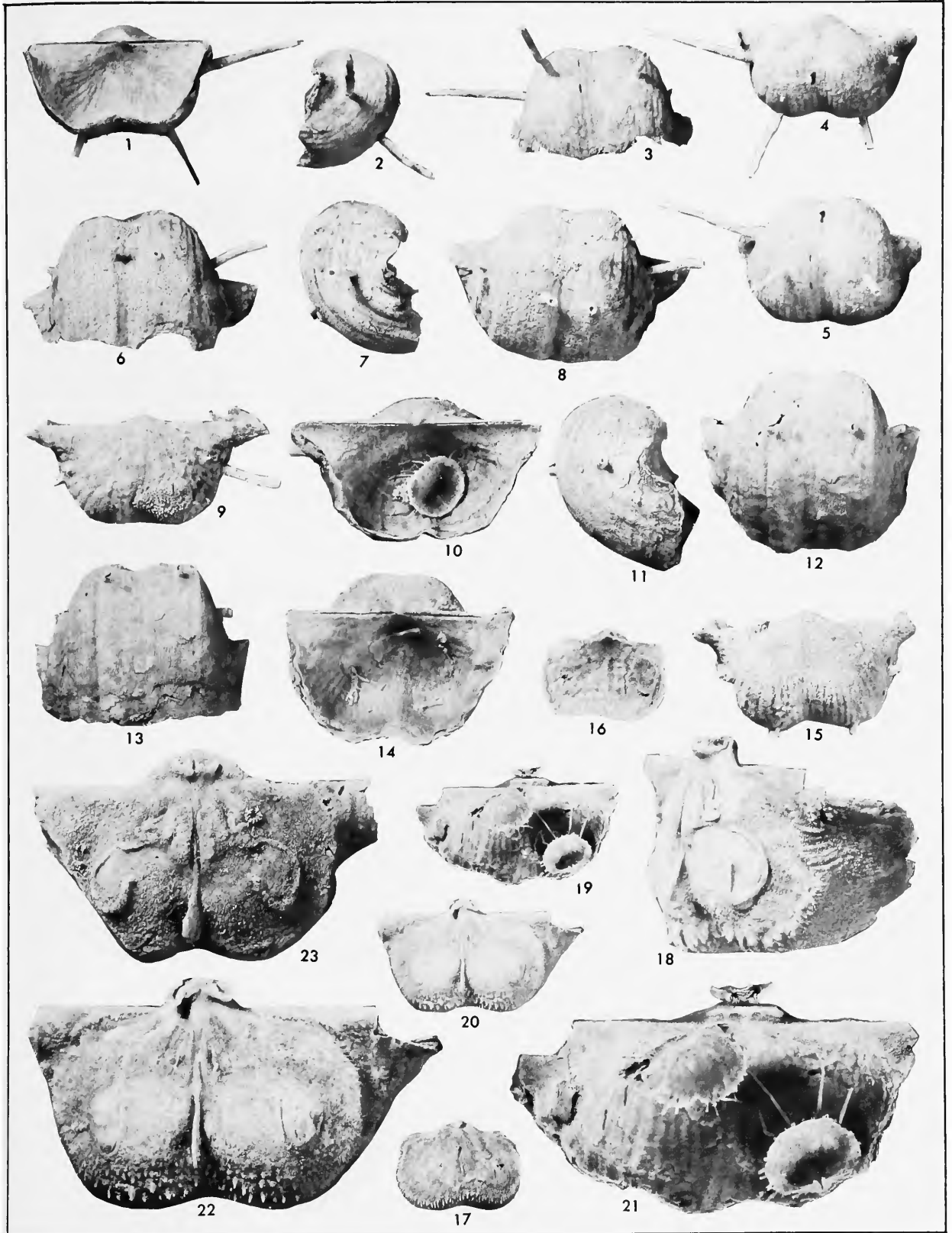


PLATE 424*Paucispinifera*

Paucispinifera quadrata, new species: 1-5, Posterior, anterior, dorsal, side, and ventral views of a strongly marked specimen, $\times 1$, paratype USNM 153987c; 6-10, side, anterior, ventral, posterior, and interior views of a pedicle valve, $\times 1$, paratype USNM 153987d; 11-15, posterior, anterior, side, ventral, and dorsal views of a young adult, $\times 1$, paratype USNM 149550m; 16-20, dorsal, side, ventral, anterior, and posterior views, of a young specimen, $\times 1$, paratype USNM 149550r; 21-25, ventral, posterior, side, anterior, and dorsal views of an immature specimen, $\times 1$, paratype USNM 149550t; 26-28, interior, anterior, and dorsal views of a brachial valve with long trail and well marked brachial ridges, $\times 1$, paratype USNM 153987e; 29, posterior of the preceding brachial valve showing the myophore and zygidium, $\times 3$; 30-32, dorsal, anterior, and interior views of another brachial valve, $\times 1$, paratype USNM 153987f (for enlarged side view see plate 423: figure 18); 33, interior of the preceding brachial valve, $\times 2$, showing cardinal process, muscle scars and brevisseptum; 34, 35, anterior and side views of a brachial valve, $\times 1$, showing anterior slope and fluted ear baffles, paratype USNM 153987g; 36, 37, exterior, $\times 1$, and interior, $\times 2$, of an immature brachial valve, showing brevisseptum and small cardinal process, paratype 153987h; 38, side, $\times 1$, showing long trail, paratype USNM 153987-i; 39, interior of a pedicle valve, showing large ear baffle, $\times 2$, paratype USNM 153987k. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 424.—*Paucispinifera*

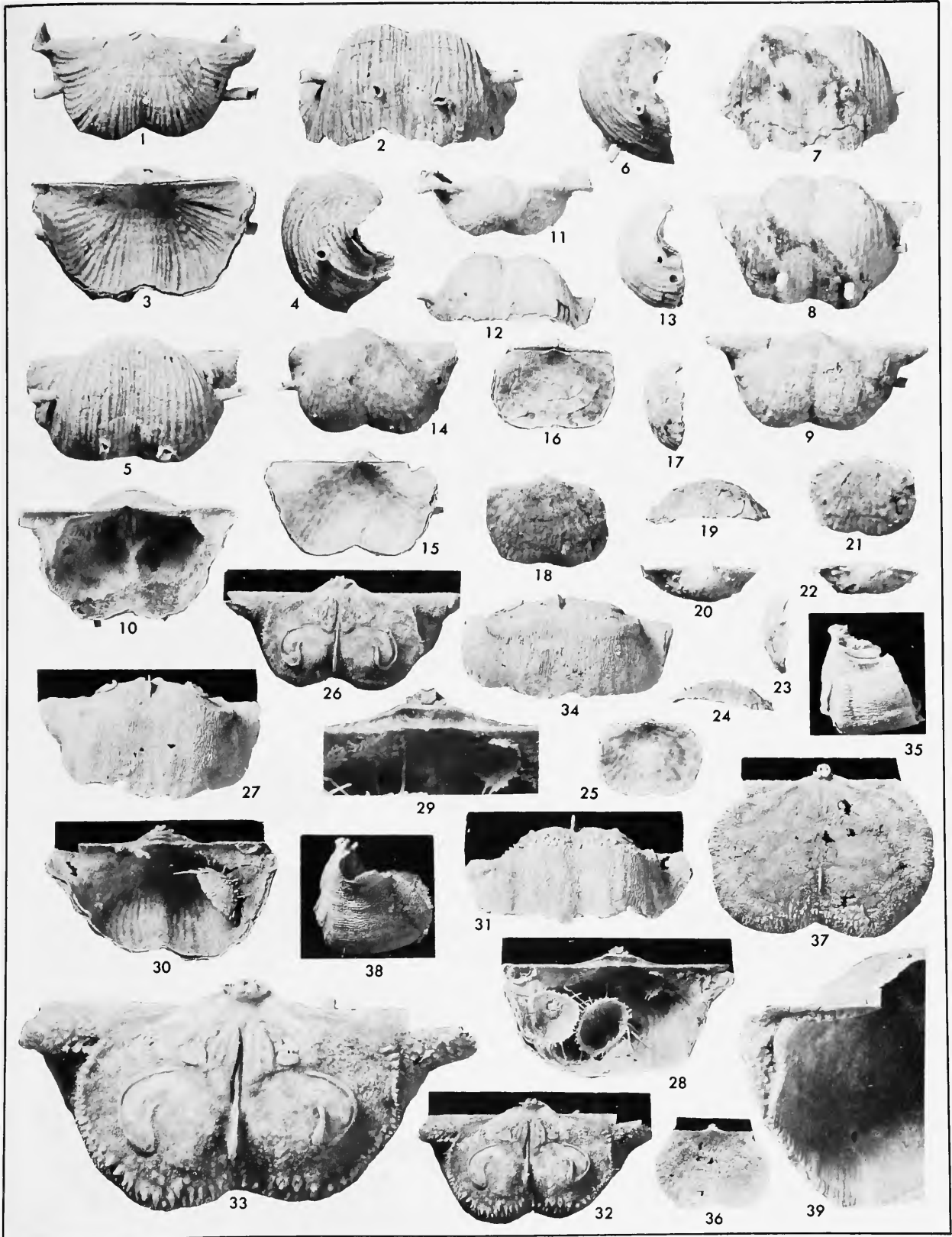


PLATE 425*Paucispinifera*

Paucispinifera tumida, new species: 1-5, Anterior, posterior, dorsal, ventral, and side views of a complete specimen, $\times 1$, paratype USNM 149555g; 6-10, ventral, side, dorsal, posterior, and anterior views, $\times 1$, of the holotype USNM 149555h; 11-13, interior, ventral, and interior tilted views of a pedicle valve with some of its spines, $\times 1$, paratype USNM 149555a; 14-16, interior, side, and dorsal views of a brachial valve, $\times 1$, paratype USNM 149555i; 17, posterior view of the preceding dorsal valve, $\times 3$, showing the myophore of the cardinal process. [Cherry Canyon Formation (Getaway Member), USNM 728.]

Paucispinifera suspecta, new species: 18-21, Side, anterior, ventral, and posterior views of a pedicle valve with long halteroid spines, $\times 1$, holotype USNM 152768a; 22-25, anterior, posterior, ventral, and side views of another pedicle valve, $\times 1$, paratype USNM 152768b; 26, 27, dorsal and interior views of a brachial valve, $\times 1$, paratype USNM 152768e; 28, interior, $\times 2$, of the preceding specimen; 29, 30, exterior and interior views of another brachial valve, $\times 1$, paratype USNM 152768f; 31, interior of the preceding brachial valve, $\times 2$, showing muscle scars and brachial ridges. [Bell Canyon Formation (Pinery Member), USNM 736.]

PLATE 425.—*Paucispinifera*

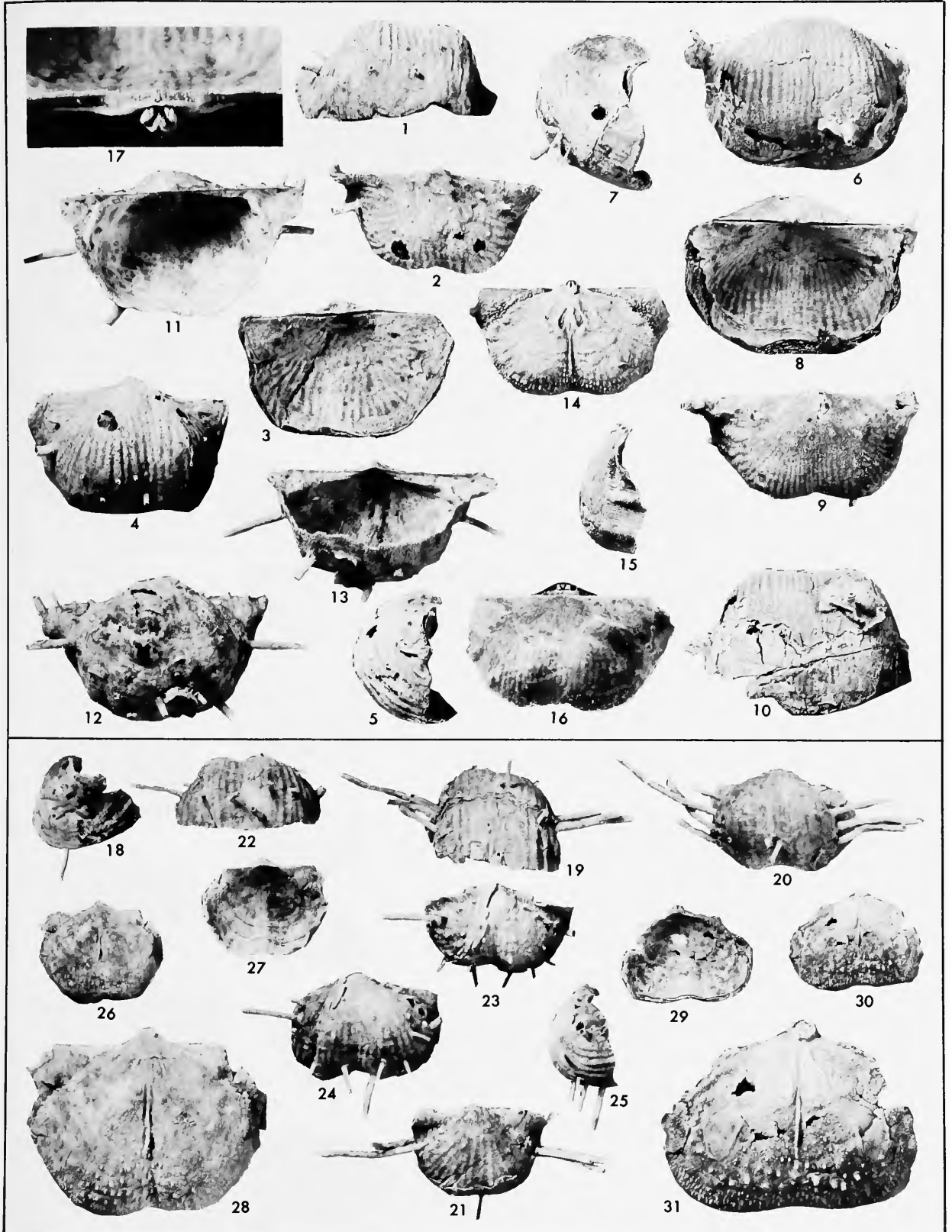


PLATE 426

Paucispinifera

Paucispinifera rectangulata, new species: 1–3, Dorsal, side, and ventral views, × 1, holotype USNM 152761a; 4–6, exterior, interior, and side views of the brachial valve, × 1, paratype USNM 152761b; 7, same brachial valve interior, × 2. [Word Formation (Willis Ranch Member), USNM 723w.]

Paucispinifera latidorsata (Girty): 8–11, Posterior, ventral, side, and dorsal views of a complete specimen retaining remnants of its halteroid spines, × 1, hypotype USNM 153952a; 12–15, exterior, interior, side, and posterior views of a fragmentary brachial valve, × 1, hypotype USNM 153952b. [Bell Canyon Formation (Hegler Member), USNM 731.]

Paucispinifera indentata (Girty): 16–19, Anterior, side, posterior, and ventral views of a pedicle valve, × 1, hypotype USNM 152760a; 20–21, interior and exterior of a brachial valve, × 1, hypotype USNM 152760b; 22, interior, × 2, of the preceding brachial valve. [Bell Canyon Formation (Hegler Member), USNM 732a.]

Paucispinifera sulcata, new species: 23–26, Posterior, ventral, anterior, and side views of a complete specimen, × 1, paratype USNM 155049. [Road Canyon Formation (base), USNM 702c.]

Paucispinifera costellata, new species: 27–31, Ventral, side, posterior, dorsal, and anterior views, × 1, of the holotype USNM 149564. [Road Canyon Formation, USNM 703 = AMNH 503.]

Paucispinifera intermedia, new species: 32–35, Interior, posterior, ventral, and side views of a large pedicle valve, × 1, showing car baffles and some spines, paratype USNM 149561a; 36–40, dorsal, ventral, side, posterior and anterior views of a complete specimen, × 1, holotype USNM 149561b; 41–45, dorsal, ventral, side, anterior, and posterior views of a small adult, × 1, paratype USNM 149561i; 46–50, dorsal, posterior, side, ventral, and anterior views of another complete individual, × 1, paratype USNM 149561o; 51–53, side, exterior, and interior views of a brachial valve, × 1, showing the zygidium, paratype USNM 149561q; 54–56, exterior, interior, and side views of another brachial valve, × 1, paratype USNM 149561r; 57, 58, interior and exterior of a brachial valve with distorted cardinal process, × 1, paratype USNM 149561p. [Word Formation (China Tank Member), USNM 706c.]

PLATE 426.—*Paucispinifera*

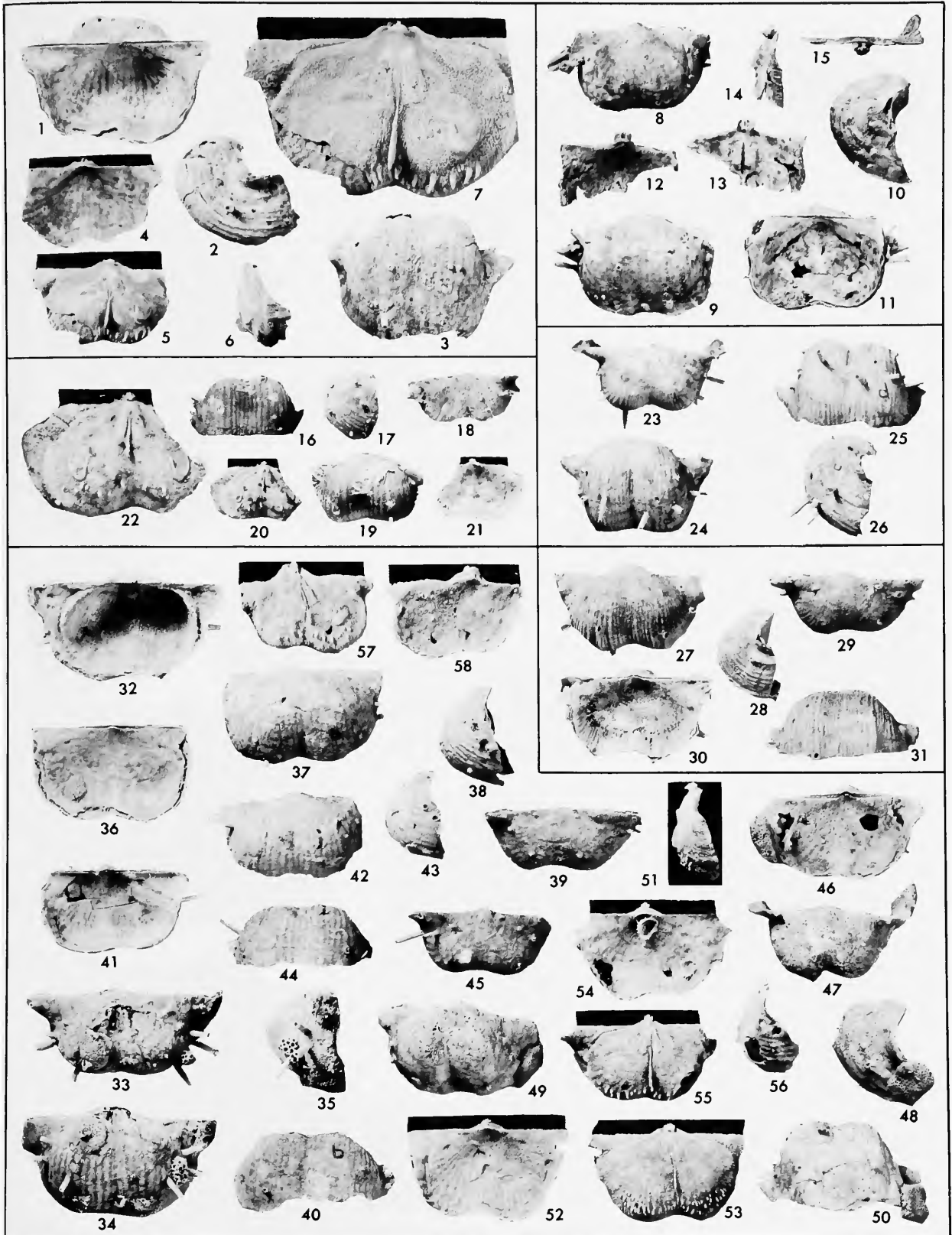


PLATE 427*Polymorpharia*

Polymorpharia polymorpha, new species: 1-3, Dorsal, side, and ventral views, \times 1, holotype USNM 149449s; 4-5, interior and exterior of a pedicle valve, \times 1, paratype USNM 149449t; 6, interior of the preceding specimen, \times 2, showing interarea; 7-9, ventral, side, and interior views of another pedicle valve, \times 1, paratype USNM 149449b; 10-14, ventral, anterior, posterior, interior, and side views of a pedicle valve, \times 1, showing muscle scars and granular interior, paratype USNM 149449c; 15, interior of a brachial valve, \times 1, paratype USNM 149449u; 16, cardinal process and zygidium, \times 4, of the preceding specimen; 17, interior of the preceding specimen, \times 2, showing brachial ridges and brevisseptum; 18, 19, exterior and interior of a brachial valve, \times 1, paratype USNM 149449q; 20, interior of the preceding specimen, \times 2, showing cardinal process, muscle scars and brevisseptum; 21, 22, posterior and interior views of the preceding specimen, \times 4, showing zygidium, cardinal process, and muscle scars; 23, posterior of another brachial valve, \times 4, showing the zygidium, paratype USNM 149449p; 24, interior of a brachial valve with pathologic cardinal process, \times 1, paratype USNM 149449r; 25, interior of the preceding specimen, \times 2, showing growths anterior to cardinal process; 26, posterior of the preceding specimen \times 4, showing the pathology in more detail. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 427.—*Polymorpharia*

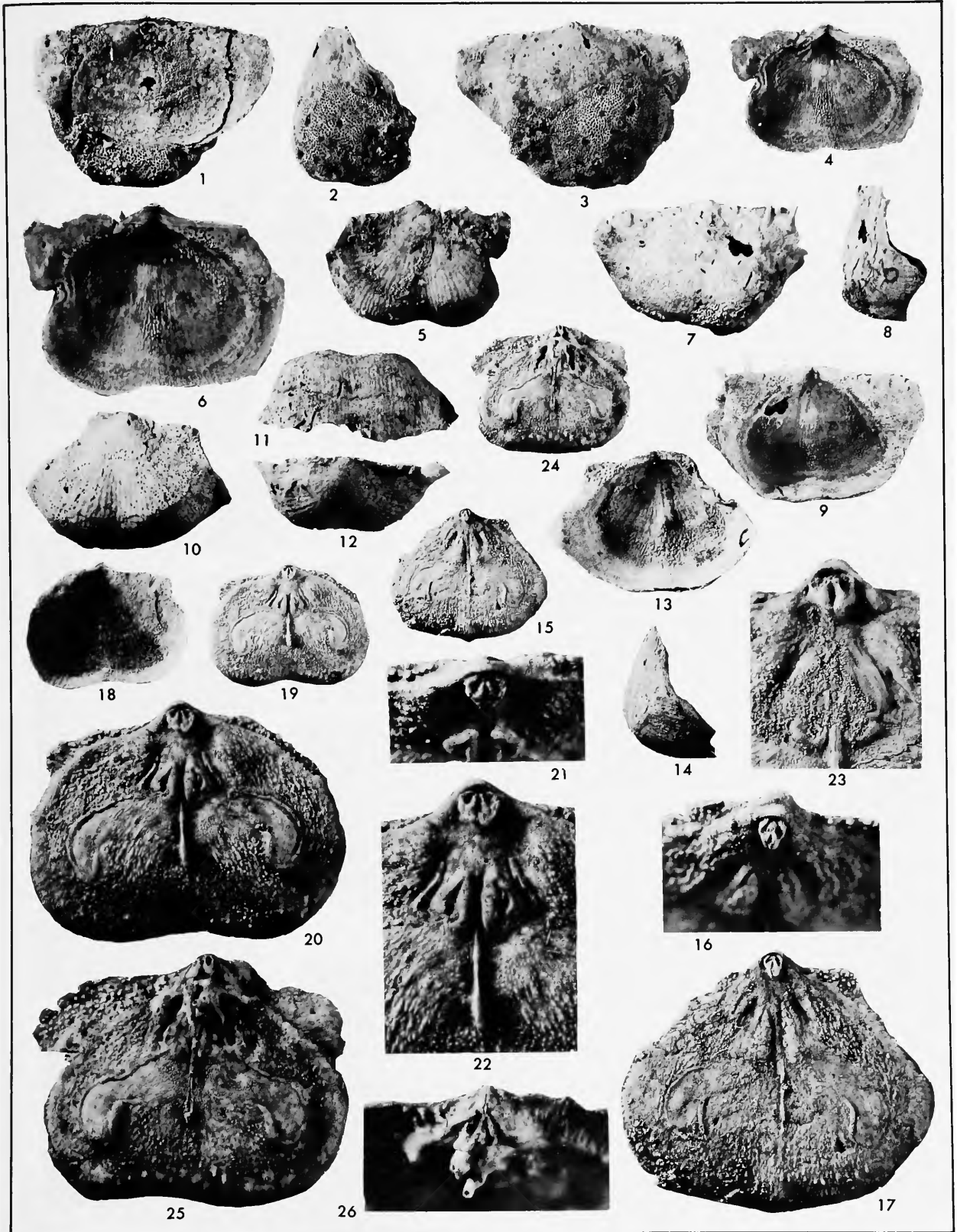


PLATE 428

Canocrinella

Canocrinella distorta, new species: 1-4, Ventral, side, anterior, and dorsal views, $\times 1$, holotype USNM 152773. [Word Formation (Appel Ranch Member), USNM 715i.]

5-8, Posterior, ventral, anterior, and side views of a ventral valve, $\times 1$, paratype USNM 153851a; 9, 10, exterior and interior of a fragmentary brachial valve, $\times 1$, showing delicate structures, paratype USNM 153851b; 11, posterior view of the preceding specimen, $\times 3$, showing the small cardinal process. [Word Formation (Appel Ranch Member), USNM 719z.]

Canocrinella fragosa, new species: 12-14, Ventral, side, and posterior views of a ventral valve, $\times 1$, paratype USNM 152774a; 15-17, posterior, ventral, and side views of another pedicle valve, $\times 1$, holotype USNM 152774b; 18, dorsal view of the brachial valve exterior, $\times 1$, paratype USNM 152774o. [Skinner Ranch Formation (base), USNM 712p.]

Canocrinella parva, new species: 19, 20, Ventral view of a pedicle valve preserving most of its spines, $\times 1$, $\times 3$, paratype USNM 153852. [Neal Ranch Formation (beds 12-14 of P. B. King), USNM 701c.]

21, Dorsal view of a specimen preserving the brachial valve, $\times 1$, paratype USNM 152775b; 22-25, dorsal, posterior, anterior, and ventral views of the preceding specimen, $\times 2$; 26-29, side, ventral, posterior, and anterior views of a pedicle valve, $\times 2$, paratype USNM 152775a; 30, 31, side and interior views of a brachial valve, $\times 2$, paratype USNM 152775c. [Neal Ranch Formation (bed 4), USNM 701d.]

32, Ventral view of a small pedicle valve, $\times 2$, paratype USNM 153853a; 33, 34, exterior, $\times 2$, and interior, $\times 4$, of a brachial valve showing the endospines and cardinal process, paratype USNM 153853b; 35, 36, exterior, $\times 2$, and interior, $\times 4$, of another brachial valve, paratype USNM 153853c; 37, ventral view of a pedicle valve preserving most of its spines, $\times 2$, paratype USNM 153853d. [Neal Ranch Formation (upper 15 feet of bed 2 of P. B. King), USNM 701.]

38-40, Dorsal, ventral, and posterior views of a complete specimen, $\times 2$, showing its spines, holotype USNM 153854. [Neal Ranch Formation (base of bed 9 of Cooper), USNM 701a².]

Canocrinella distorta, new species: 41-43, Ventral, posterior, and side views of a pedicle valve, $\times 1$, paratype YPM 10775. [Word Formation (Appel Ranch Member), R. E. King locality 247.]

Canocrinella species unidentifiable: 44, Ventral view, $\times 1$, of 3 specimens, enlarged below; 45, ventral view, $\times 3$, of figured specimen USNM 153855b; 46, ventral view, $\times 3$, of figured specimen, 153855c; 47, ventral view, $\times 3$, of figured specimen 153855a. [Cathedral Mountain Formation, USNM 702b.]

PLATE 428.—*Cancrinella*

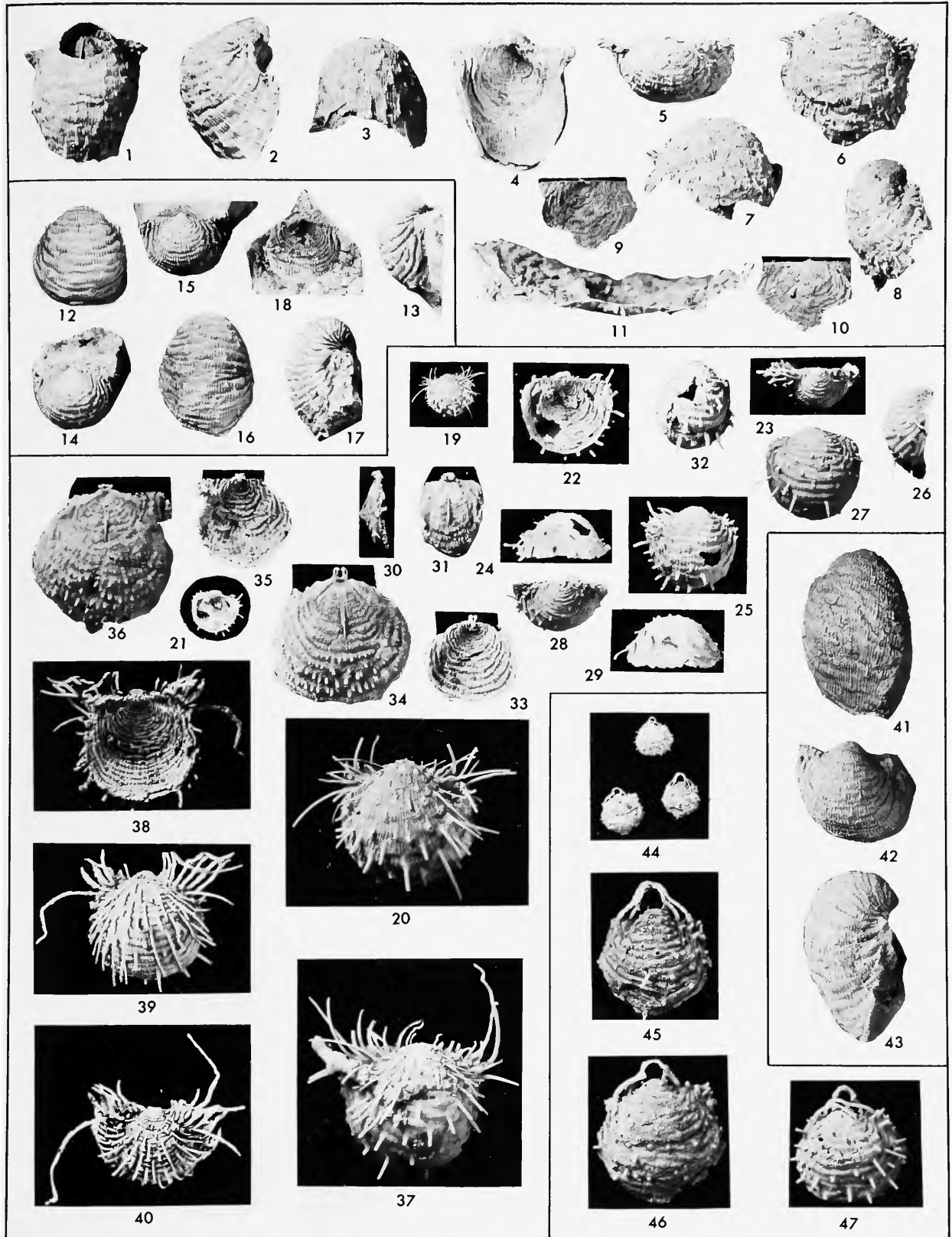


PLATE 429

Cancrinella

Cancrinella planumbona, new species: 1-4, Anterior, posterior, ventral, and side views, $\times 1$, of the holotype USNM 152779a; 5, 6, exterior, $\times 1$, and interior, $\times 2$, of a fragmentary brachial valve showing delicate structures, paratype 152779b; 7, posterior of the preceding paratype, $\times 3$, showing the cardinal process. [Word Formation (China Tank Member), USNM 706c.]

Cancrinella expansa, new species: 8-11, Anterior, posterior, side, and ventral views of an imperfect pedicle valve, $\times 1$, paratype USNM 153856a; 12-15, side, anterior, posterior, and ventral views of a nearly complete individual, $\times 1$, holotype USNM 153856b. [Word Formation (China Tank Member), USNM 706c.]

Cancrinella subquadrata, new species: 16, 17, Interior and exterior of a brachial valve, $\times 1$, paratype USNM 153857a; 18, 19, exterior, $\times 2$, and posterior, $\times 3$, of the preceding specimen, showing the cardinal process; 20, 21, exterior and interior of a brachial valve, $\times 1$, paratype USNM 153857b; 22, 23, exterior and interior of another brachial valve, $\times 1$, paratype USNM 153857c; 24-27, posterior, anterior, ventral, and side views of a ventral valve preserving many of its spines, $\times 1$, holotype USNM 152777; 28, ventral view of the holotype, $\times 2$; 29-32, side, anterior, posterior, and ventral views of a young pedicle valve preserving some of its spines, $\times 1$, paratype USNM 153857d; 33, posterior of a brachial valve, $\times 4$, showing the cardinal process, paratype USNM 153857e; 34-37, dorsal, side, anterior, and interior views of a large brachial valve, $\times 1$, paratype USNM 153858a; 38-40, dorsal, interior, and posterior views of the preceding specimen, $\times 2$, showing cardinal process, septum, endospines and the spines on the exterior. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 429.—*Cancrinella*

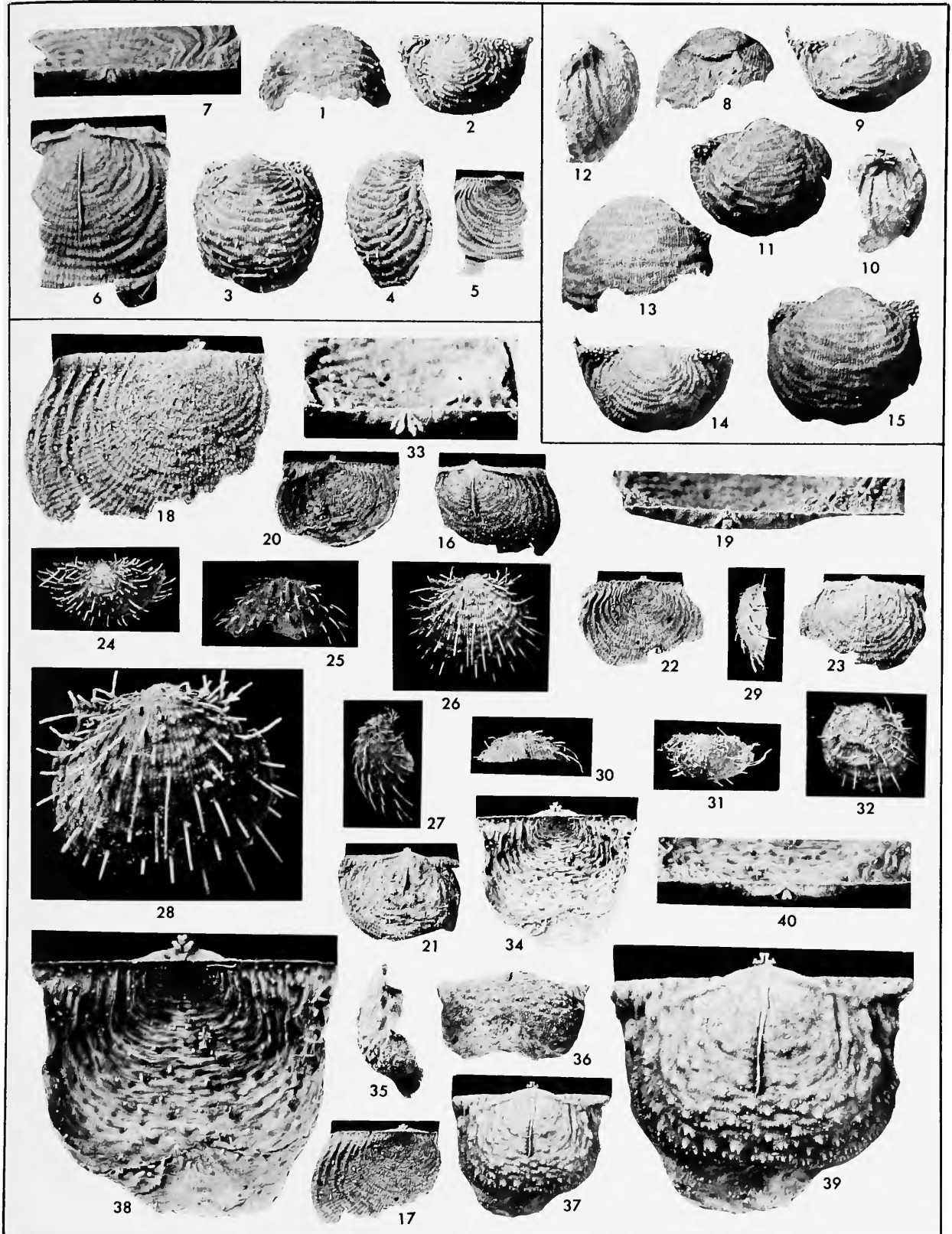


PLATE 430

Canocrinella and *Grandaurispina*

Canocrinella species indeterminate: 1, 2, Ventral views of a pedicle valve, $\times 1$, $\times 2$, figured specimen, USNM 153859a; 3, exterior of the brachial valve, $\times 1$, figured specimen, USNM 153859b. [Bone Spring Formation, USNM 746.]

Canocrinella species 1: 4, 5, Dorsal view of a nearly complete specimen, $\times 1$, $\times 2$, figured specimen, USNM 152781; 6, ventral view of the preceding specimen, $\times 2$. [Cathedral Mountain Formation, USNM 702b.]

Canocrinella species indeterminate: 7–10, Posterior, side, ventral, and dorsal views of a complete specimen, shorn of its spines, $\times 1$, figured specimen USNM 153860. [Neal Ranch Formation (bed 4 of P. B. King), USNM 727e.]

Grandaurispina species 3: 11–13, Side, posterior, and ventral views of a pedicle valve, $\times 1$, figured specimen USNM 153861; 14, ventral view of the preceding specimen, $\times 2$. [Cathedral Mountain Formation, USNM 702b.]

Canocrinella sparsispinosa, new species: 15–17, Side, posterior and ventral views of a pedicle valve preserving some of its spines, $\times 1$, paratype USNM 152780h; 18, ventral view of the paratype, $\times 2$; 19–21, posterior, side, and ventral views of another pedicle valve, $\times 1$, paratype USNM 152780i; 22, ventral view of the preceding paratype, $\times 2$; 23–26, anterior, side, posterior, and ventral views of a ventral valve, $\times 1$, paratype USNM 152780b; 27, ventral view of the preceding specimen, $\times 2$; 28–31, anterior, side, posterior, and ventral views of a large ventral valve, $\times 1$, holotype USNM 152780a; 32, ventral view of the holotype, $\times 2$; 33, posterior of a ventral valve showing the spine arrangement along the hinge, $\times 1$, paratype USNM 152780j; 34, 35, exterior and interior of a brachial valve, $\times 1$, paratype USNM 152780–l; 36, interior of the preceding specimen, $\times 2$, showing endospines and septum; 37, posterior of the preceding paratype, showing the cardinal process, $\times 3$; 38–40, exterior, $\times 1$, and interior, $\times 1$, $\times 2$, of a brachial valve, showing endospines and brevisseptum, paratype USNM 152780k; 41, posterior of the preceding specimen, $\times 3$, showing the cardinal process; 42, 43, exterior, $\times 1$, and interior $\times 2$, of another brachial valve, paratype USNM 152780m; 44, posterior of the preceding specimen, $\times 3$, showing the cardinal process; 45, 46, exterior and interior of a brachial valve, $\times 1$, paratype USNM 152780g; 47, posterior of the preceding specimen, $\times 3$, showing the cardinal process. [Bone Spring Formation, USNM 728f.]

PLATE 430.—*Canocrinella* and *Grandaurispina*

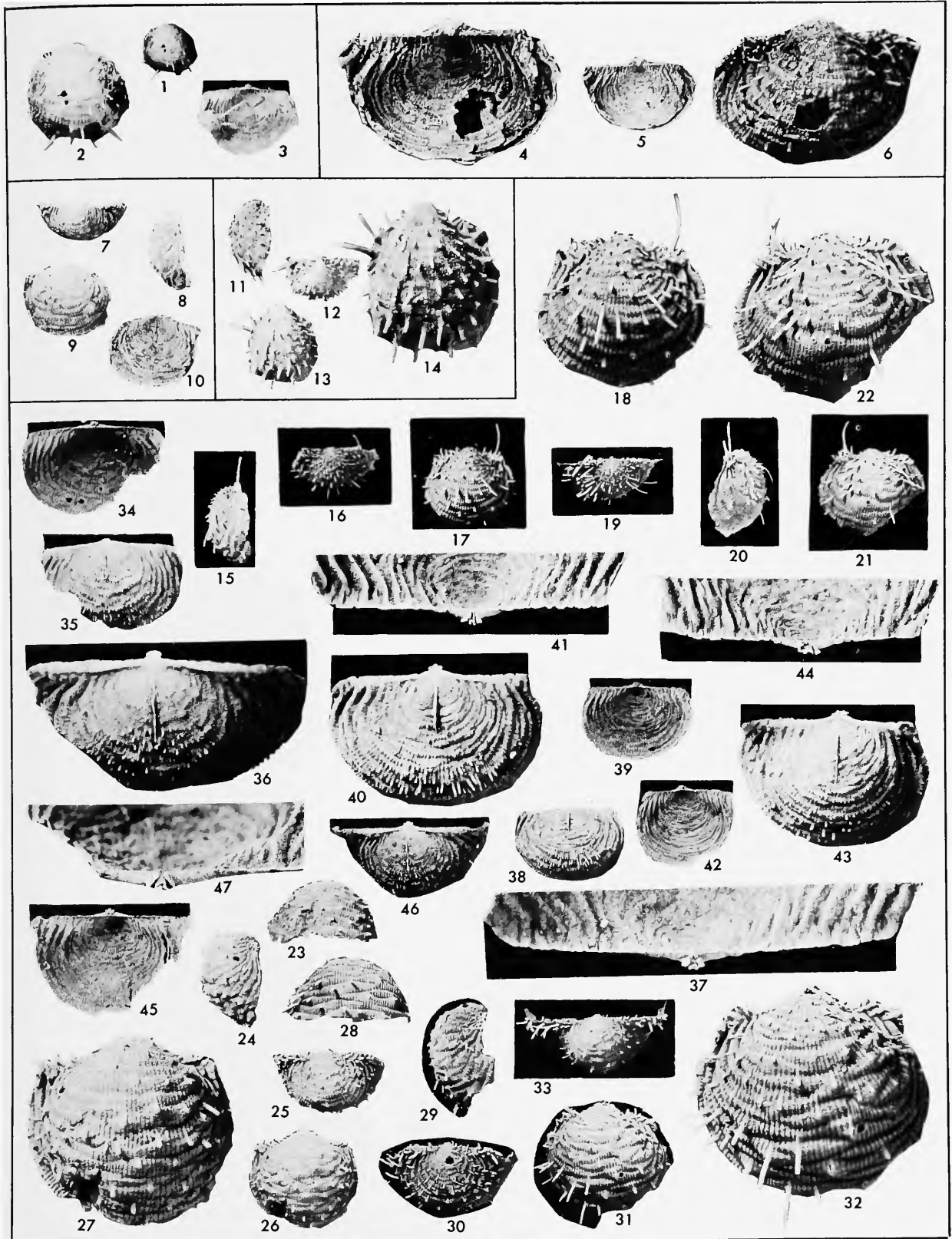


PLATE 431*Linoproductus*

Linoproductus angustus R. E. King: 1-3, Posterior, ventral, and side views of a large pedicle valve, $\times 1$, hypotype USNM 149462. [Skinner Ranch Formation (base), USNM 716p.]

Linoproductus species 1: 4-6, Posterior, side, and ventral views of a pedicle valve, $\times 1$ figured specimen USNM 152772a. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701q.]

Linoproductus semisulcatus, new species: 7-9, Ventral, posterior, and side views of a large pedicle valve, $\times 1$, holotype USNM 149490a; 10-12, ventral, posterior, and side views of a specimen preserving a mould of the brachial valve, $\times 1$, paratype USNM 149490b. [Lenox Hills Formation (base = Neal Ranch Formation of Ross), USNM 715b.]

PLATE 431.—*Linoproductus*

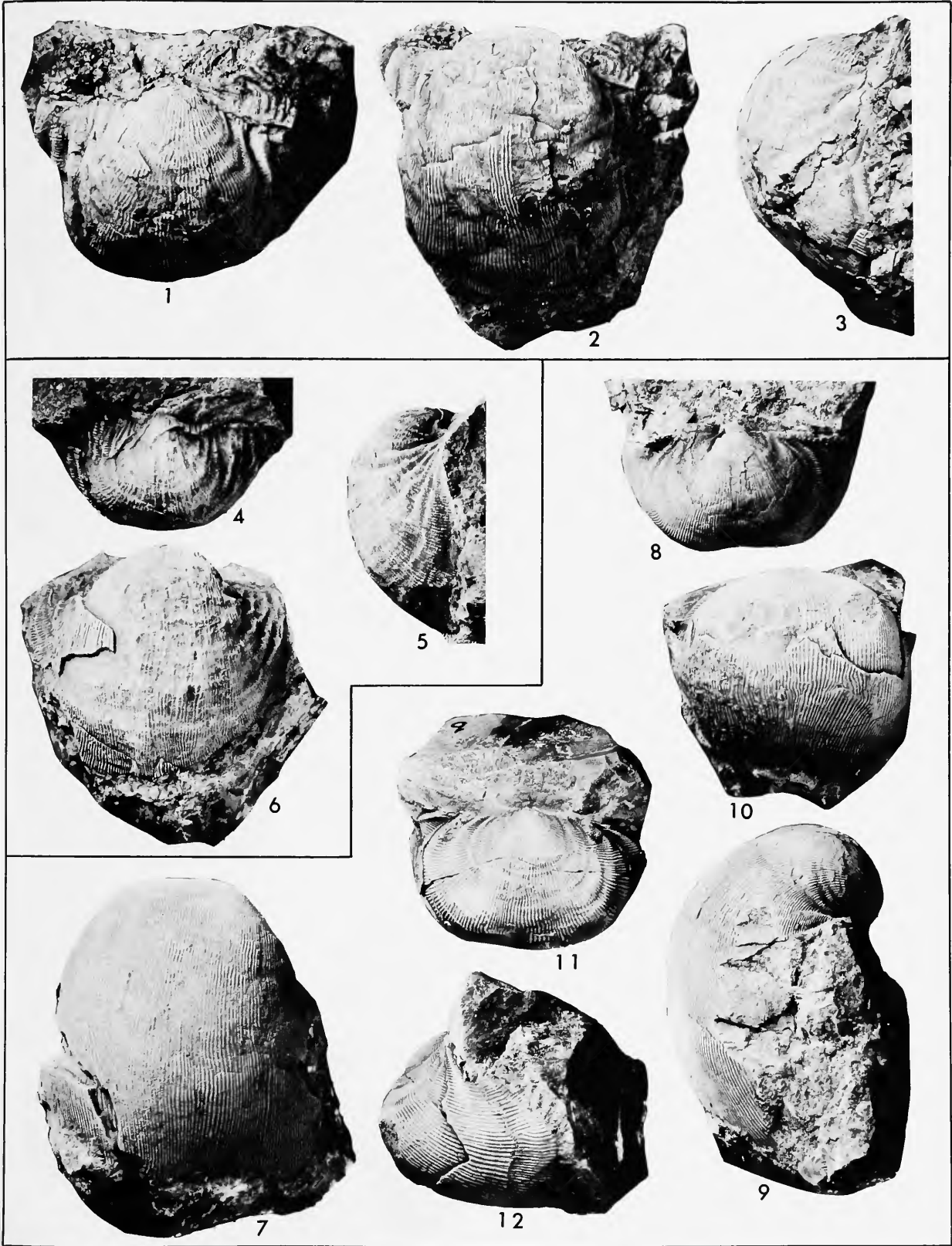


PLATE 432

Linoproductus

Linoproductus angustus R. E. King: 1, Dorsal view of immature pedicle valve, showing initial attachment ring composed of two spines, $\times 3$, hypotype USNM 140203 (Grant 1963, plate 19: figure 4); 2, another immature pedicle valve, dorsal view, $\times 4$, somewhat larger than the preceding but showing attachment ring and initial cementing surface, hypotype USNM 152890f; 3, another immature pedicle valve in dorsal view, $\times 4$, showing the attachment ring and point of cementation, hypotype USNM 152890b; 4, ventral view of an immature pedicle valve, $\times 4$, showing attachment surface and irregular spine ring, hypotype USNM 152890a; 5, 6, segment of crinoid stem encircled by spat, $\times 3$, hypotype USNM 140210 (Grant 1963, plate 19: figures 12, 13); 7, ventral view of a small pedicle valve, $\times 3$, showing impressed groove left by attachment to crinoid stem, hypotype USNM 140202 (Grant 1963, plate 19: figure 3); 8, dorsal view of another small pedicle valve, $\times 3$, showing tight ring, hypotype USNM 140201 (Grant, 1963, plate 19: figure 2); 9, dorsal view of a young adult still preserving the initial ring and lateral reinforcements of it, $\times 3$, hypotype USNM 152890c; 10, section of crinoid stem, $\times 3$, showing an immature pedicle valve in lateral view and the long initial spine growing around the stem, hypotype USNM 152890d; 11, immature pedicle valve in life position, attached to a portion of bryozan colony, $\times 3$, hypotype USNM 140214 (Grant 1963, plate 19: figure 18); 12, 13, interior of the brachial valve, $\times 1$, showing median septum and cardinal process, hypotype USNM 152890e; 14, posterior view, $\times 2$, of the preceding specimen, showing the myophore of the cardinal process. [Bone Spring Formation, USNM 728f.]

15, 16, Dorsal and ventral views of the visceral disc region of a complete specimen, $\times 1$, hypotype USNM 149460. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

17–19, Ventral, side, and posterior views of a young adult, $\times 1$, showing spine bases along posterior margin, hypotype USNM 153928. [Bone Spring Formation, USNM 728e.]

20–22, Ventral, side, and posterior views of a small adult, lectotype, $\times 1$, YPM 11519a; 23–26, ventral, side, posterior and dorsal views of a large adult, $\times 1$, paratype YPM 11519b. [Skinner Ranch Formation (base), King locality 105.]

27, Ventral view of another large pedicle valve, $\times 1$, hypotype T10057. [Stratigraphic position uncertain, R. E. King locality 15.]

PLATE 432.—*Linoproductus*

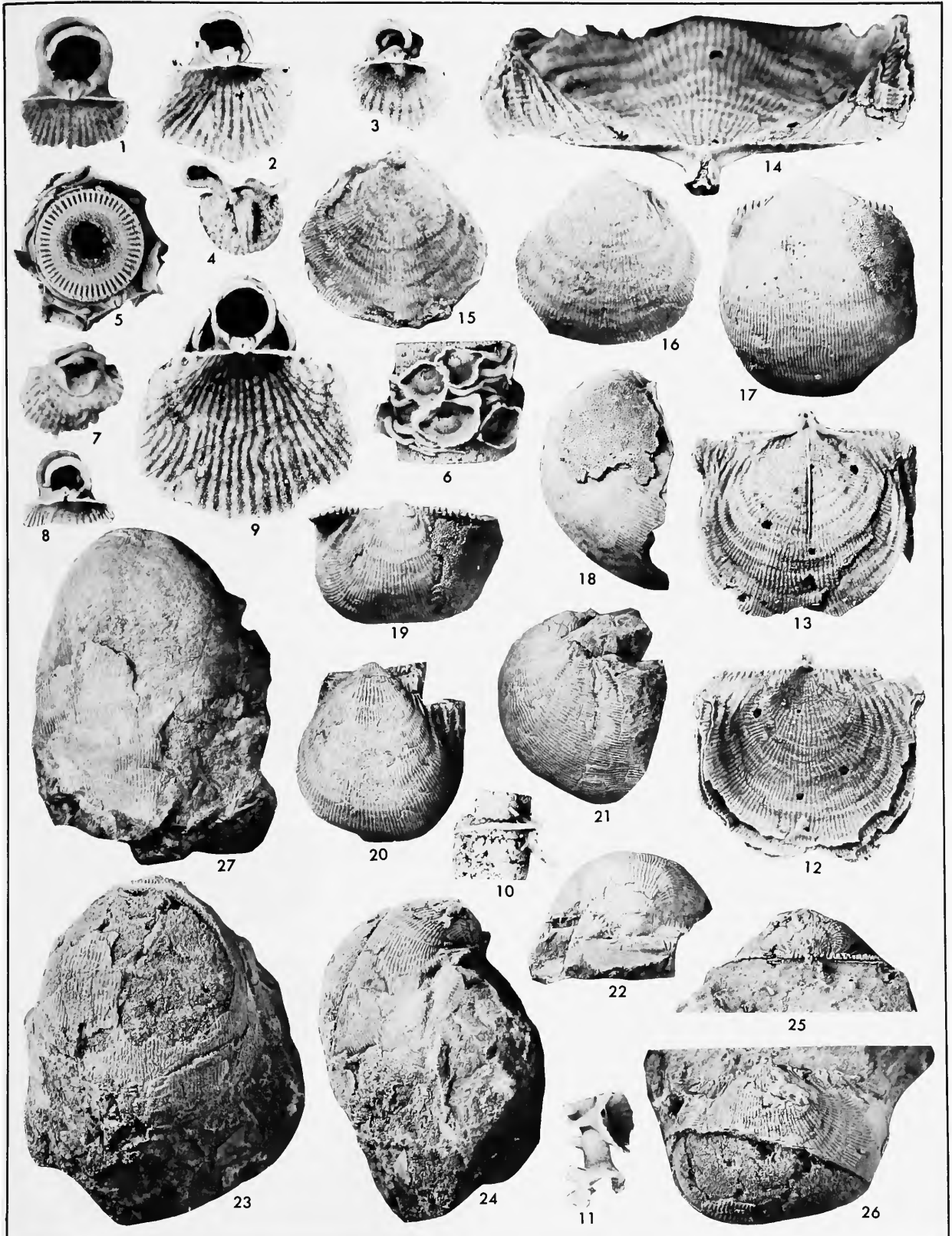


PLATE 433

Compressoproductus and *Linoproductus*

Compressoproductus species 3: 1–5, Posterior, anterior, side, ventral, and interior views of a pedicle valve, $\times 1$, figured specimen USNM 151578. [Road Canyon Formation (base) USNM 703a.]

Compressoproductus species 4: 6, 7, Ventral and posterior views of a large pedicle valve preserving some of the attachment spines, $\times 1$, figured specimen USNM 153932a; 8, 9, posterior and side views of another pedicle valve with a tuft of rhizoid spines, $\times 1$, figured specimen USNM 153932b; 10–12, interior $\times 1$, $\times 2$, and side, $\times 2$, views, of a small brachial valve, showing the unilobate cardinal process continuous with the median septum, figured specimen USNM 153932c; 13–15, interior, $\times 1$, $\times 2$, and side, $\times 2$, views of a brachial valve, showing the cardinal process, figured specimen USNM 153932d; 16–18, interior, $\times 1$, $\times 2$, and side, $\times 2$, views of another brachial valve, figured specimen USNM 153932e. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

Linoproductus nasutus R. E. King: 19–23, Anterior, posterior, side, ventral, and dorsal views of the holotype, $\times 1$, showing the nasute anterior, YPM 11523. [Word Formation (Appel Ranch Member), R. E. King locality 246.]

Linoproductus delicatus, new species: 24–26, Ventral, posterior, and side views, $\times 1$, holotype USNM 149467a. [Cathedral Mountain Formation, USNM 702.]

Linoproductus undatus, new species: 27–29, Ventral, side, and posterior views of pedicle valve, $\times 1$, showing few body spine bases, but strongly wrinkled lateral slope and ears, paratype USNM 149455a. [Hess Formation (Taylor Ranch Member), USNM 702m.]

30–33, Side, anterior, ventral, and posterior views of a pedicle valve, $\times 1$, paratype USNM 149454a; 34–36, side, ventral, and dorsal views of a silicified specimen, $\times 1$, paratype USNM 149454b; 37, 38, side and ventral views, showing the trail and mould of the brachial valve, $\times 1$, paratype USNM 149454c; 39, 40, ventral and dorsal views, $\times 1$, of the visceral region belonging to the preceding specimen; 41–43, side and ventral views, $\times 1$, and ventral view, $\times 2$, showing the strong attachment ring and accessory spines of the posterior margin, holotype USNM 149454d. The specimen must have been attached throughout most of its life. [Hess Formation (Taylor Ranch Member), USNM 702f.]

PLATE 433.—*Compressopproductus* and *Linoproductus*



PLATE 434*Yakovlevia* and *Liraria*

Yakovlevia hessorum, new species: 1, Ventral view of an immature specimen, $\times 4$, showing remnant of attachment ring and early spines just below the posterior margin, paratype USNM 151485c; 2, another immature specimen, $\times 1$, further advanced than the preceding and showing the posterior spines, paratype USNM 151860; 3, a more advanced stage than the preceding in ventral view, $\times 1$, paratype USNM 151486q; 4, another pedicle valve with posterior spines, $\times 1$, paratype USNM 151486p; 5, pedicle valve, $\times 1$, showing long marginal spines, paratype USNM 151486r; 6, very small pedicle valve, $\times 1$, paratype USNM 151486s; 7, small pedicle valve, $\times 3$, showing the posterior spines which strongly resemble those of the Chonetacea, paratype USNM 151486n (for natural size view, see plate 474: figure 9); 8, interior of the brachial valve, $\times 2$, showing brevisseptum, muscle scars and brachial ridges, paratype USNM 124051e (for $\times 1$ view of this specimen, see plate 473: figure 7). [Word Formation (Willis Ranch Member), USNM 706e.]

Liraria lirata, new species: 9–13, Posterior, anterior, ventral, side, and interior views of the pedicle valve, $\times 1$, holotype USNM 152782a; 14–18, anterior, posterior, side, ventral, and interior views of another pedicle valve, $\times 1$, paratype USNM 152782b; 19, 20, interior and exterior of a brachial valve, $\times 1$, paratype USNM 152782j; 21, exterior of the preceding specimen, $\times 2$; 22, 23, posterior and interior views of the preceding specimen, $\times 4$, showing small cardinal process and internal ridges; 24, 25, exterior and interior of another brachial valve, $\times 1$, paratype USNM 152782k; 26, exterior of the preceding, $\times 2$, showing dorsal ornament; 27, 28, posterior and interior of the preceding, $\times 4$, showing cardinal process and inner ridges; 29, exterior of a brachial valve, $\times 2$, paratype USNM 152782i; 30, interior of the preceding, $\times 3$, showing the cardinal process and interior ridges. [Bone Spring Formation, USNM 728e.]

PLATE 434.—*Yakovlevia* and *Liraria*

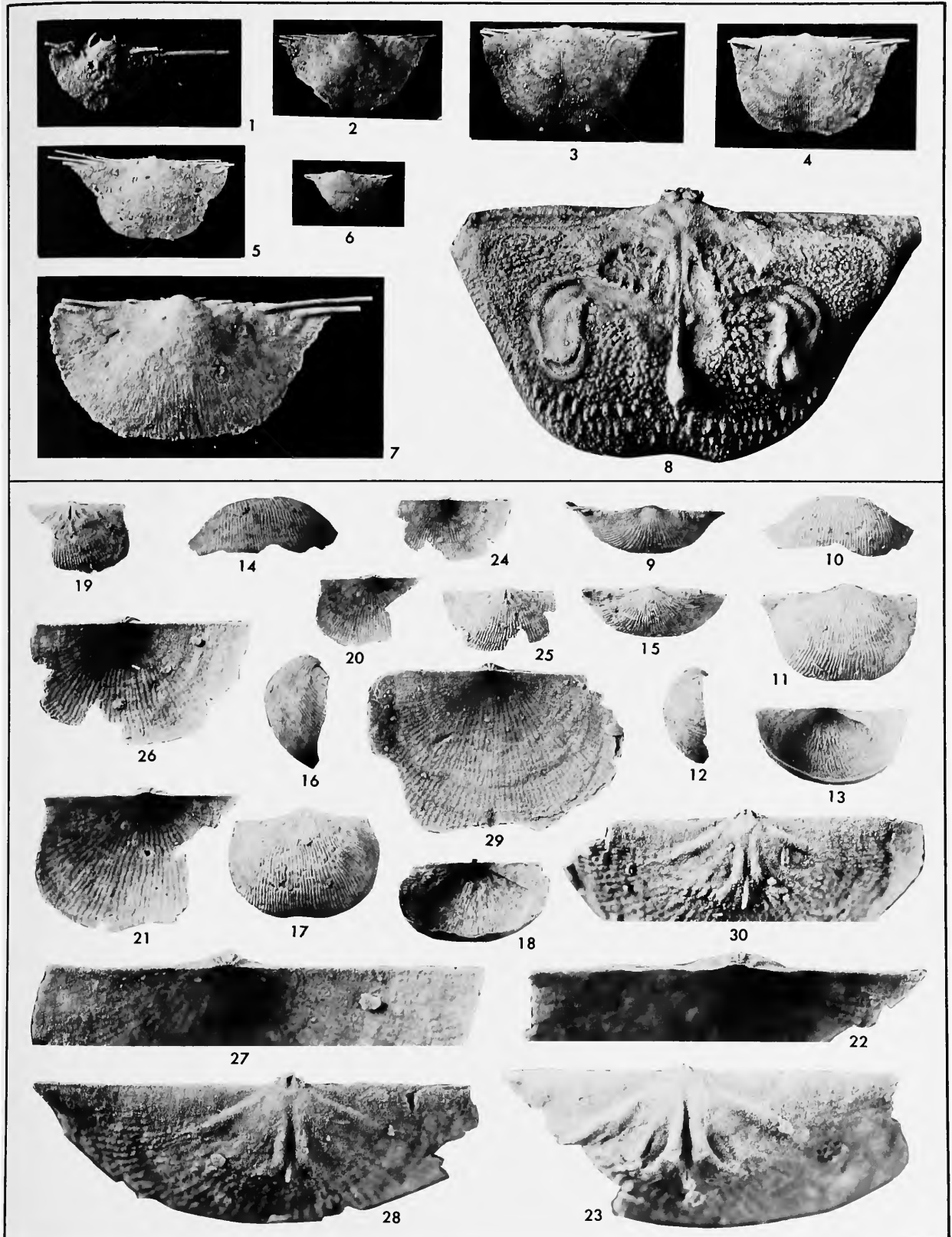


PLATE 435*Grandaurispina*

Grandaurispina (?) *vaga*, new species: 1, 2, Posterior and ventral views of a large pedicle valve preserving some of its halteroid spines and the body spines, $\times 1$, paratype USNM 153886g; 3-6, anterior, ventral, side, and dorsal views of another spiny specimen, $\times 1$, paratype USNM 153886h; 7-10, anterior, ventral, side, and dorsal views of another complete specimen, having a spiny brachial valve, $\times 1$, paratype USNM 153886i; 11-15, anterior, side, ventral, posterior, and dorsal views of a complete specimen, $\times 1$, holotype, USNM 152786a; 16-18, dorsal and interior views, $\times 1$, and interior, $\times 2$, of a brachial valve, showing median septum and endospines, paratype USNM 152786e; 19, 20, interior and exterior of a brachial valve, $\times 1$, paratype USNM 153886j; 21, 22, same views, $\times 2$, of the same specimens; 23, dorsal view, $\times 3$, of the cardinal process of the preceding specimen; 24, interior of another brachial valve, $\times 2$, paratype USNM 152786f. [Cathedral Mountain Formation, USNM 702un.]

25-28, Anterior, posterior, dorsal, and side views of a complete specimen stripped of its spines by accident, $\times 1$, paratype USNM 152785a; 29, 30, ventral views of the preceding specimen before the spines were lost, $\times 1$, $\times 2$, showing long halteroid spines; 31, 32, dorsal view of a pedicle valve, $\times 1$, $\times 2$, showing strong ear baffles, paratype USNM 152785b. [Cathedral Mountain Formation, USNM 702.]

PLATE 435.—*Grandaurispina*

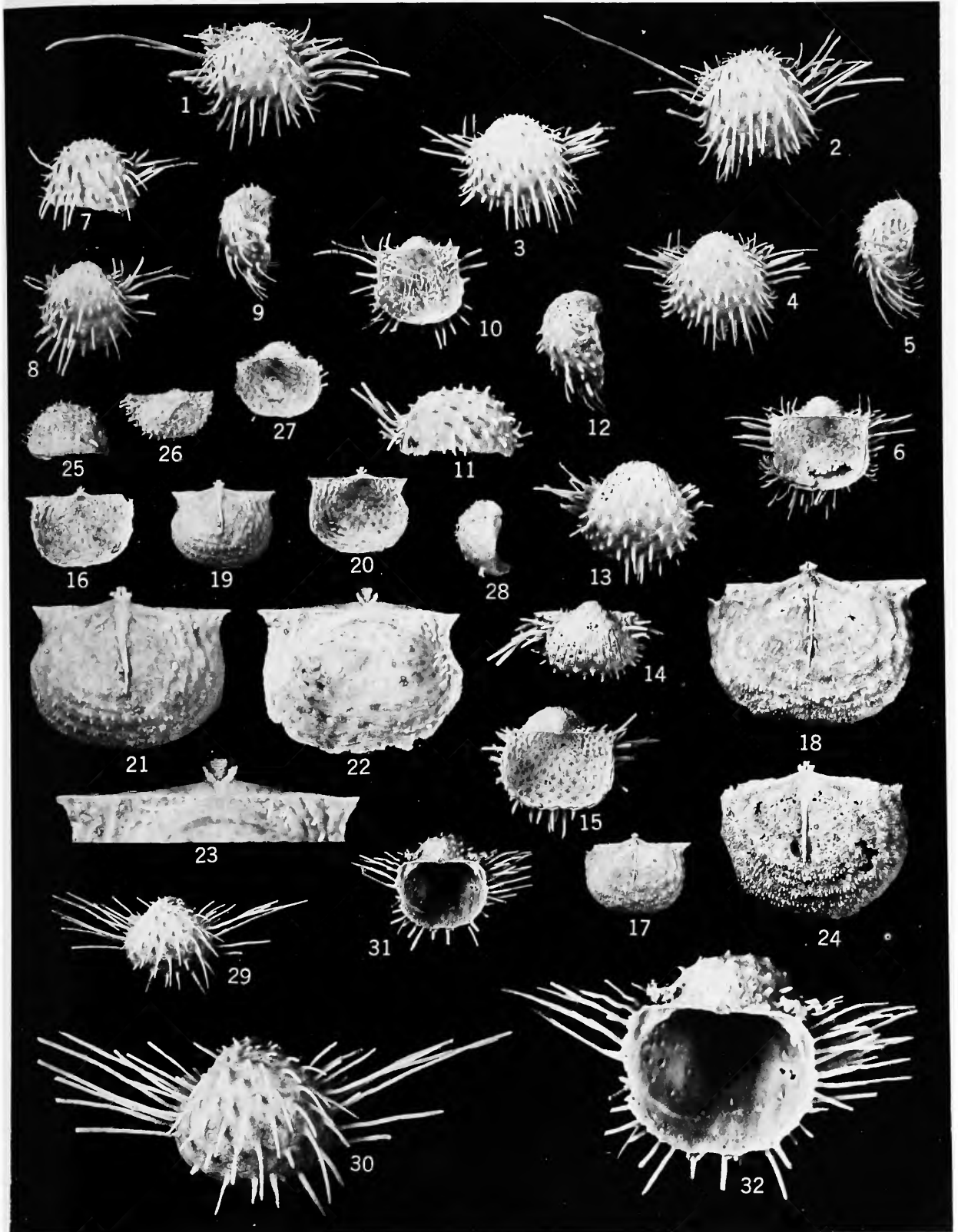


PLATE 436

Grandaurispina

Grandaurispina kingorum Muir-Wood and Cooper: 1-4, Posterior, dorsal, ventral, and anterior views of a specimen with large thick halteroid spines over the ears, $\times 1$, hypotype USNM 153887a; 5, 6, posterior and ventral views of a large specimen with long halteroid spines, $\times 1$, hypotype USNM 153887d; 7, posterior view of another large pedicle valve, $\times 1$, hypotype USNM 153887c; 8, ventral view of an immature specimen, $\times 1$, hypotype USNM 153889a; 9, ventral view, $\times 1$, of a pedicle valve, larger than the preceding and retaining the initial attachment ring, hypotype USNM 153889b; 10, 11, ventral and anterior views of a pedicle valve, $\times 1$, larger than the preceding, hypotype USNM 153889g; 12, ventral view of nearly mature pedicle valve, $\times 1$, hypotype USNM 149994a; 13-15, ventral, posterior, and anterior views of a nearly full grown pedicle valve, $\times 1$, hypotype USNM 153889h; 16-19, posterior, ventral, anterior, and dorsal views of a small adult, $\times 1$, hypotype USNM 153887b; 20, ventral view of a large swollen specimen, $\times 1$, hypotype USNM 149994b; 21, dorsal view of a complete specimen preserving a large halteroid spine and the stumps of others, $\times 1$, hypotype USNM 149994c; 22, dorsal view of a specimen showing the spiny brachial valve, $\times 2$, holotype USNM 123454 (specimen now broken). [Word Formation (Willis Ranch Member), USNM 706e.]

23, 24, Posterior and ventral views of a large pedicle valve, $\times 1$, hypotype USNM 153888b; 25, 26, ventral and posterior views of a large specimen with long halteroid spines, $\times 1$, hypotype USNM 153888c. [Word Formation (China Tank Member), USNM 706c.]

PLATE 436.—*Grandaurispina*

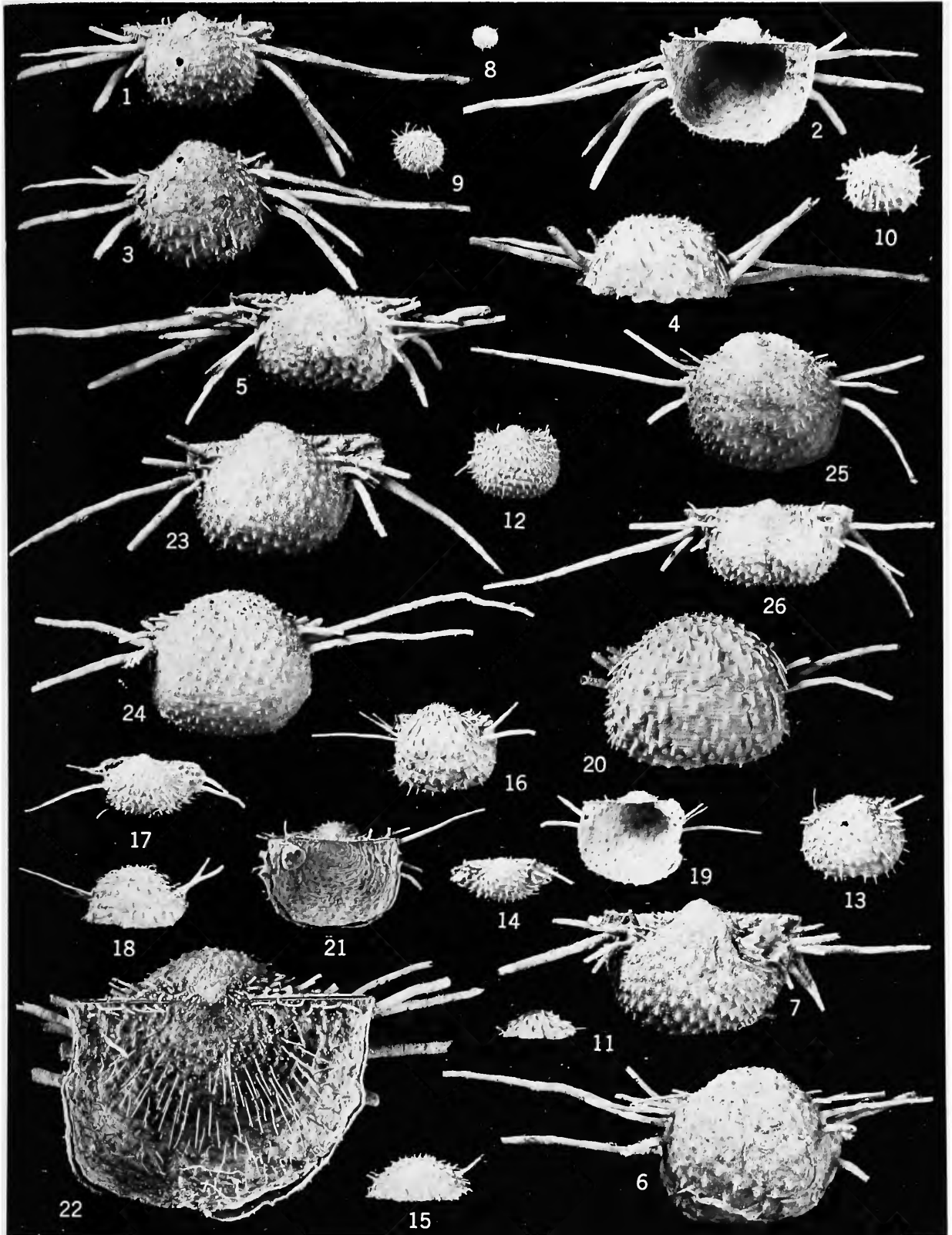


PLATE 437

Grandaurispina

Grandaurispina kingorum Muir-Wood and Cooper: 1, Ventral view of 4 immature pedicle valves and exterior of a brachial valve, $\times 1$, hypotypes 153890a (top), 153890b and c (second row), 153890d and e (bottom row); 2, 3, ventral and dorsal views of a small, complete adult, $\times 1$, hypotype USNM 149994d; 4, ventral view, $\times 3$, of hypotype 153890a; 5, ventral view, $\times 3$, of hypotype USNM 153890e; 6, ventral view, $\times 1$, of hypotype USNM 153890b; 7–10, anterior, side, posterior, and dorsal views of a small adult, $\times 1$, hypotype USNM 152784c; 11, 12, dorsal view of a brachial valve, $\times 1$, $\times 2$, showing the thick forest of spines on the exterior, paratype USNM 123455f; 13, 14, exterior of another brachial valve displaying the protective spines, $\times 1$, $\times 2$, paratype USNM 123455g; 15, exterior of a brachial valve stripped of its spines but showing numerous dimples, $\times 1$, hypotype USNM 149994h; 21, 22, interior of preceding specimen $\times 1$, $\times 2$; 16, 17, interior and dorsal views of a brachial valve, $\times 1$, showing the thick median ridge, hypotype USNM 149994f; 18, 19, interior and tilted exterior of the preceding specimen, $\times 2$, showing the brachial ridges and cardinal process; 20, dorsal view of a brachial valve, $\times 1$, showing spines, hypotype USNM 149994g; 23, posterodorsal view of the cardinal process of the preceding specimen, $\times 2$, showing the myophore; 24, 25, interior of an immature brachial valve, $\times 1$, $\times 2$, showing the septum and endospines, hypotype USNM 149994i; 26, interior of a brachial valve, smaller than the preceding, $\times 1$, hypotype USNM 149994j; 27, exterior of a brachial valve, $\times 1$, showing numerous protective spines, hypotype USNM 153890f; 28–30, ventral, posterodorsal, and posterior views of the cardinal process of a large brachial valve, $\times 3$, paratype USNM 123455e; 31, exterior of another brachial valve, $\times 1$, showing the forest of protective spines, hypotype USNM 153890g; 32, posterodorsal view of the myophore of the cardinal process of a large brachial valve, $\times 3$, hypotype USNM 149994k. [Word Formation (Willis Ranch Member), USNM 706c.]

PLATE 437.—*Grandaurispina*

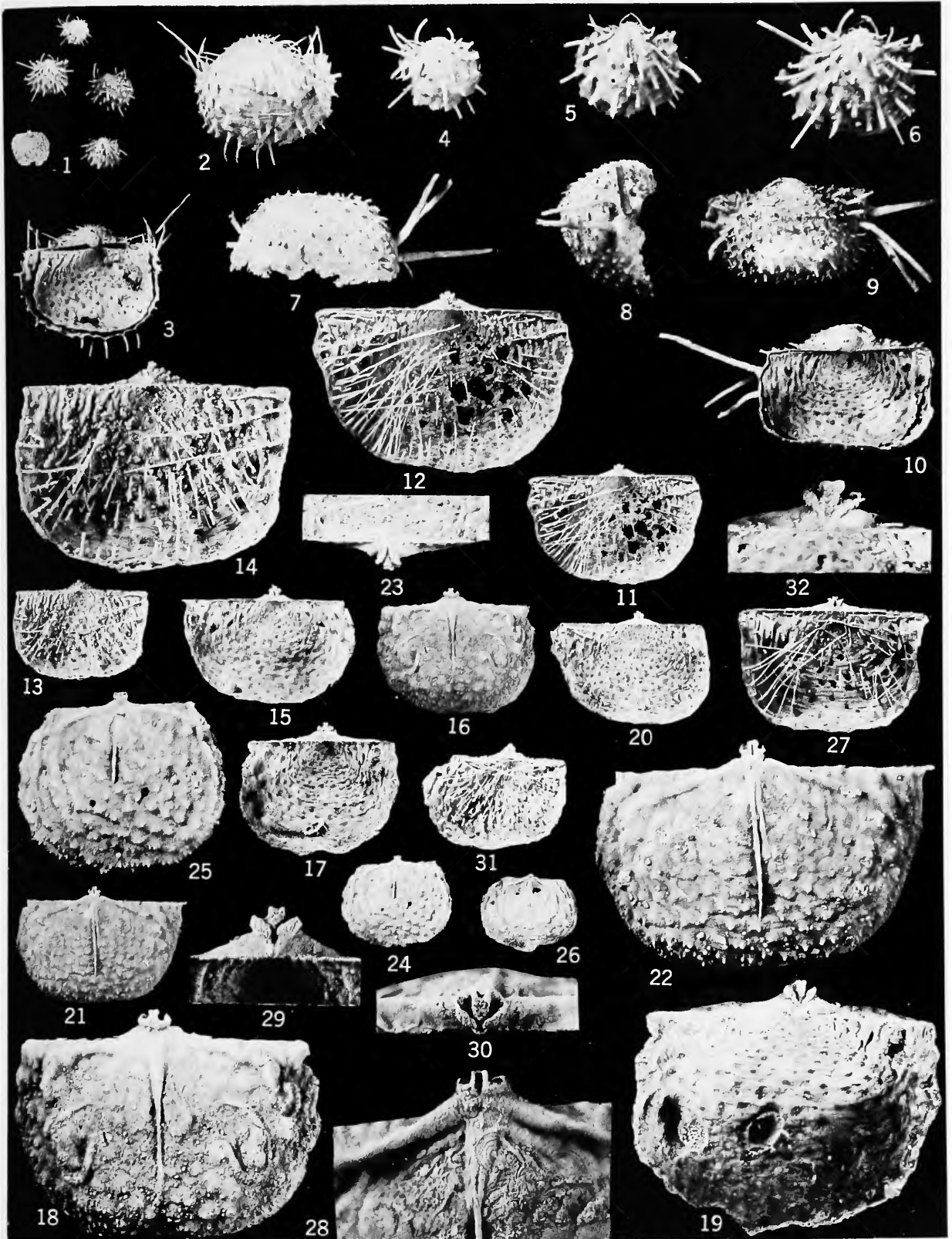


PLATE 438*Grandaurispina*

Grandaurispina crassa, new species: 1-5, Dorsal, anterior, posterior, ventral, and side views of a small but complete specimen, × 1, paratype USNM 150016d; 6-9, dorsal, side, ventral, and posterior views of a large, narrow specimen, × 1, paratype USNM 150016a. [Word Formation (Appel Ranch Member), USNM 706d.]

10-13, Ventral, interior, posterior, and anterior views of a large pedicle valve, × 1, paratype USNM 150018k; 14-18, anterior, ventral, side, posterior, and dorsal views of a complete specimen, × 1, holotype USNM 150018c; 19-21, posterior, ventral, and side views of a young pedicle valve, × 1, paratype USNM 150018i; 22, 23, exterior and interior views of a brachial valve, × 1, paratype USNM 150018q; 24, 25, interior and exterior of the preceding brachial valve, × 2, showing the median septum and cardinal process; 26, 27, exterior and interior of another brachial valve, × 1, paratype USNM 150018p; 28, 29, interior and exterior views of the preceding paratype, × 2, showing protective spines and endospines. [Word Formation (Appel Ranch Member), USNM 715i.]

30-33, Posterior, side, anterior, and ventral views of a large pedicle valve, × 1, paratype USNM 153891. [Word Formation (Appel Ranch Member), USNM 719z.]

PLATE 438.—*Grandaurispina*

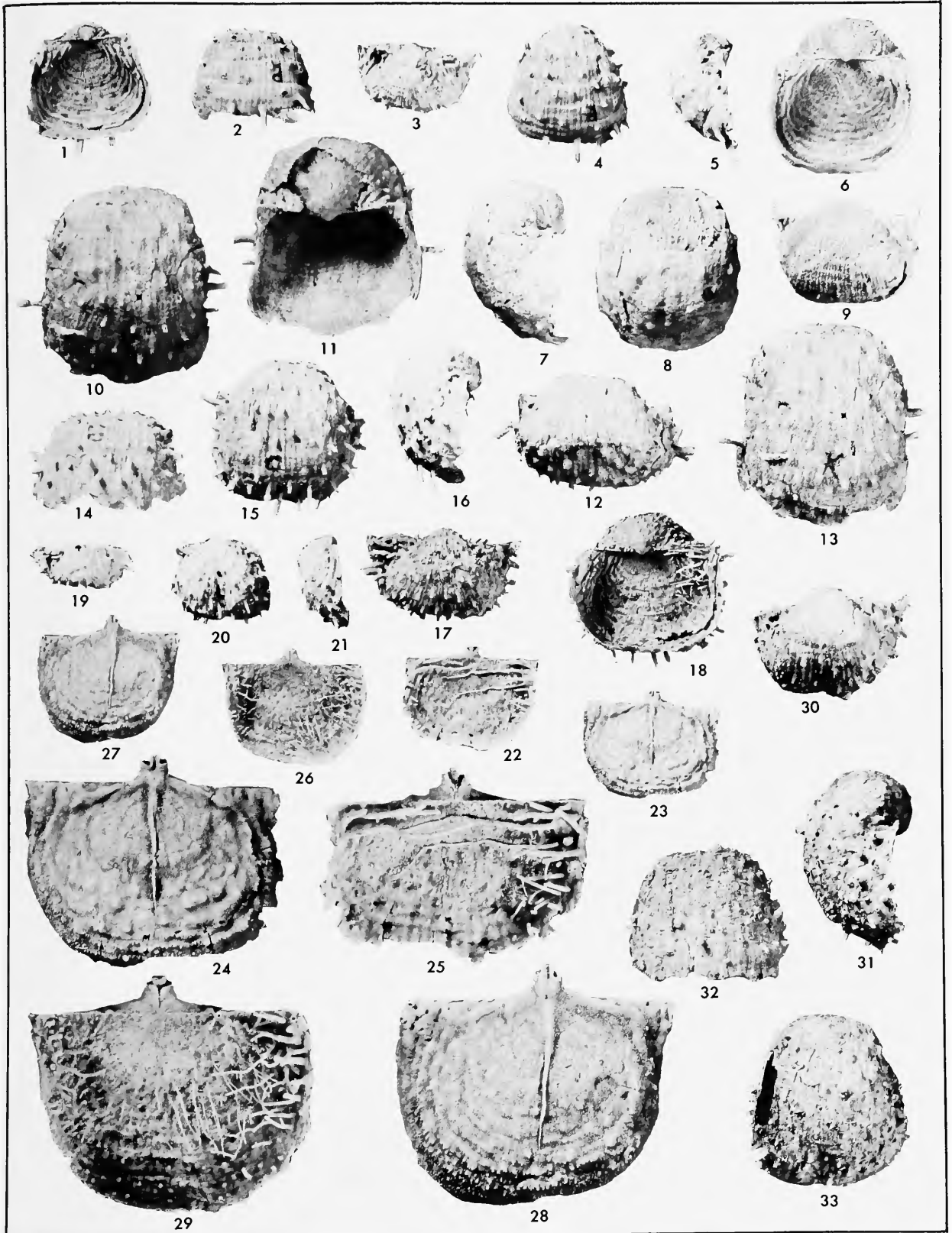


PLATE 439

Grandaurispina

Grandaurispina kingorum Muir-Wood and Cooper: 1, Exterior of a brachial valve with unusual development of the cardinal process region, $\times 1$, hypotype USNM 149994m; 2, 3, interior and exterior of the preceding specimen, $\times 2$, showing the tissue almost burying the cardinal process; 4, exterior of another, normal brachial valve, $\times 1$, hypotype USNM 149994e; 5, posterodorsal view of the preceding specimen, showing the myophore of the cardinal process, $\times 2$. [Word Formation (Willis Ranch Member), USNM 706e.]

Grandaurispina rudis, new species: 6–10, Ventral, posterior, anterior, interior, and side views of a small pedicle valve preserving the halteroid spines, $\times 1$, paratype USNM 150008d; 11–15, anterior, posterior, side, interior, and ventral views of another pedicle valve, $\times 1$, paratype USNM 150008a; 16–19, side, posterior, ventral, and anterior views of a large pedicle valve, $\times 1$, holotype USNM 150008h; 20, 21, exterior and interior of a brachial valve, $\times 1$, paratype USNM 150008g; 22, 23, exterior and interior of the preceding brachial valve, $\times 2$, showing septum and cardinal process; 24, posterodorsal view of the cardinal process of the preceding specimen, $\times 3$; 25, 26, exterior and interior of another brachial valve, showing a veritable forest of protective spines, $\times 1$, paratype USNM 150008b; 27, 28, exterior and interior of the preceding brachial valve, $\times 2$; 29, posterodorsal view of the cardinal process of the preceding specimen, $\times 3$. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 439.—*Grandaurispina*

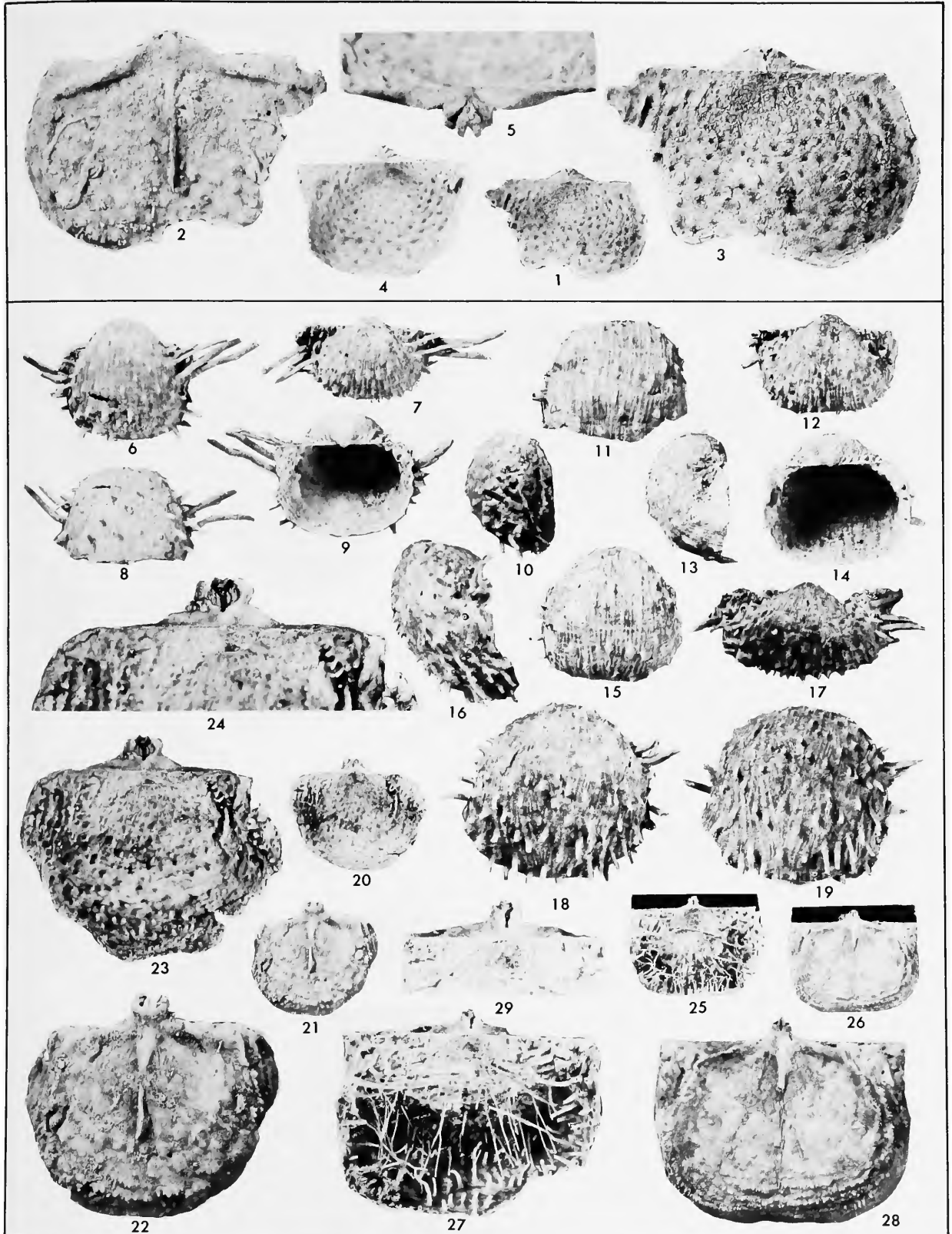


PLATE 440

Grandaurispina

Grandaurispina gibbosa, new species: 1, 2, Ventral and posterior views of a pedicle valve, showing some of its body spines and the halteroid spines on one side, \times 1, paratype USNM 150003a; 3–6, anterior, posterior, side, and ventral views of a small pedicle valve, \times 1, paratype USNM 150004–1; 7–10, ventral, anterior, side, and posterior views of a small adult pedicle valve preserving its halteroid spines, \times 1, paratype USNM 150003b; 11–15, interior, anterior, ventral, posterior, and side views of a large pedicle valve, \times 1, paratype USNM 150004d; 16–18, posterior, dorsal, and side views of the paratype, \times 1, USNM 150004g; 19–22, dorsal, anterior, posterior, and side views of a specimen preserving both valves, \times 1, holotype USNM 150004e; 23–27, interior, posterior, side, and ventral views of a large pedicle valve, \times 1, preserving short halteroid spines, paratype USNM 150004b; 28, 29, exterior and interior of a brachial valve, \times 1, paratype USNM 150003d; 30, interior of the preceding specimen, \times 2, showing cardinal process and bundled endospines; 31, posterodorsal view, \times 3, of the cardinal process of the preceding brachial valve; 32, 33, exterior and interior of another brachial valve, \times 1, paratype USNM 150003e; 34, interior of the preceding brachial valve, \times 2, showing septum united with cardinal process shaft; 35, interior of a brachial valve, \times 2, paratype USNM 150003f; 36, posterodorsal view of the preceding specimen, \times 3, showing the myophore. [Word Formation (lens between the Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 440.—*Grandaurispina*

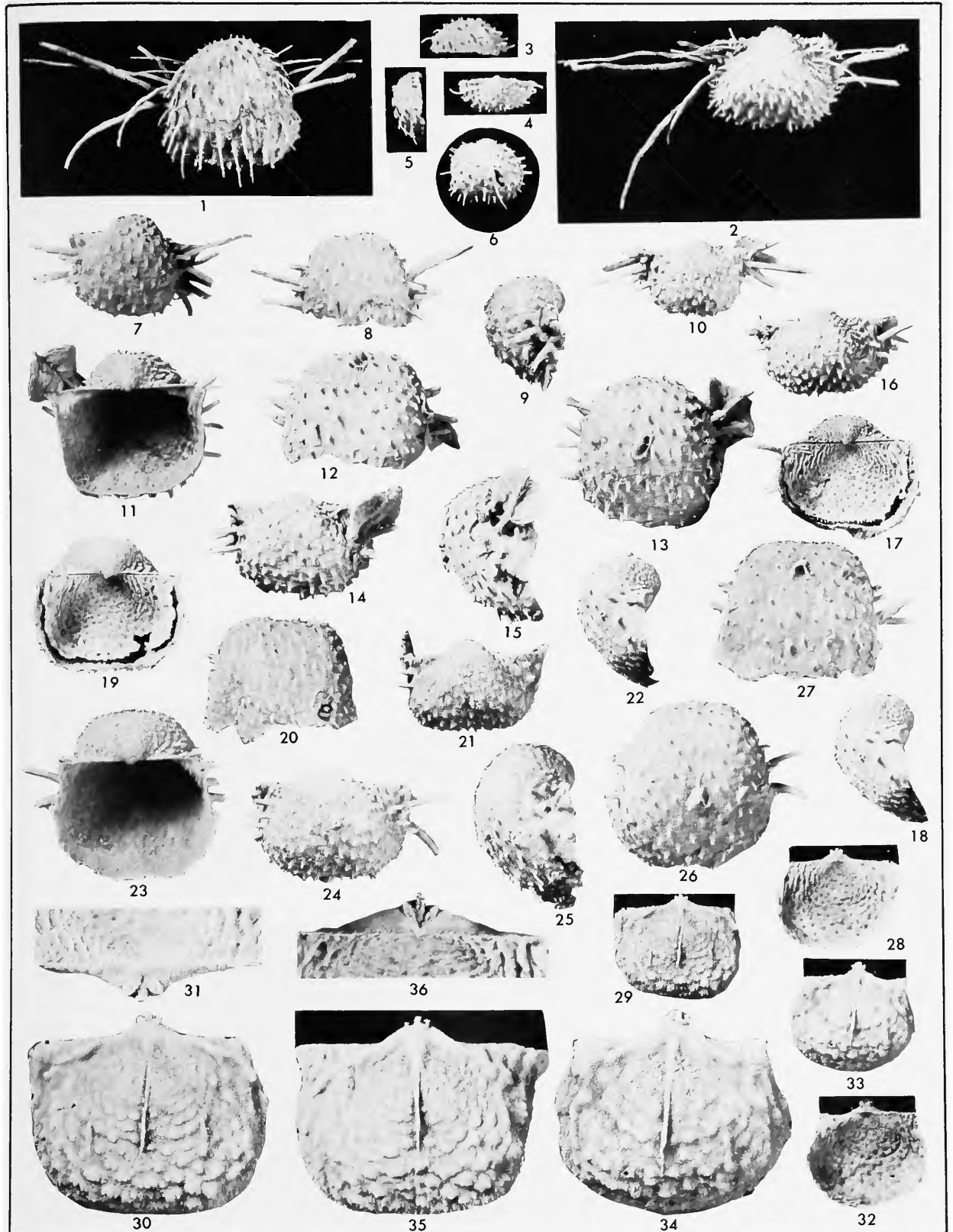


PLATE 441

Grandaurispina

Grandaurispina elongata, new species: 1-3, Ventral, posterior, and side views of a small pedicle valve with well developed halteroid spines on one side, $\times 1$, paratype USNM 150005d; 4-6, posterior, side, and ventral views of a large pedicle valve, $\times 1$, holotype USNM 150005a; 7-10, anterior, side, ventral, and posterior views of a small adult, $\times 1$, paratype USNM 153892; 11-14, anterior posterior, ventral, and side views of an adult, $\times 1$, paratype USNM 150005c; 15-19, ventral, interior, posterior, anterior, and side views of another adult, $\times 1$, paratype USNM 150005b; 20, 21, exterior and interior of a brachial valve, $\times 1$, paratype USNM 150005g; 22, 23, interior and posterior views of the preceding brachial valve, $\times 2$, showing cardinal process, septum, cardinal process platform; 24, posterodorsal view of the cardinal process, $\times 3$, of the preceding specimen; 25, 26, exterior and interior of another brachial valve, $\times 1$, showing dimples and spine bases, paratype USNM 150005h. [Word Formation (Willis Ranch Member), USNM 706e.]

Grandaurispina gibbosa, new species: 27-29, Dorsal, posterior and side views of a specimen with both valves, $\times 1$, paratype USNM 153893a; 30-33, anterior, side, posterior, and ventral views of a small pedicle valve with halteroid spines, $\times 1$, paratype USNM 153893b; 34-37, anterior, ventral, side, and posterior views of an adult pedicle valve, $\times 1$, paratype USNM 150003c. [Word Formation (lens between the Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 441.—*Grandaurispina*

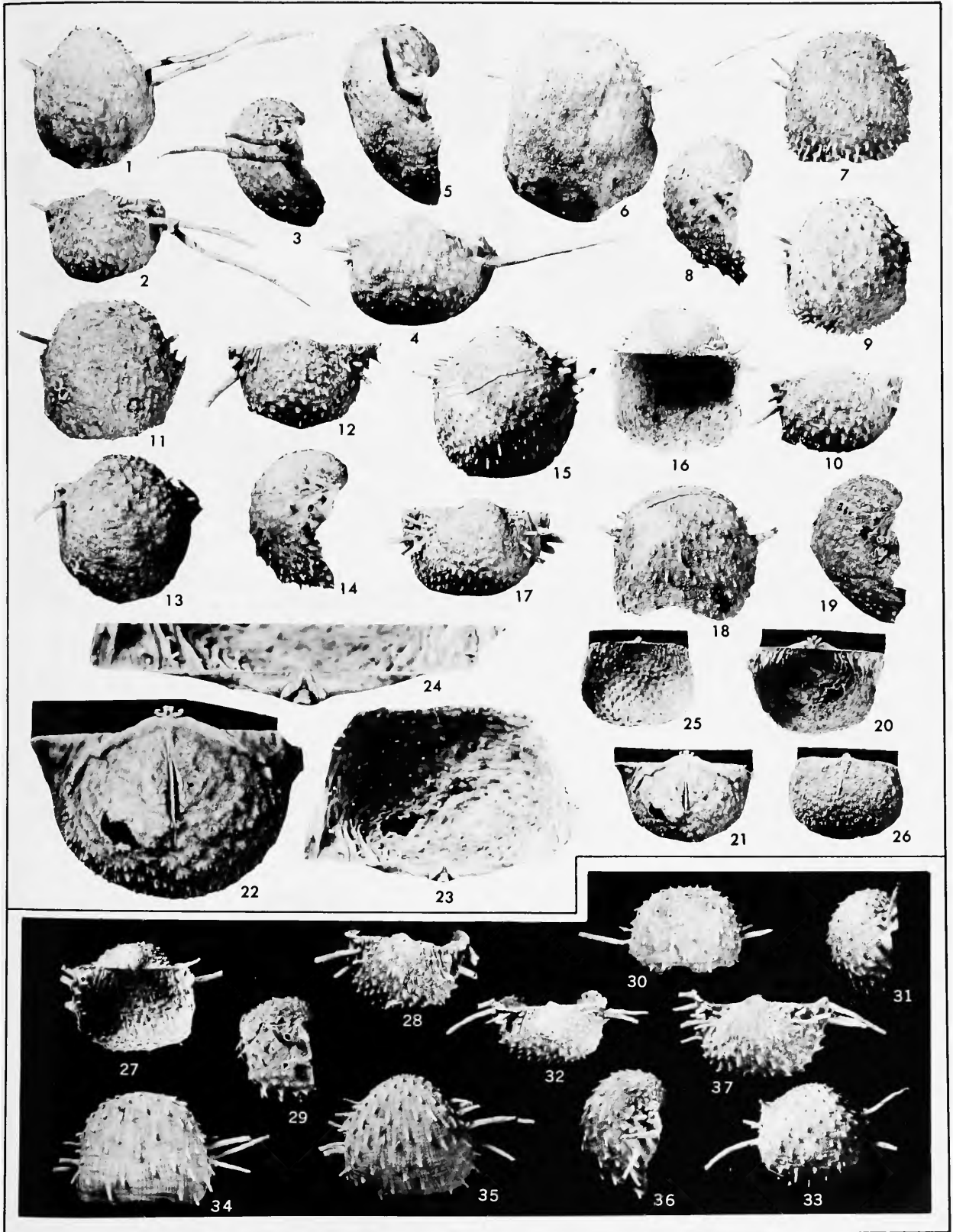


PLATE 442

Grandaurispina

Grandaurispina bella, new species: 1–5, Interior, posterior, ventral, side, and anterior views of a small adult, × 1, paratype USNM 149989a; 6–10, anterior, side, ventral, interior, and posterior views of a large adult, × 1, paratype USNM 149989b. [Word Formation (Willis Ranch Member), USNM 706e.]

11–15, Interior, anterior, side, ventral, and posterior views of a pedicle valve, × 1, paratype USNM 149988b; 16–20, ventral, interior, side, anterior, and posterior views of a full-grown pedicle valve, × 1, holotype USNM 149988a; 21–23, ventral, posterior, and anterior views of a small adult preserving part of its halteroid spines, × 1, paratype USNM 149988p; 24, 25, interior and exterior of a brachial valve, × 1, paratype USNM 149988g; 26, 27, interior and exterior, × 2, of the preceding; 28, posterodorsal view of the preceding specimen, × 3, showing the small cardinal process; 29, exterior of another brachial valve, × 1, showing dimples and spine bases, paratype USNM 149988j; 30, enlargement, × 2, of the preceding brachial valve exterior; 31, posterodorsal view of the preceding specimen, × 3, showing small cardinal process; 32, 33, exterior and interior of another brachial valve, × 1, showing almost enclosed cardinal process, paratype USNM 149988h; 34, exterior of the preceding specimen, × 2, showing engulfed cardinal process; 35, 36, exterior and interior of a brachial valve, × 1, paratype USNM 149988i; 37, 38, interior and exterior of the preceding brachial valve, × 2, showing protective spines, septum, and cardinal process. [Word Formation (Willis Ranch Member), USNM 706.]

Grandaurispina belliformis, new species: 39–42, Posterior, ventral, side, and interior views, × 1, holotype USNM 149983a; 43–45, side, exterior, and interior views of the brachial valve, × 1, paratype USNM 149983b. [Cherry Canyon Formation (Getaway Member), USNM 728.]

Grandaurispina undulata, new species: 46–49, Interior, side, ventral, and posterior views of a pedicle valve, × 1, holotype USNM 150010a; 50–53, interior, side, posterior, and ventral views of another pedicle valve, × 1, paratype USNM 150010b; 54, 55, exterior and interior of a brachial valve, × 1, paratype USNM 150010c. [Cherry Canyon Formation (Getaway Member), USNM 732.]

PLATE 442.—*Grandaurispina*

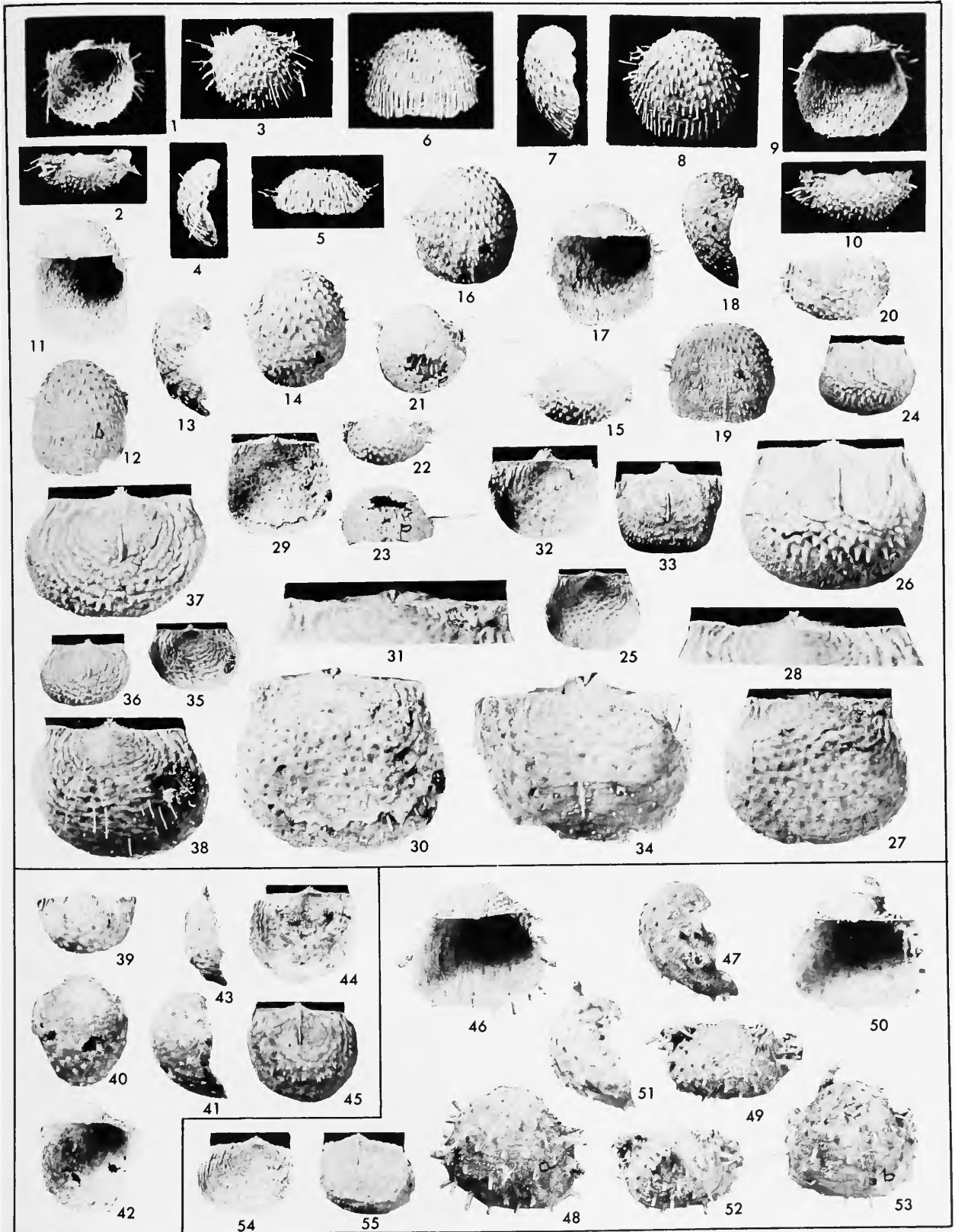


PLATE 443

Grandaurispina

Grandaurispina meekana (Girty): 1, 2, Ventral view of a fragmentary specimen scarcely recognizable specifically, $\times 1$, $\times 2$, holotype USNM 118532. [Formation uncertain, USGS 3763 (green).]

Grandaurispina rara, new species: 3-7, Interior, anterior, ventral, posterior, and side views of a pedicle valve, $\times 1$, holotype USNM 153895a; 8-12, interior, ventral, posterior, side, and anterior views of another pedicle valve, $\times 1$, paratype USNM 153895b; 13, 14, exterior and interior of a brachial valve, $\times 1$, paratype USNM 153895e; 15, interior of the preceding specimen, $\times 2$; 16, posterodorsal view, showing the cardinal process of the preceding specimen, $\times 3$. [Word Formation (Appel Ranch Member), USNM 719z.]

17, 18, Dorsal and posterior views of a complete specimen with crushed pedicle valve, $\times 1$, paratype USNM 153896; 19, 20, exterior and interior of a brachial valve, $\times 1$, showing dimples and endospines, paratype USNM 149984e; 21, 22, interior and posterior views of the preceding brachial valve, $\times 2$, showing median septum, cardinal process, and endospines; 23, posterodorsal view of the preceding brachial valve, $\times 3$, showing the cardinal process, $\times 3$. [Word Formation (Appel Ranch Member), USNM 715i.]

Grandaurispina crassa, new species: 24, 25, Dorsal and interior views of the cardinal process of a thickened brachial valve, $\times 2$, paratype USNM 153897a; 26, 27, interior and exterior of another brachial valve, $\times 2$, paratype USNM 153897b. [Word Formation (Appel Ranch Member), USNM 719z.]

28, 29, Exterior and interior of a thickened brachial valve with cardinal process almost enclosed, $\times 1$, paratype USNM 153894; 30, interior of the preceding brachial valve, $\times 2$; 31, posterodorsal view of the preceding specimen, $\times 3$, showing the engulfed cardinal process. [Word Formation (Appel Ranch Member), USNM 715i.]

PLATE 443.—*Grandaurispina*

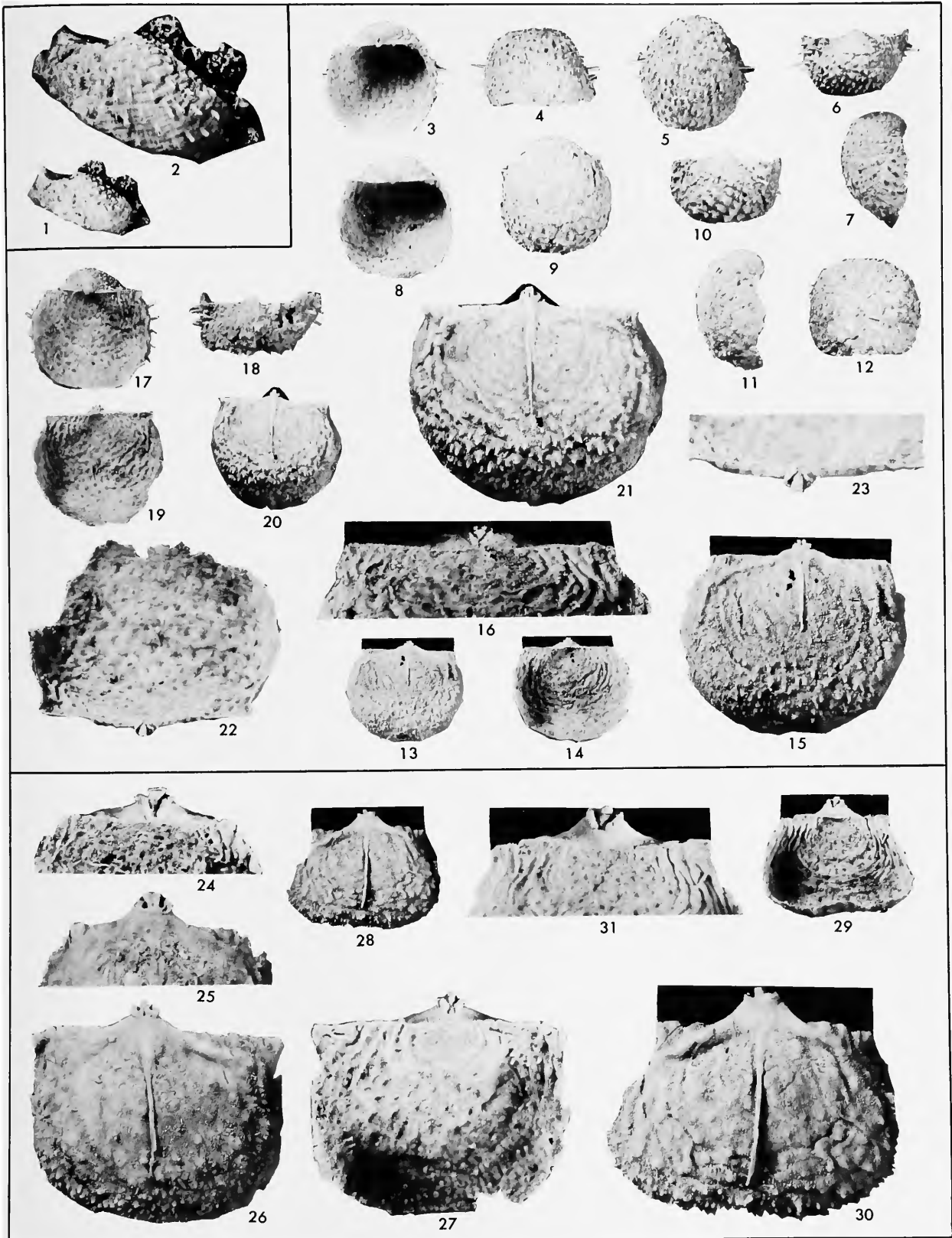


PLATE 444

Holotricharina

Holotricharina hirsuta, new species: 1-4, Posterior, anterior, ventral, and side views of a specimen preserving its halteroid spines, $\times 1$, paratype USNM 153899a; 5-7, posterior, ventral, and dorsal views of a nearly complete specimen, $\times 1$, paratype USNM 153899b; 8, ventral view of an immature specimen, $\times 1$, showing large and small spines, paratype USNM 153899c; 9, immature specimen in ventral view, $\times 1$, showing early development of large body spines, paratype USNM 153899d; 10, immature specimen, showing posteriorly developed small spines and larger ones on the anterior, $\times 2$, paratype USNM 149894a; 11-13, posterior, anterior, and ventral views of a small adult, $\times 1$, paratype USNM 153899e; 14, 15, anterior and ventral views of an adult with many small spines, $\times 1$, paratype USNM 153899f; 16, ventral view of a paratype, $\times 1$, USNM 153899g; 17, an immature specimen with concentric wrinkles, $\times 1$, paratype USNM 153899h; 18, 19, anterior and ventral views of a small adult, $\times 1$, paratype USNM 153899i; 20-22, ventral, anterior, and posterior views of another small adult, $\times 1$, paratype USNM 153899j; 23, ventral view of an immature pedicle valve, $\times 1$, paratype USNM 153899k; 24, ventral view, $\times 1$, of another immature paratype, USNM 153899-l; 25, ventral view of a pedicle valve with many small spines, $\times 1$, paratype USNM 153899m; 26, ventral view of an adult with long halteroid spines, $\times 1$, paratype USNM 153899n; 27, 28, dorsal view of a complete specimen preserving the forest of spines on the brachial valve, $\times 1$, $\times 2$, paratype USNM 153899o; 29-32, dorsal, posterior, ventral, and anterior views of a specimen shorn of its spines, $\times 1$, holotype USNM 149896a; 33-36, ventral, posterior, anterior, and dorsal views of another stripped specimen, $\times 1$, paratype USNM 149896c; 37, 38, exterior and interior of a large brachial valve, $\times 1$, paratype USNM 153899p; 39, 40, interior and side of a brachial valve, $\times 1$, paratype USNM 153899q; 41, 42, exterior and interior of the preceding brachial valve, $\times 2$, showing septum, cardinal process, and endospines; 43, side, view of another brachial valve, $\times 1$, paratype USNM 153899r; 44, 45, interior and exterior of the preceding specimen, $\times 2$, showing cardinal process and exterior wrinkles; 46, 47, side and anterior views of another brachial valve, $\times 1$, paratype USNM 153899s; 48, 49, interior and exterior of the preceding brachial valve, $\times 2$, showing small cardinal process, endospines and exterior spines. [Road Canyon Formation (base), USNM 702c.]

PLATE 444.—*Holotricharina*

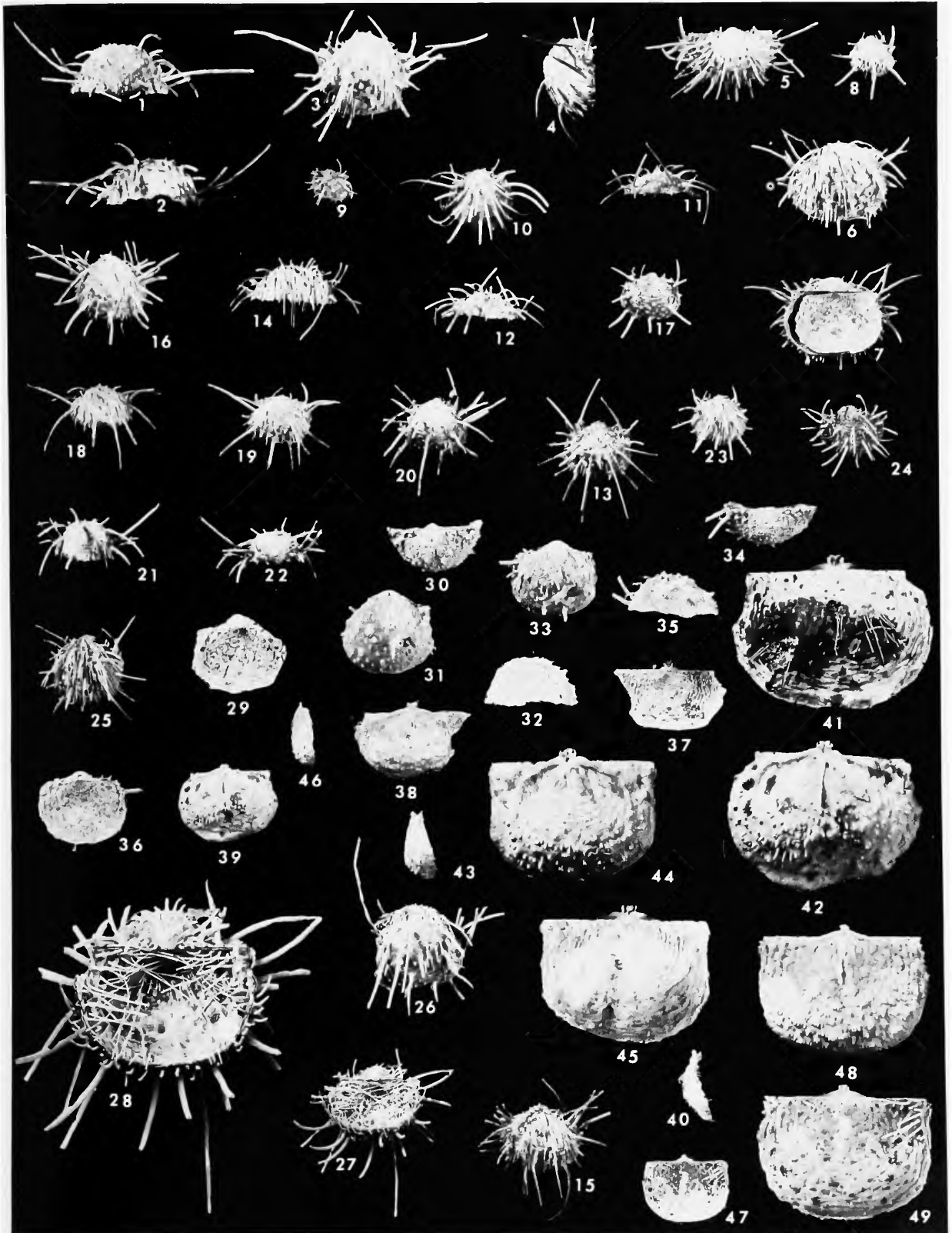


PLATE 445

Echinaria, *Holotricharina*, *Hystriculina*, and *Calliprotonia*

Echinaria species 1: 1-4, Interior, $\times 1$, $\times 2$, and exterior, $\times 1$, $\times 2$, of a fragmentary brachial valve, showing the long cardinal process, figured specimen USNM 149682b; 5, 6, side and ventral views of a small pedicle valve, $\times 1$, figured specimen USNM 149682c; 7, 8, side and ventral views of a pedicle valve, showing same attached spines, $\times 1$, figured specimen USNM 149682a. [Neal Ranch Formation (top 15 feet of bed 2 = Gray Limestone Member of P. B. King), USNM 701.]

Holotricharina hirsuta, new species: 9-12, Ventral, side, posterior, and dorsal views of a specimen preserving both valves and most of its spines, $\times 1$, paratype USNM 149894b; 13, 14, side and interior views of a brachial valve belonging to the preceding pedicle valve, $\times 1$; 15, interior of the preceding brachial valve, $\times 2$. [Road Canyon Formation (base), USNM 702c.]

Holotricharina sparsa, new species: 16-20, Anterior, dorsal, ventral, posterior, and side views of a complete specimen, $\times 1$, holotype USNM 149904a; 21, dorsal view of the holotype, $\times 2$; 22-26, interior, exterior, partial anterior, anterior, and side views of a brachial valve, $\times 1$, showing exterior spines and endospines, paratype USNM 149904b; 27-30, posterior, dorsal, partial anterior, and anterior views of the preceding specimen, $\times 2$, showing the unusual development of endospines. [Road Canyon Formation, USNM 707e.]

Holotricharina species 1: 31, 32, Ventral and side views of a large pedicle valve, $\times 1$, figured specimen USNM 152787. [Road Canyon Formation (base), 703a.]

Hystriculina dugoutensis (R. E. King): 33-35, Posterior and ventral views of a pedicle valve, $\times 1$, hypotype USNM 149754b; 36-38, dorsal, posterior, and ventral views of a specimen with both valves, $\times 1$, hypotype USNM 149754c; 39-41, ventral, posterior, and anterior views of another pedicle valve, $\times 1$, hypotype USNM 149754a. [Lenox Hills Formation, USNM 715.]

42-45, Ventral, anterior, posterior, and side views of a cotype, $\times 1$, YPM 11773b; 46, ventral view of the preceding specimen, $\times 2$; 47-50, ventral, anterior, side, and dorsal views, $\times 1$, lectotype YPM 11773a; 51, ventral view of the lectotype, $\times 2$. [Lenox Hills Formation, R. E. King locality 193.]

Calliprotonia species: 52, Dorsal view of a small specimen, $\times 2$, showing the cardinal process, figured specimen USNM 149684 (for other views, see plate 386: figures 10-13). [Neal Ranch Formation (bed 4), USNM 701d.]

PLATE 445.—*Echinaria*, *Holotricharina*, *Hystriculina*, and *Calliprotonia*

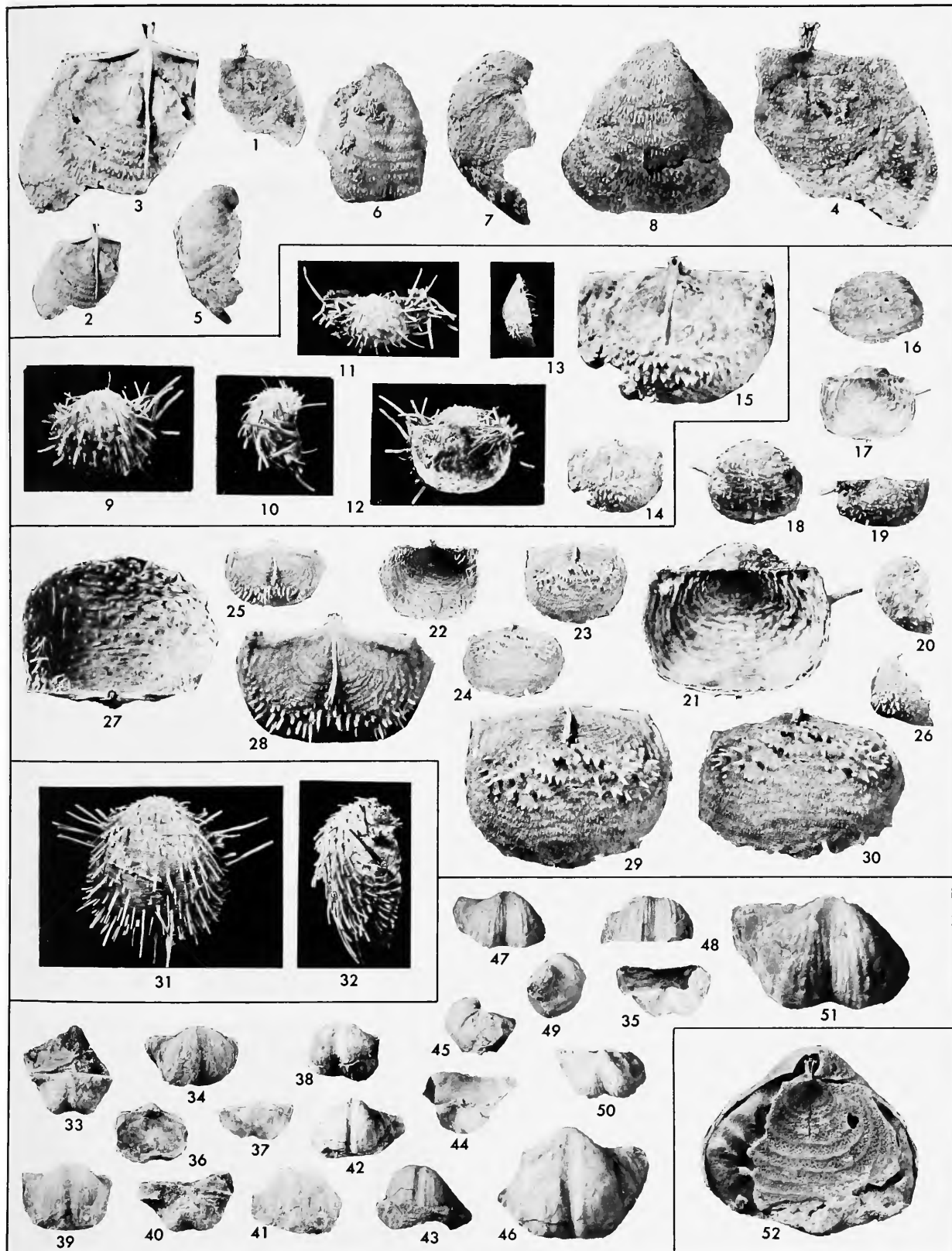


PLATE 446

Acanthocrania, *Paucispiniifera*, *Elliottella*, *Liosotella*, *Megousia*, and *Holotrucharina*

Acanthocrania magna, new species (See vol. 2, p. 243): 1–3, Dorsal, side, and interior views of a large specimen, $\times 1$, holotype USNM 153908; 4, interior of holotype, $\times 2$. [Cathedral Mountain Formation (top), USNM 726o.]

Paucispiniifera parasulcata, new species: 5–9, Ventral, side, posterior, anterior, and dorsal views of the holotype, $\times 1$, USNM 153909a; 10, interior of the brachial valve, $\times 2$, paratype USNM 153909b. [Road Canyon Formation (top, with *Collumatus*), USNM 736x.]

18–22, Dorsal, posterior, side, ventral, and anterior views of a complete specimen, $\times 1$, paratype USNM 153911a. [Road Canyon Formation (top, with *Collumatus*), USNM 732j.]

Elliottella aff. *E. varicostata*, new species: 11–15, Posterior, ventral, side, dorsal, and anterior views of a complete specimen, $\times 1$, figured specimen USNM 153910a. 16, 17, same specimen enlarged, $\times 2$. [Cibolo Formation (Breccia Zone of Udden), USNM 738r.]

Liosotella rotunda, new species: 23–27, Dorsal, anterior, posterior, side, and ventral views of a small adult, $\times 1$, paratype USNM 153912a; 28–33, side, anterior, ventral, dorsal, and posterior views of another complete specimen, $\times 1$, paratype USNM 153912b. [Road Canyon Formation (top, with *Collumatus*), USNM 732j.]

Megousia mucronata, new species: 34–38, Posterior, ventral, side, anterior, and dorsal views of a complete specimen, $\times 1$, paratype USNM 153913a; 39, dorsal view, $\times 2$, of the paratype; 40, 41, interior of the brachial valve, $\times 1$, $\times 2$, paratype USNM 153913b. [Road Canyon Formation (top, with *Collumatus*), USNM 732j.]

Holotrucharina hirsuta, new species: 42, 43, Dorsal and ventral views, $\times 1$, paratype USNM 153914; 44, 45, anterior and dorsal views of the preceding specimen, $\times 2$, showing the two sizes of spines on the shell body. [Cathedral Mountain Formation (top), USNM 726o.]

PLATE 446.—*Acanthocrania*, *Paucispinifera*, *Elliottella*, *Liosotella*, *Megousia*,
and *Holotricharina*

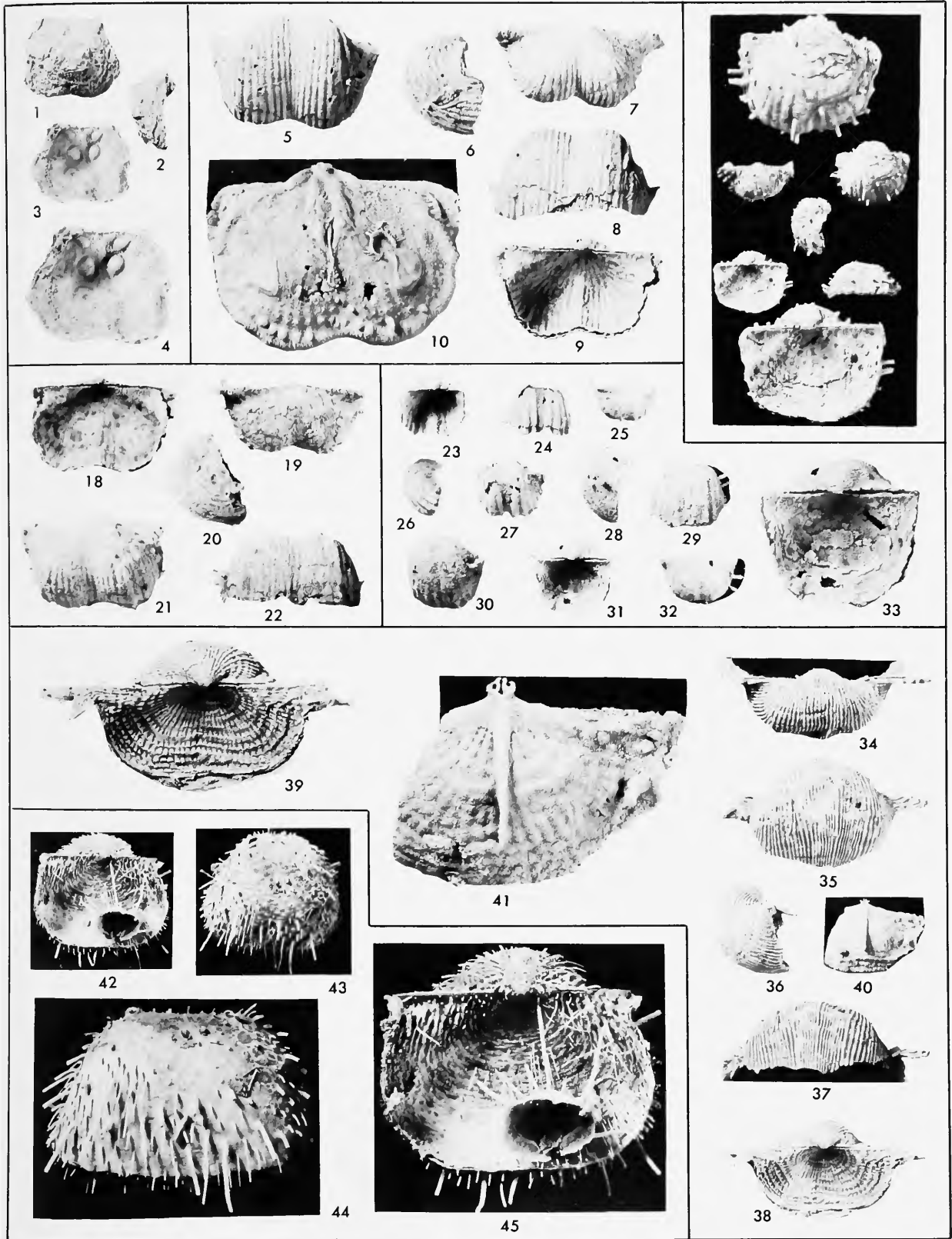


PLATE 447

Megousia and *Kozlowskia*

Megousia flexuosa, new species: 1, 2, Ventral views of an immature specimen with initial attachment ring, $\times 1$, $\times 2$, paratype USNM 149945a; 3–5, ventral view, $\times 1$, and ventral and dorsal views, $\times 2$, of another immature individual with initial attachment spines, paratype USNM 149945b; 6–10, dorsal, side, anterior, ventral, and posterior views of a small adult, $\times 1$, paratype USNM 149946i; 11, dorsal view, $\times 2$, of the preceding specimen; 12–16, dorsal, side, posterior, ventral, and anterior views, $\times 1$, of the holotype USNM 149946b; 17, dorsal view, $\times 2$, of the holotype; 18–22, posterior, ventral, side, anterior, and dorsal views of another complete specimen, $\times 1$, paratype USNM 149946c; 23, dorsal views, $\times 2$, of the preceding paratype; 24–28, ventral, anterior, side, posterior, and interior views, $\times 1$, of a large pedicle valve, paratype USNM 149946a; 29, 30, ventral and dorsal views of a malformed specimen, $\times 1$, paratype USNM 149946j; 31, 32, ventral and dorsal views of the preceding specimen, $\times 2$, showing the malformation in greater detail; 33, 34, exterior and interior of the dorsal valve, $\times 1$, paratype USNM 149946k; 35, 36, exterior and interior of the preceding paratype, $\times 2$, showing the cardinal process and median ridge; 37, exterior of another brachial valve, $\times 1$, paratype USNM 149946–1; 38, 39, exterior and interior of the preceding brachial valve, $\times 2$, showing cardinal process and brevisseptum. [Word Formation (Willis Ranch Member), USNM 706.]

Megousia umbonata, new species: 40–43, Anterior, side, dorsal, and ventral views, $\times 1$, showing anteriorly piled up trails; holotype USNM 149959a; 44, dorsal view, $\times 2$, holotype; 45–47, posterior, dorsal, and ventral views, $\times 1$, of another specimen, paratype USNM 149959b; 48, dorsal view of a small specimen with numerous trails, $\times 1$, paratype USNM 149959c. [Cathedral Mountain Formation, USNM 707q.]

Kozlowskia finlayensis, new species: 49–53, Ventral, anterior, side, posterior, and dorsal views, $\times 1$, of the holotype YPM 11802; 54–55, posterior and ventral views of the same specimen, enlarged $\times 2$. [Leonard Formation (below ammonoid bed), Fossil Hill, northwest Finlay Dome, Hudspeth County, Texas.]

PLATE 447.—*Megousia* and *Kozlowskia*

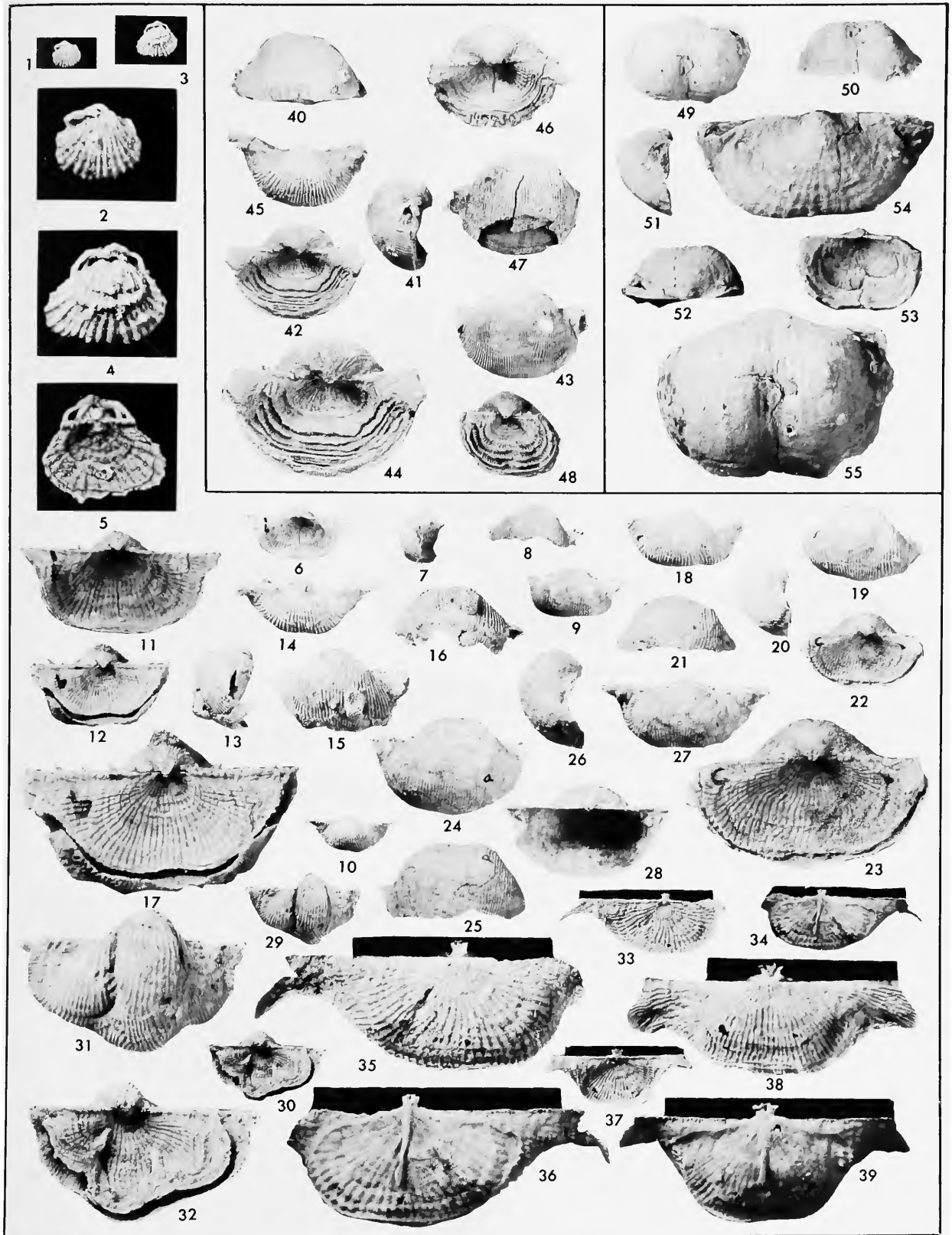


PLATE 448*Megousia*

Megousia cf. *M. mucronata*, new species: 1-4, Posterior, anterior, side, and ventral views of the pedicle valve, $\times 1$, figured specimen USNM 153974a; 5-9, dorsal, interior, side, anterior, and posterior views of the brachial valve, $\times 1$, figured specimen USNM 153974b; 10, 11, interior and exterior of the preceding brachial valve, $\times 2$, showing interior details and the lateral wing. [Word Formation (China Tank Member), USNM 706c.]

Megousia mucronata, new species: 12-15, Anterior, ventral, side, and posterior views of a large pedicle valve, $\times 1$, paratype USNM 149944b; 16-19, posterior, side, anterior, and ventral views of a pedicle valve preserving some of the lateral halteroid spines, $\times 1$, paratype USNM 149944c; 20-23, side, ventral, anterior, and dorsal views, $\times 1$, of the holotype USNM 149944a; 24, dorsal view of the holotype, $\times 2$, showing trails; 25-28, interior, anterior, posterior, and dorsal views of a brachial valve, $\times 1$, paratype USNM 149944m; 29, 30, interior and exterior of the preceding specimen, $\times 2$, showing cardinal process and brevisseptum; 31, posterior view of the cardinal process of the preceding specimen, $\times 4$, showing myophore; 32-35, anterior, posterior, interior, and exterior views of another brachial valve, $\times 1$, paratype USNM 149944k; 36-39, anterior, interior, posterior, and exterior views of a large brachial valve, $\times 1$, paratype USNM 149944-1; 40, 41, interior and exterior of the preceding brachial valve, $\times 2$, showing septum, cardinal process and trails; 42, posterior view of the preceding specimen, $\times 4$, showing myophore of the cardinal process. [Word Formation (China Tank Member), USNM 706c.]

PLATE 448.—*Megousia*

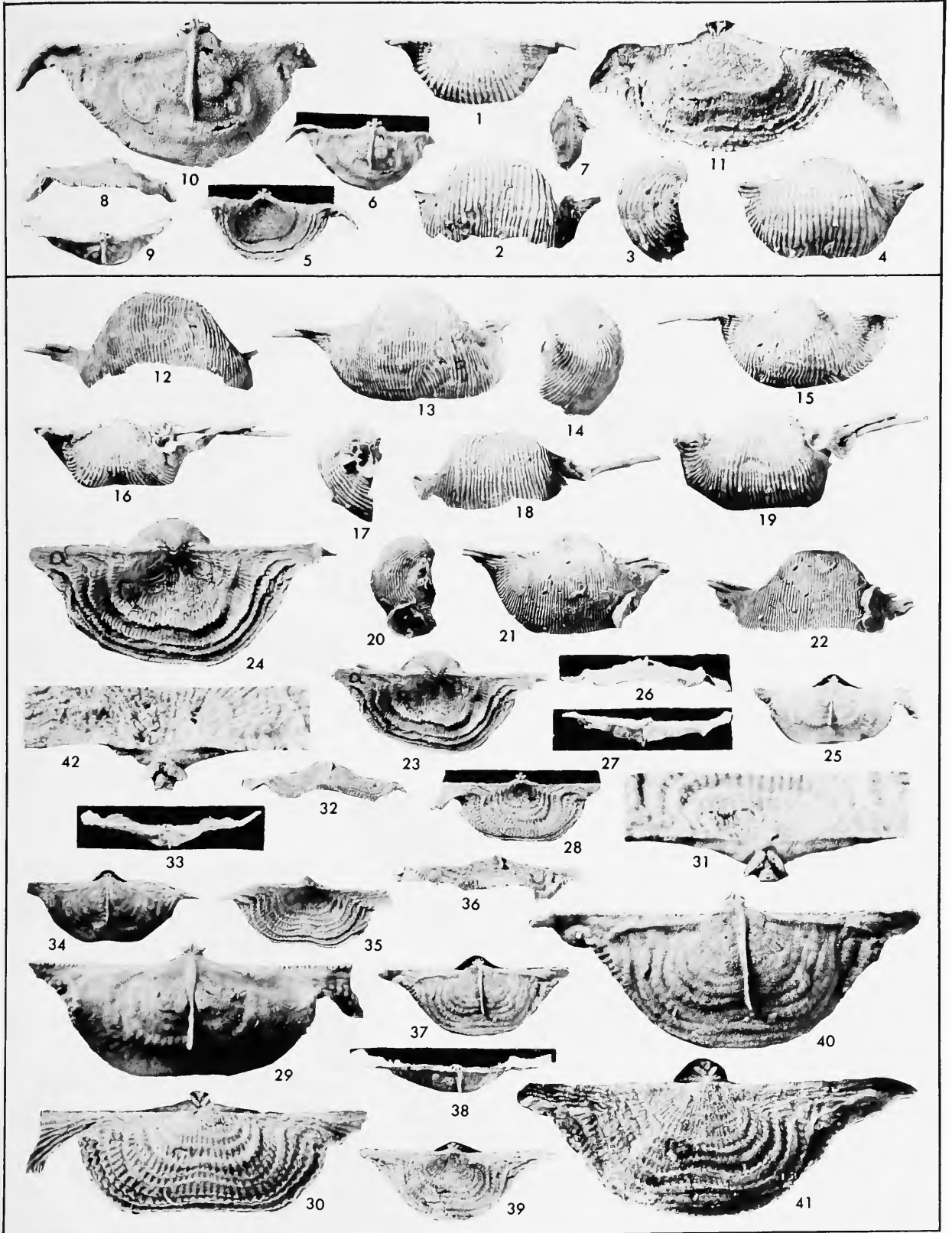


PLATE 449

Megousia

Megousia definita, new species: 1, 2, Side and interior of a brachial valve, $\times 1$, paratype USNM 153975a; 3, 4, interior and exterior of the preceding specimen, $\times 2$, showing brevisseptum and cardinal process; 5, posterior of the preceding specimen, showing the myophore of the cardinal process, $\times 4$; 6, ventral view of an immature specimen, $\times 2$, paratype USNM 149952c; 7, 8, ventral view of two immature specimens preserving part or all of the initial attachment ring, $\times 2$, paratypes USNM 149952a, b; 9–13, dorsal, anterior, posterior, side, and ventral views of a complete specimen, $\times 1$, paratype USNM 149953d; 14–18, ventral, dorsal, posterior, side, and anterior views of another complete specimen, $\times 1$, holotype USNM 149953a; 19, dorsal view, $\times 2$, of the holotype; 20–24, dorsal, anterior, ventral, side, and posterior views of a complete specimen, $\times 1$, paratype USNM 149953b; 25, dorsal view, $\times 2$, of the preceding specimen; 26–29, anterior, dorsal, ventral, and side views of a specimen with some of the halteroid spines preserved, $\times 1$, paratype USNM 149953g; 30, side view of the preceding specimen, $\times 2$, showing the ear and spines; 31–35, dorsal, posterior, anterior, interior, and side views of the brachial valve, $\times 1$, paratype USNM 149953h; 36, 37, interior and exterior of the preceding specimen, showing the cardinal process and brevisseptum, $\times 2$; 38–42, exterior, posterior, anterior, interior and side views of another brachial valve, $\times 1$, paratype USNM 149953i; 43–46, posterior, dorsal, side, and interior views, $\times 2$, of the preceding brachial valve with well developed alae, cardinal process, and muscle scars. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 449.—*Megousia*

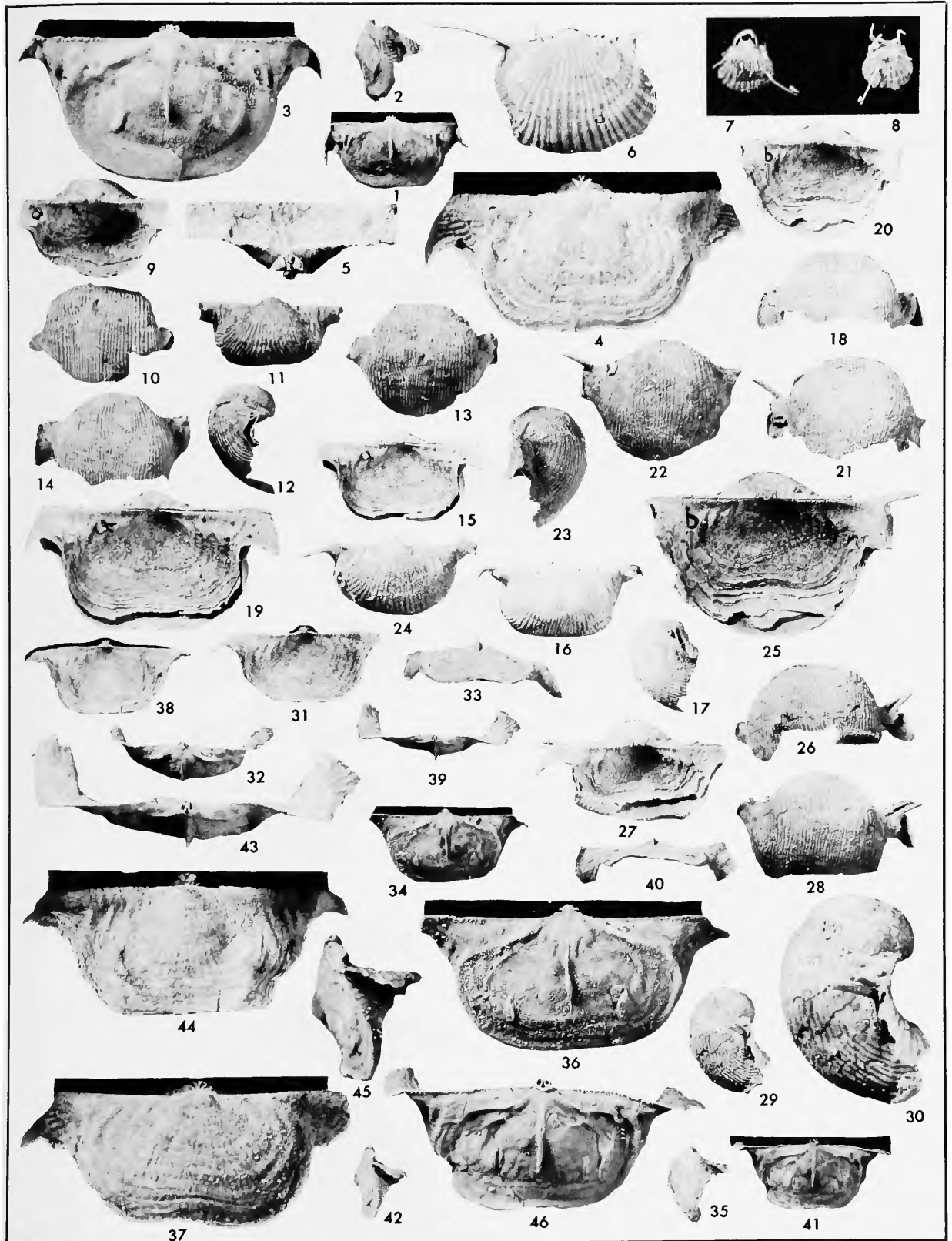


PLATE 450

Megousia

Megousia auriculata Muir-Wood and Cooper: 1-4, Anterior, posterior, dorsal, and side views, \times 1, of a brachial valve, hypotype USNM 149925c; 5-8, posterior, interior, dorsal and side views of the preceding specimen, \times 2, showing the long alae, cardinal process and brevisseptum; 9-11, posterior, anterior, and dorsal views of another brachial valve, \times 1, hypotype USNM 149925d; 12-14, side, interior, and exterior views, \times 2, of the preceding brachial valve; 15-18, anterior, ventral, side, and dorsal views, \times 1, of a complete specimen, hypotype USNM 149925b; 19, 20, dorsal and side views of the preceding specimen, \times 2, showing the large alae; 21-25, side, dorsal, ventral, anterior, and posterior views of a complete and alate specimen, \times 1, hypotype USNM 149925a; 26, dorsal view of the preceding specimen, \times 2, showing alae. [Road Canyon Formation, USNM 703d.]

27, 28, Ventral and interior views of a pedicle valve, \times 1, hypotype USNM 153976a; 29, interior, \times 2, of the preceding specimen; 30, exterior of a brachial valve with wide wings, \times 1, hypotype USNM 153976b; 31, interior of the preceding specimen, 2, showing the widely spread wings; 32, dorsal view of a complete specimen, \times 2, showing trails, hypotype USNM 153976c; 33, 34, interior and exterior of a brachial valve, \times 2, showing cardinal process and septum, hypotype USNM 153976d. [Cathedral Mountain Formation, USNM 721u.]

35-38, Anterior, dorsal, posterior, and ventral views of a complete specimen, \times 1, hypotype USNM 149923; 39, dorsal view of the preceding specimen, \times 2, showing the numerous trails. [Cathedral Mountain Formation, USNM 703b.]

40-43, Ventral, dorsal, posterior, and ventral views of a small complete specimen with long halteroid spines, \times 1, hypotype USNM 149915; 44, dorsal view of the preceding specimen, \times 2. [Cathedral Mountain Formation, USNM 702a¹.]

45-47, Dorsal, side, and ventral views of a small specimen with large wings, \times 1, holotype USNM 124108b (for an enlarged view of the holotype, see plate 452: figure 25); 48, exterior, of a brachial valve with wings, \times 2, hypotype USNM 149940n. [Road Canyon Formation, USNM 707e.]

PLATE 450.—*Megousia*

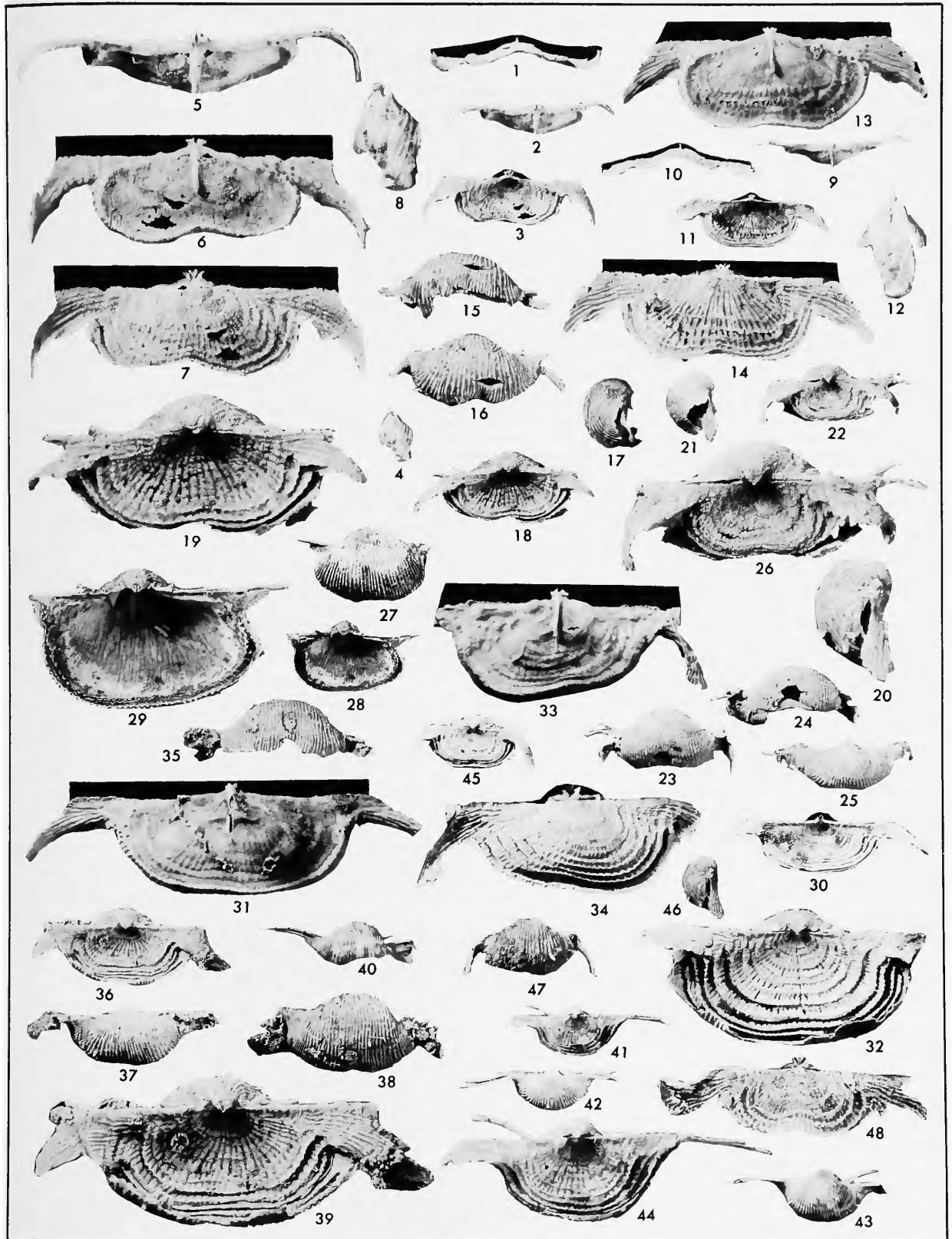


PLATE 451

Megousia

Megousia auriculata Muir-Wood and Cooper: 1, 2, Interior and exterior views of an immature pedicle valve, $\times 3$, showing the large attachment ring, hypotype USNM 149929a; 3, 4, interior and exterior of another immature pedicle valve with attachment ring surrounding a segment of crinoid stem, $\times 3$, hypotype USNM 149929b; 5, 43, ventral and dorsal views of an immature pedicle valve preserving early halteroid spines, $\times 3$, hypotype USNM 149929d; 6, 7, ventral view of a small pedicle valve, $\times 1$, $\times 2$, showing remnant of attachment ring, hypotype USNM 149929e; 8, 9, posterior and dorsal views, of the preceding specimen, $\times 3$; 10, 11, ventral view of a small pedicle valve, $\times 1$, $\times 2$, hypotype USNM 149929f; 12, 13, posterior and dorsal views of the preceding specimen, $\times 3$, showing attachment surface and spines; 14, very small specimen, $\times 4$, showing attachment surface at apex, hypotype USNM 149929h; 15-17, ventral, dorsal, and posterior views, $\times 3$, showing posterior attachment surface, hypotype USNM 149929-1; 18-20, ventral, dorsal, and posterior views of an immature specimen, $\times 3$, showing attachment surfaces and spines, hypotype USNM 149929m; 21, 42, ventral and dorsal views of a young specimen, $\times 2$, showing trails and spines, hypotype USNM 149929g; 22, ventral view of the preceding specimen with numerous spines, $\times 1$; 23-25, ventral, dorsal, and posterior views of an immature specimen, $\times 3$, showing attachment surfaces, hypotype USNM 149929s; 26, ventral view of an immature specimen with attachment ring, $\times 4$, hypotype USNM 149929j; 27, ventral view of a pedicle valve with attachment ring, $\times 4$, hypotype USNM 149929i; 28, ventral view of a young specimen, $\times 4$, hypotype USNM 149929k; 29, immature pedicle valve, $\times 3$, with attachment ring, hypotype USNM 149929n; 30, immature pedicle valve, $\times 3$, hypotype USNM 149929q; 31, immature pedicle valve with attachment ring, $\times 4$, hypotype USNM 149929t; 32, immature pedicle valve with attachment spines, $\times 4$, hypotype USNM 149929u; 33, immature pedicle valve, $\times 3$, hypotype USNM 149929o; 34, interior of a pedicle valve, $\times 3$, showing attachment spines, hypotype USNM 149929v; 35, 36, interior and ventral views of a pedicle valve having attachment rings, $\times 3$, hypotype USNM 149929c; 41, ventral view of a pedicle valve with long halteroid spine, $\times 1$, hypotype USNM 149925e; 44-47, dorsal, posterior, ventral, and side views of a complete specimen with alae, $\times 1$, hypotype USNM 149940u; 48, 49, side and dorsal views of the preceding specimen, $\times 2$, showing alae. [Road Canyon Formation, USNM 707e.]

37-39, Ventral, dorsal, and posterior views, $\times 1$, of a small specimen with long halteroid spines, hypotype USNM 149936; 40, ventral view of the preceding specimen, $\times 2$, showing halteroid spines and wings. [Road Canyon Formation, USNM 712t.]

PLATE 451.—*Megousia*

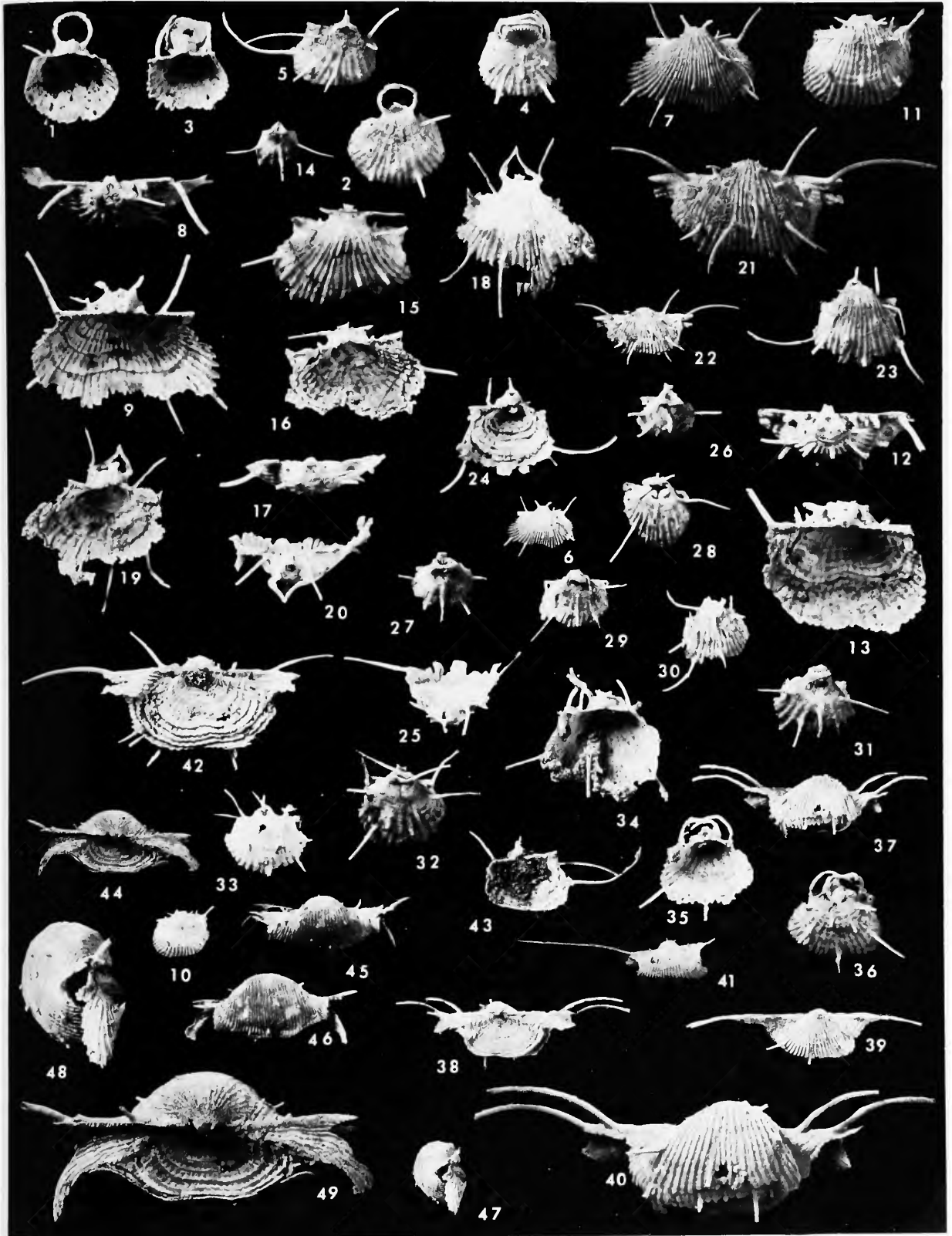


PLATE 452

Megousia and *Yakovlevia*

Megousia? girtyi (R. E. King): 1–3, Posterior, ventral, and side views, × 1, of the paratype YPM 11501. [Cathedral Mountain Formation, R. E. King localities 23, 24.]

4, 5, Ventral and posterior views of the holotype, × 1, YPM 11507. [Cathedral Mountain Formation, R. E. King locality Ax.]

Megousia umbonata, new species: 6–10, Ventral, side, anterior, posterior, and dorsal views of a strongly costellate specimen, × 1, paratype USNM 149957; 11, dorsal view, × 2, of the preceding specimen. [Cathedral Mountain Formation, USNM 702.]

12–16, Ventral, anterior, side, dorsal, and posterior views of a complete specimen, × 1, paratype USNM 153977; 17, dorsal view, × 2, of the preceding specimen. [Cathedral Mountain Formation, USNM 702-low.]

18, Dorsal view of a complete specimen, × 2, showing the attachment rings, paratype USNM 153978. [Road Canyon Formation, USNM 726d.]

Megousia auriculata Muir-Wood and Cooper: 19–21, Interior, posterior, and exterior views, × 2, showing strongly curved ala, hypotype USNM 149924. [Road Canyon Formation, USNM 703c.]

22, Interior of the pedicle valve, × 2, hypotype USNM 149929x; 23–25, posterior, ventral, and dorsal views of an immature specimen with attachment surface, × 4, paratype USNM 124108c; 26, dorsal view of the holotype, × 2, showing long wings (for additional views see plate 450: figures 45–47); 27, 28, exterior and interior of a brachial valve, × 2, hypotype USNM 149940r. [Road Canyon Formation, USNM 707e.]

Yakovlevia hessorum, new species: 29, Small pedicle valve with broken spines, × 1, paratype USNM 153979a (see plate 474: figure 21); 30, pedicle valve with spine on left side distorted, × 1, paratype USNM 153980d; 31, pedicle valve in which large anterior spines have not yet formed, × 1, paratype USNM 151486k; 32, 33, dorsal and side views of a specimen with both valves, × 1, paratype USNM 151486v; 34, ventral view of a pedicle valve preserving halteroid spines, × 1, paratype USNM 154102. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 452.—*Megousia* and *Yakovlevia*

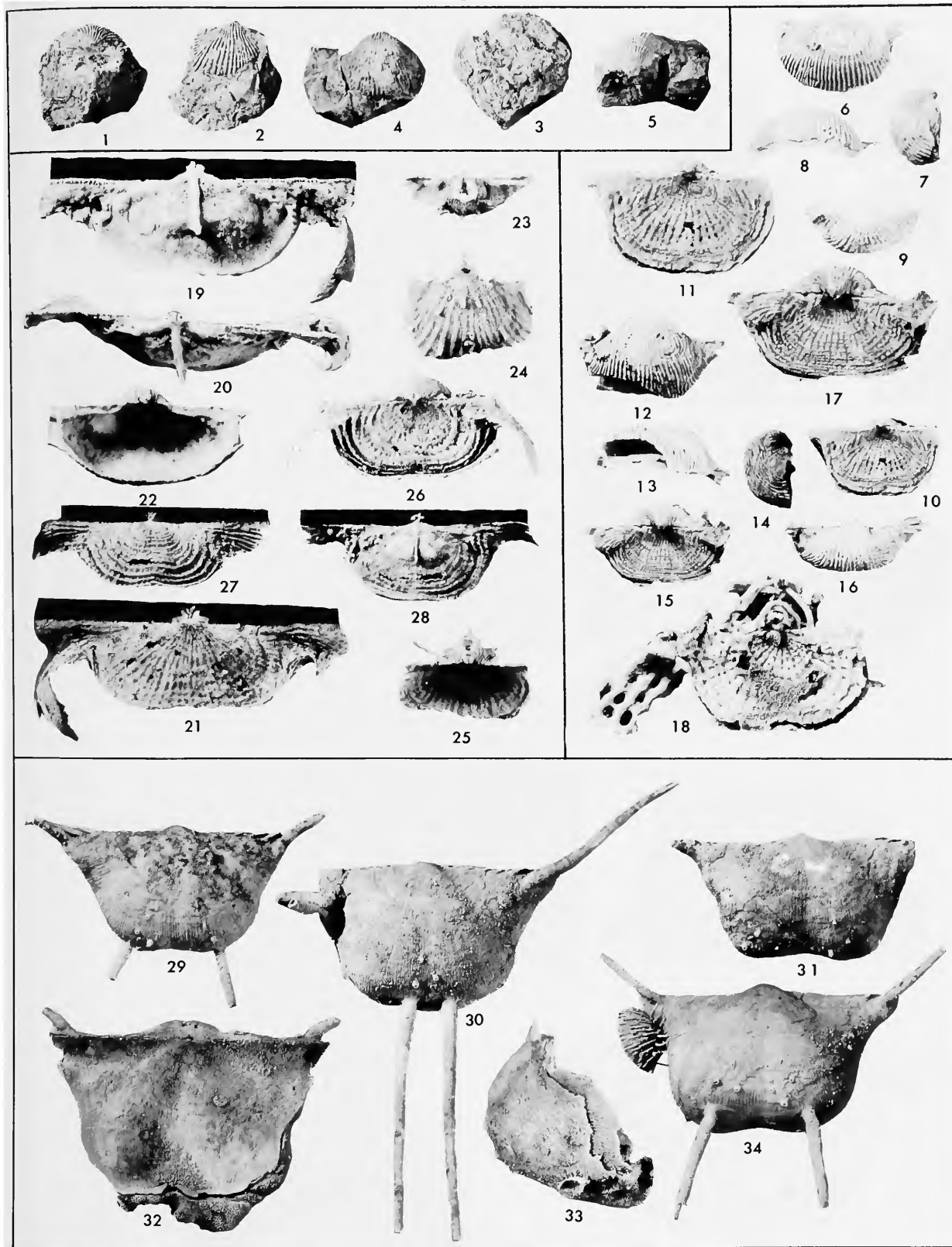


PLATE 453

Megousia, Grandaurispina, Linoproductus, Antiquatonia, and Kozlowskia

Megousia mucronata, new species: 1, Exterior of a young specimen retaining the original attachment ring, $\times 1$, paratype USNM 149943a; 2, 3, interior and exterior of the preceding specimen, $\times 3$, showing initial attachment ring and accessory spines; 4, 5, exterior of another immature pedicle valve preserving the attachment ring, $\times 1$, $\times 2$, paratype USNM 149943b; 6, interior of the preceding pedicle valve, showing development of coarse pustules along the ear baffles, $\times 3$. [Word Formation (China Tank Member), USNM 706c.]

Grandaurispina species 7: 7-9, Ventral, anterior, and side views of a slightly distorted pedicle valve, $\times 1$, figured specimen 155046a; 10, exterior of the brachial valve, $\times 1$, showing pits and spine bases, paratype USNM 155046b; 11, 12, exterior and interior of the cardinal process of the preceding brachial valve, $\times 2$, [Cathedral Mountain Formation (lower), USNM 721u.]

Megousia cf. *M. auriculata* Muir-Wood and Cooper: 13-16, Dorsal, side, ventral, and anterior views of a small adult, $\times 1$, figured specimen USNM 153929a; 17-20, posterior, anterior, ventral, and side views of a large adult, $\times 1$, figured specimen USNM 153929b. [Road Canyon Formation, USNM 721z.]

21-24, Side, anterior, posterior, and ventral views of another pedicle valve, $\times 1$, figured specimen USNM 153930. [Road Canyon Formation, USNM 721j.]

Linoproductus angustus R. E. King: 25, 26, Interior and ventral views of an old adult pedicle valve, $\times 1$, showing attachment ring and accessory spines making a strong holdfast, hypotype USNM 140222 (Grant 1963, plate 19: figures 27, 31); 27-29, ventral, side and dorsal views of a young adult, showing posterior marginal spines converging for strengthening the attachment of the shell, $\times 3$, hypotype USNM 140209 (Grant 1963, plate 19: figures 10, 11, 15). [Bone Spring Formation, USNM 728f.]

Antiquatonia costella, new species: 30-33, Posterior, side, anterior, and ventral views of a large pedicle valve, $\times 1$, holotype USNM 153931. [Lenox Hills Formation (base), USNM 715b.]

Kozlowskia alata, new species: 34, Interior of the brachial valve, $\times 3$, showing small cardinal process, brevisseptum, thickened brachial ridges, strong ear baffles continuous with the submarginal ridge, and slight development of endospines, paratype USNM 149799a (for additional views, see plate 312: figures 18-20). [Skinner Ranch Formation (base), USNM 705a.]

PLATE 453.—*Megousia*, *Grandaurispina*, *Linoproductus*, *Antiquatonia*,
and *Kozlowskia*

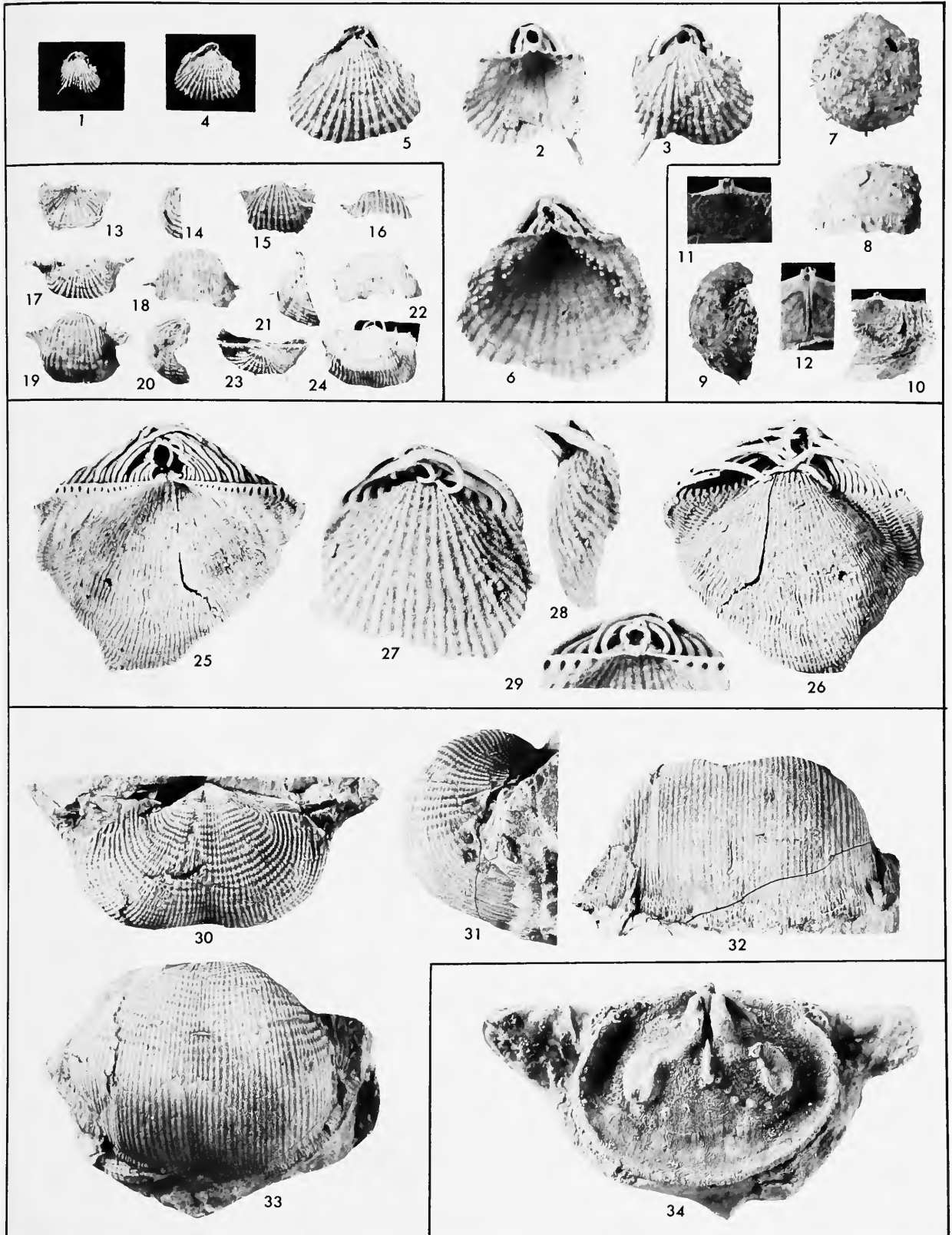


PLATE 454*Compressoproductus*

Compressoproductus thomasi, new species: 1-4, Ventral, posterior, side, and anterior views, $\times 1$, of a small paratype, USNM 151552e; 5-7, posterior, ventral, and side views of a larger pedicle valve than the preceding and with crisscross wrinkles, $\times 1$, paratype USNM 151552c; 8-10, ventral, posterior, and side views of a large specimen with strongly wrinkled shell, $\times 1$, holotype USNM 151552a; 11, 12, posterior and partial side view of another wrinkled pedicle valve, $\times 1$, paratype USNM 151552h; 13, partial side view of the preceding specimen, $\times 2$, showing the ornamentation in detail. [Cathedral Mountain Formation, USNM 708.]

14-16, Partial side, side, and ventral views of a small specimen attached to *Institella* and showing its mode of existence, $\times 1$, paratype USNM 153954a; 17-19, ventral, posterior, and side views of another pedicle valve, $\times 1$, paratype USNM 153954b; 20-22, left, side, ventral, and right side views of a pedicle valve showing the attachment spines, $\times 1$, paratype USNM 153954c. [Cathedral Mountain Formation (Wedin Member), USNM 700x.]

PLATE 454.—*Compressoproductus*

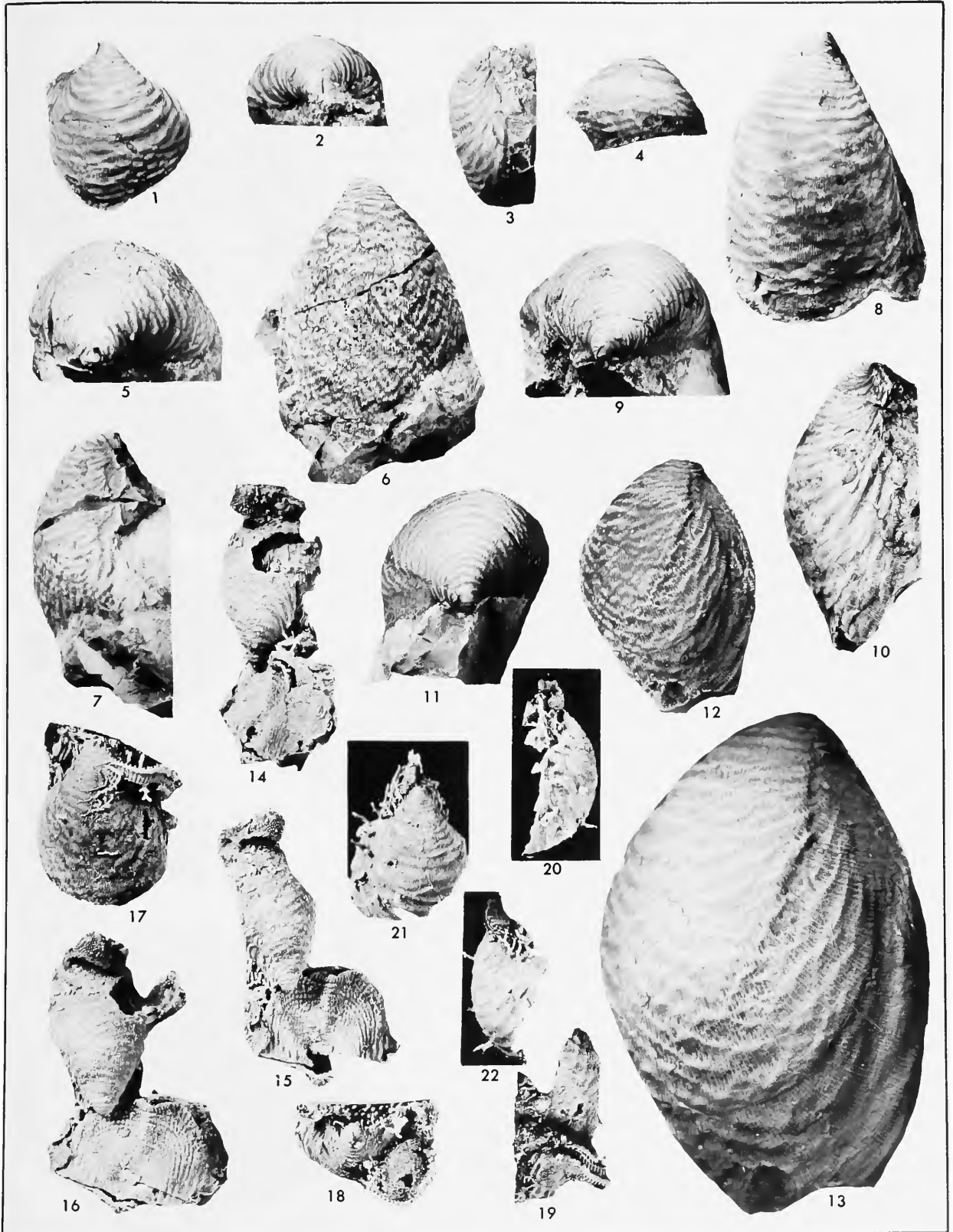


PLATE 455

Striatifera and *Compressoproductus*

Striatifera linoproductiformis, new species: 1, 2, Ventral and side views of large wrinkled pedicle valve, $\times 1$, paratype USNM 151538a. [Lenox Hills Formation, USNM 705.]

Compressoproductus thomasi, new species: 3, Posterior of a fragmentary pedicle valve, showing narrow beak and attachment spines, $\times 1$, paratype USNM 153955a; 4, 5, interior and exterior of a small brachial valve, $\times 1$, paratype USNM 153955b; 6, 7, exterior and interior of another brachial valve, $\times 1$, paratype USNM 153955c (for additional views, see plate 457: figures 1, 2). [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

8–10, Anterior, posterior, and ventral views of a small adult, $\times 1$, paratype USNM 153956. [Cathedral Mountain Formation, USNM 721u.]

Compressoproductus concentricus, new species: 11–14, Anterior, side, posterior, and ventral views of a pedicle valve, $\times 1$, paratype USNM 151542. [Hess Formation (Taylor Ranch Member), USNM 716o.]

15–18, Anterior, posterior, side, and ventral views of a pedicle valve, $\times 1$, paratype USNM 151575b; 19–22, posterior, anterior, side, and ventral views of a pedicle valve, $\times 1$, holotype USNM 151575a; 23, ventral view of the preceding specimen, $\times 2$, showing the ornament. [Skinner Ranch Formation (Decie Ranch Member), USNM 714t.]

Compressoproductus species 4: 24, 25, Interior and exterior of an immature ventral valve, $\times 4$, showing attachment ring, figured specimen, USNM 151579a; 26, interior of the brachial valve of a youthful specimen, $\times 4$, showing the bladelike septum continuous with the cardinal process, figured specimen USNM 151579d; 27, posterior of another pedicle valve, $\times 4$, showing initial attachment ring, figured specimen USNM 151579c; 28, small cluster of pedicle valves with initial attachment spines, $\times 4$, figured specimen, USNM 151579b. [Skinner Ranch Formation (Poplar Tank Member), USNM 707ha.]

PLATE 455.—*Striatifera* and *Compressoproductus*

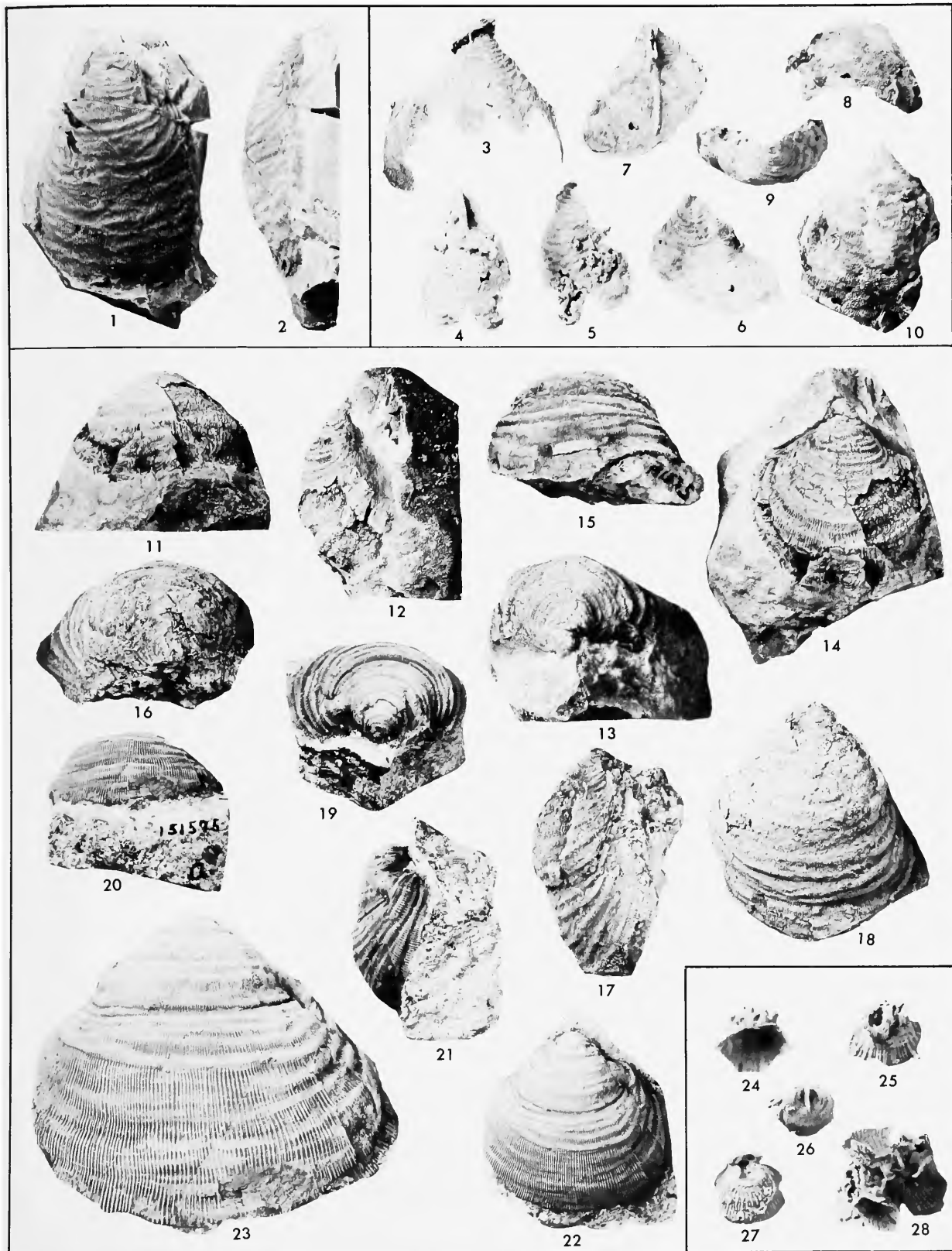


PLATE 456*Compressoproductus*

Compressoproductus species 1: 1–3, Anterior, ventral, and side views of a young individual, $\times 1$, figured specimen USNM 153959a; 4, ventral view of an immature pedicle valve, $\times 1$, figured specimen USNM 153959b; 5–8, anterior, posterior, side, and ventral views of a young pedicle valve, $\times 1$, figured specimen USNM 153959c; 9–13, posterior, anterior, ventral, side, and interior views of an adult pedicle valve, $\times 1$, figured specimen USNM 153959d; 14–16, posterior, ventral, and side views of a pedicle valve, $\times 1$, figured specimen USNM 153959e; 17, 18, interior of the brachial valve, $\times 1$, $\times 2$, figured specimen USNM 153959f; 19, interior of a brachial valve, $\times 2$, figured specimen USNM 153959g; 20, 21, ventral and side views of a pedicle valve preserving the attachment spines on one side, $\times 1$, figured specimen USNM 153959h. [Road Canyon Formation, USNM 726d.]

Compressoproductus flabellatus, new species: 22–24, Exterior, interior, $\times 1$, and interior, $\times 2$, of a brachial valve, paratype USNM 153960a; 25–29, ventral, interior, posterior, side, and anterior views of a pedicle valve, $\times 1$, paratype USNM 153960b; 30–34, anterior, posterior, ventral, side, and interior views of a young pedicle valve, $\times 1$, paratype USNM 153960c; 35–39, posterior, anterior, side, ventral, and interior views of another pedicle valve, $\times 1$, paratype USNM 153960d; 40–44, side, interior, anterior, posterior, and ventral views of a paratype, $\times 1$, USNM 153960e; 45, 46, exterior and interior of the same paratype, $\times 2$; 47, 48, interior of the brachial valve, $\times 1$, $\times 2$, paratype USNM 153960f; 49, 50, interior of a pedicle valve, $\times 1$, $\times 2$, showing young specimens attached, paratype USNM 153960g. [Cathedral Mountain Formation, USNM 726u.]

PLATE 456.—*Compressoproducetus*

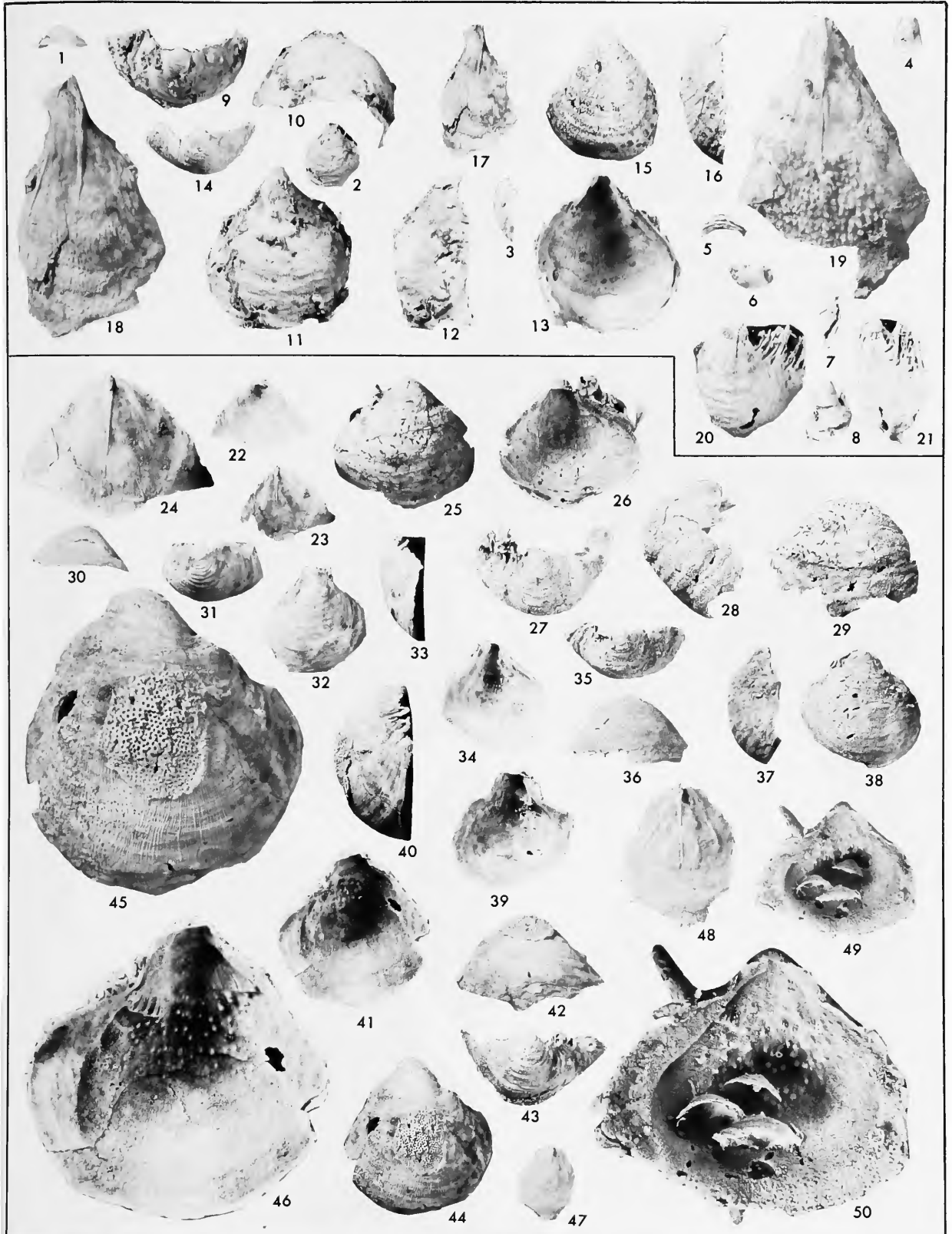


PLATE 457

Compressoproductus

Compressoproductus thomasi, new species: 1, Side view of a large brachial valve, \times 1, paratype USNM 153955b; 2, interior of another brachial valve, \times 1, showing the cardinal process, paratype USNM 153955c (for additional figures of these specimens, see plate 455: figures 4–7). [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

3, 4, Side and ventral views of a pedicle valve attached to a fenestellid bryozoan, \times 1, paratype USNM 151554a; 5, 6, exterior and side of a brachial valve, \times 1, paratype USNM 151554b. [Cathedral Mountain Formation (Wedin Member), USNM 714w.]

7, Ventral view of a pedicle valve with attached *Institella*, \times 1, paratype USNM 153954d. [Cathedral Mountain Formation (Wedin Member), USNM 700x.]

8, Interior of a large pedicle valve, \times 1, paratype USNM 153962. [Cathedral Mountain Formation, USNM 702.]

Compressoproductus compressus (Waagen): 9, 10, Ventral and side views of a small specimen, \times 1, hypotype USNM 96597a; 11, 12, side and dorsal views of a long slender specimen, \times 1, hypotype USNM 96597b; 13, interior of a pedicle valve showing beak region, \times 1, hypotype USNM 153965. ["Middle Productus Limestone," Wargal Formation (Kalabagh Member) northeast of Kumaranwali Dhok, Warcha Mandi, Salt Range, Pakistan.]

14, 15, Dorsal and side views of a large individual, \times 1, hypotype USNM 153963. ["Lower Productus Limestone", Amb Formation, south of dam site, north of Warcha, Salt Range, Pakistan.]

16, 17, Side and interior of a brachial valve, \times 1, showing the cardinal process, hypotype USNM 153964. ["Middle Productus Limestone," Wargal Formation (Kalabagh Member), one-half mile west of Khura, Salt Range, Pakistan.]

Compressoproductus rarus, new species: 18, 19, Exterior and interior of the brachial valve, \times 1, paratype USNM 153966; 20, 21, interior and side of the preceding specimen, \times 2, showing the cardinal process and median septum. [Word Formation (China Tank Member), USNM 733q.]

22, Ventral view of a small pedicle valve, \times 2, showing attachment spines, paratype USNM 153967. [Word Formation, USNM 732s.]

PLATE 457.—*Compressoproductus*

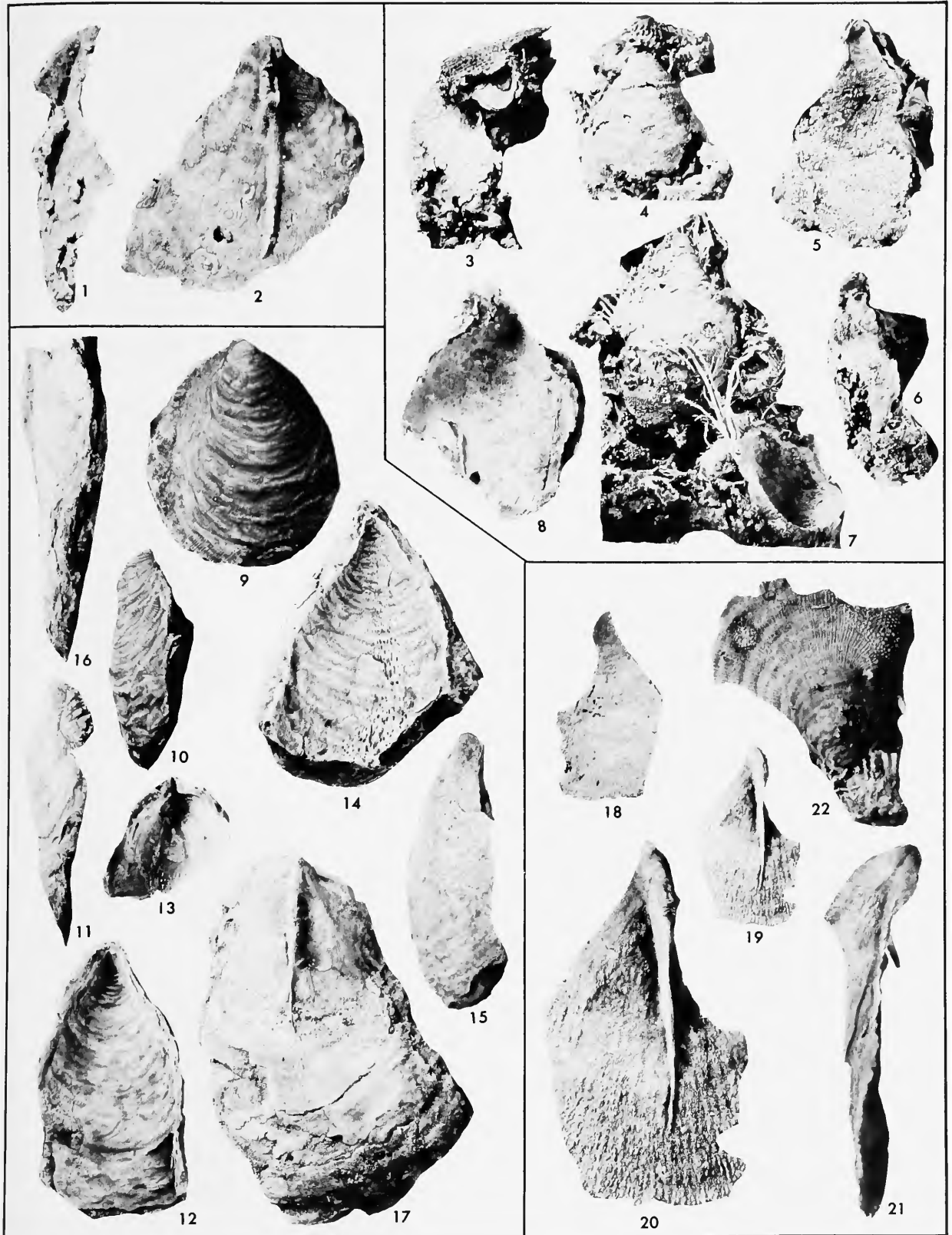


PLATE 458

Compressoproductus

Compressoproductus rarus, new species: 1, 2, Side and interior of a young specimen attached to a bryozoan, $\times 1$, paratype USNM 151566k; 3, interior of the preceding specimen, $\times 2$, showing attachment spines; 4, 5, exterior and interior of a brachial valve, $\times 1$, paratype USNM 151565a; 6, 7, interior and side views of the preceding specimen, $\times 2$, showing the cardinal process and long median septum; 8, interior of another brachial valve, $\times 2$, showing same features as preceding specimen, paratype USNM 151565b; 9–13, side, anterior, ventral, interior, and posterior views of a small pedicle valve, $\times 1$, paratype USNM 151566f; 14, ventral view of the preceding specimen, $\times 2$, showing ornament; 15–19, ventral, anterior, posterior, side, and interior views of a medium sized pedicle valve, $\times 1$, paratype USNM 151566e; 20, posterior view of the interior of the preceding specimen, $\times 2$, showing narrow and thickened posterior plates; 21, ventral view of another small pedicle valve, $\times 1$, paratype USNM 151566h; 22, ventral view of a somewhat larger specimen than the preceding with well preserved ornament, $\times 1$, paratype USNM 151566d; 23, ventral view of a nearly fully grown ventral valve, $\times 1$, paratype USNM 151566g; 24–28, ventral, interior, side, anterior, and posterior views of a pedicle valve, $\times 1$, paratype USNM 151566b; 29–33, side, ventral, anterior, posterior and interior of a strongly convex pedicle valve, $\times 1$, paratype USNM 151566c; 34–37, ventral, side, interior, and anterior views of a large ventral valve, $\times 1$, holotype USNM 151566a; 38, posterior view of the inside of the preceding pedicle valve tilted to show the posterior plates, $\times 2$; 39, anterior view of the preceding specimen, $\times 2$, showing the fine radial ornament and young *Rhamnaria* pedicle valve. [Word Formation (China Tank Member), USNM 706c.]

PLATE 458.—*Compressoproductus*

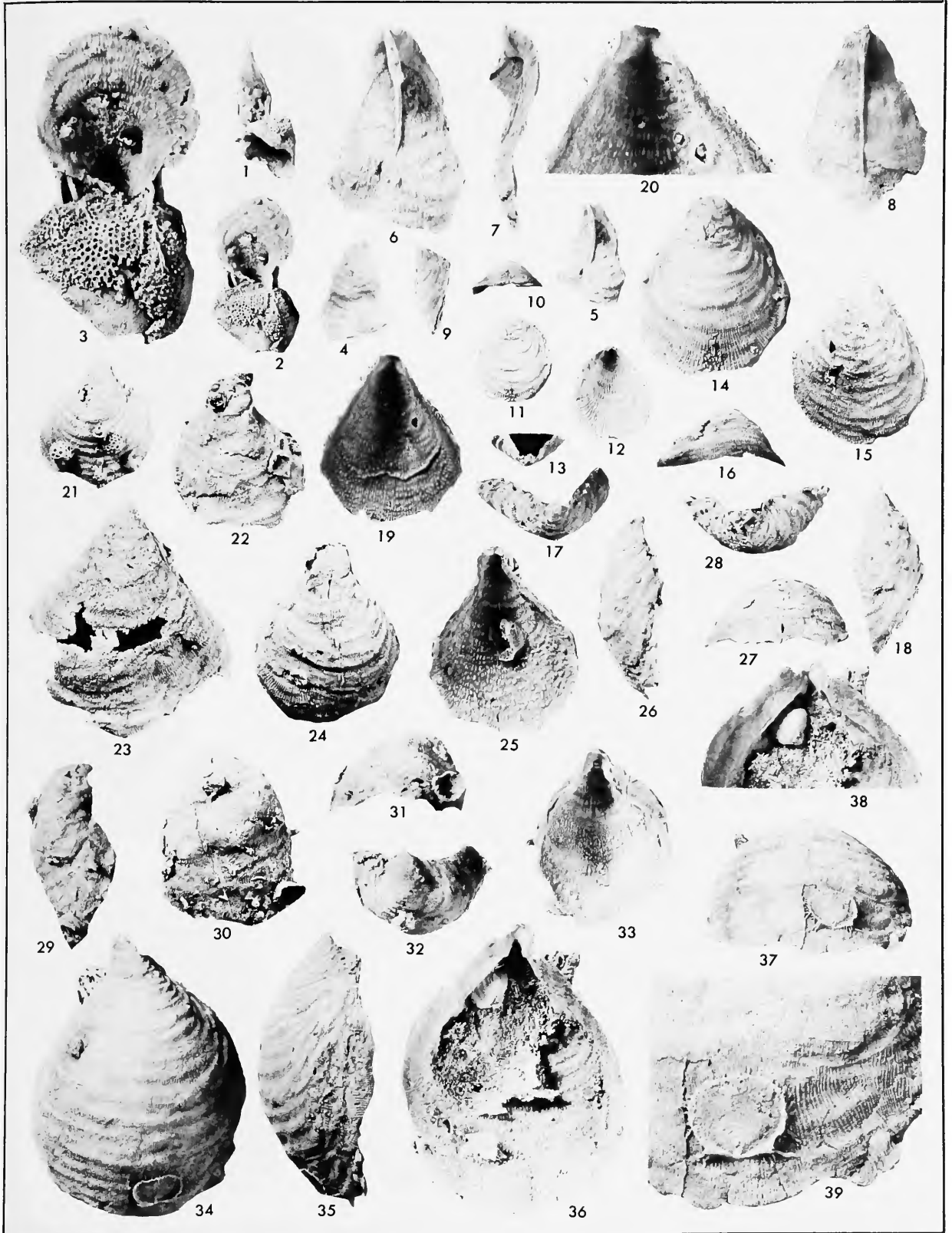


PLATE 459

Compressoproductus

Compressoproductus species 5: 1-3, interior, ventral, and side views of a pedicle valve, $\times 1$, showing apical plates in the interior, figured specimen USNM 151567a; 4, ventral view of a wide and spreading pedicle valve, $\times 1$, figured specimen USNM 151567b; 5-7, exterior, interior, and side of a brachial valve, $\times 1$, figured specimen USNM 151567c; 8, side of the preceding, $\times 2$, showing the greatly thickened cardinal process. [Hess Formation (Taylor Ranch Member), USNM 702d.]

Compressoproductus parvus, new species: 9-11, Ventral, side, and interior views of an attenuated pedicle valve, $\times 1$, paratype USNM 151545. [Skinner Ranch Formation (Sullivan Peak Member), USNM 722-1.]

12-15, Dorsal, anterior, posterior, and side views of specimen with both valves, $\times 1$, paratype USNM 151560h; 16-19, anterior, side, posterior, and ventral views of a pedicle valve, $\times 1$, showing some quincunxial wrinkling, paratype USNM 151560c; 20-23, posterior, anterior, ventral, and side views of a pedicle valve, $\times 1$, holotype USNM 151560a; 24, side of the holotype, showing the ornament, $\times 2$; 25-27, posterior, ventral and side views of a wrinkled pedicle valve, $\times 1$, paratype USNM 151560b. [Skinner Ranch Formation (Poplar Tank Member), USNM 708e.]

28-31, Posterior, anterior, side, and ventral views of a wrinkled specimen, $\times 1$, paratype USNM 153968. [Skinner Ranch Formation (top), USNH 723-1.]

Compressoproductus rarus, new species: 32-34, Interior, side, and ventral views of a small pedicle valve, $\times 1$, showing apical plates, paratype USNM 151564. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 459.—*Compressoproductus*

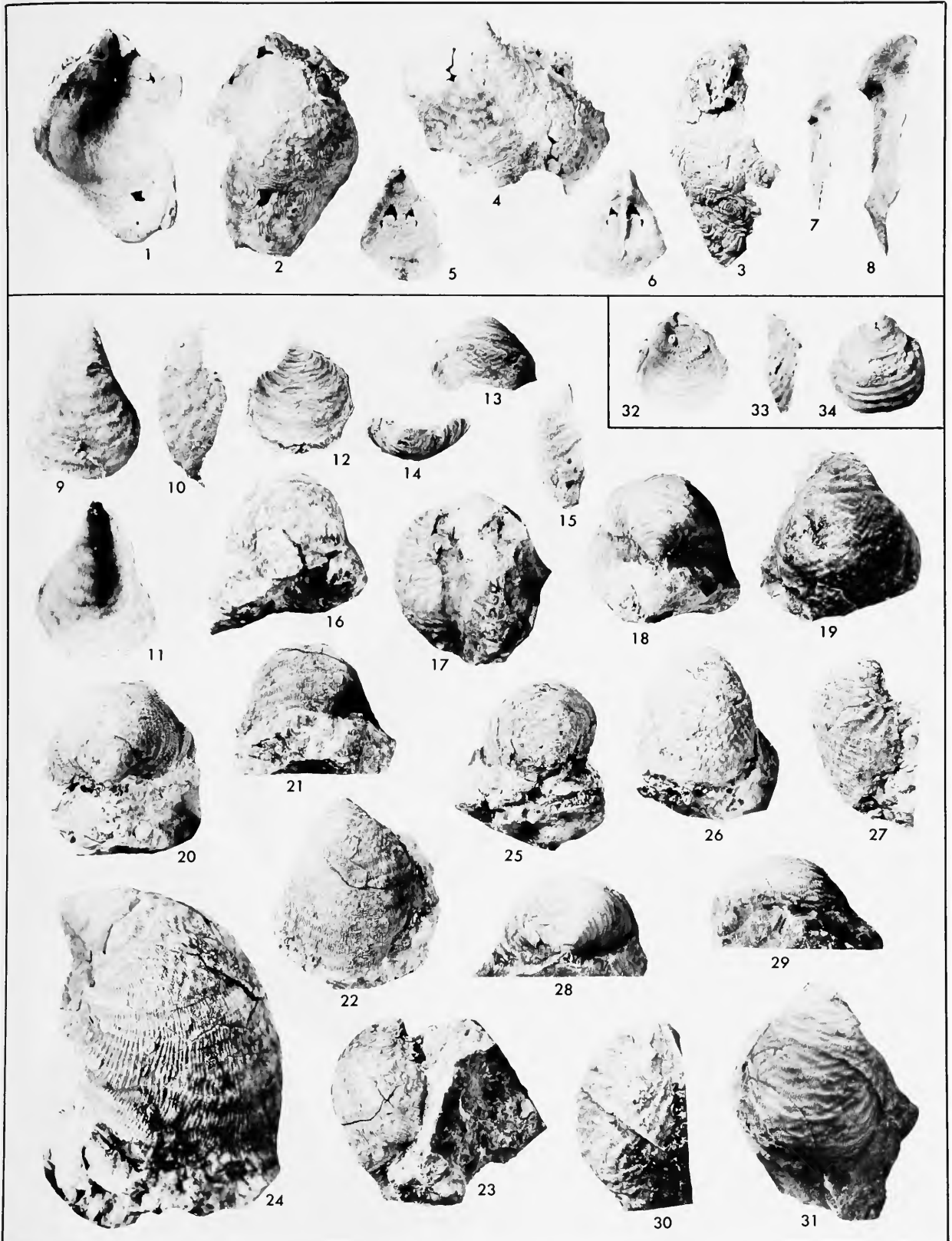


PLATE 460

Compressoproductus

Compressoproductus species 6: 1–4, Anterior, ventral, posterior and side views of a pedicle valve, $\times 1$, figured specimen 153969a; 5, ventral view of a small pedicle valve, $\times 1$, figured specimen USNM 153969b; 6, ventral view of an immature pedicle valve, $\times 1$, figured specimen USNM 153969c; 7, 8, interior of two brachial valves, $\times 1$, figured specimens 153969d, e. [Road Canyon Formation, USNM 721j.]

Compressoproductus curtus, new species: 9, 10, Immature ventral valve with attachment ring, $\times 1$, $\times 2$, paratype USNM 151568a; 11–15, anterior, dorsal, posterior, side, and ventral views of a complete specimen, $\times 1$, holotype USNM 151569; 16–20, interior, ventral, posterior, anterior, and side views of a large pedicle valve, $\times 1$, paratype USNM 151568f; 21, interior of the preceding specimen, $\times 1.5$, showing apical plates and endospines around the muscle area; 22–27, ventral, side, interior, anterior, posterior, and interior tilted views, $\times 1$, showing apical plates and musculature, paratype USNM 151568g; 28–32, anterior, side, ventral, posterior, and interior views of a large adult, $\times 1$, paratype USNM 151568e; 33, interior of the preceding specimens $\times 1.5$, showing muscle area and endospines; 34, 35, side and interior of the brachial valve, $\times 2$, paratype USNM 151568m; 36, 37, exterior and interior of another brachial valve, $\times 1$, paratype USNM 151568n; 38, 39, interior and side views of the preceding specimen, $\times 2$, showing cardinal process. [Cathedral Mountain Formation, USNM 702b.]

PLATE 460.—*Compressoproducetus*

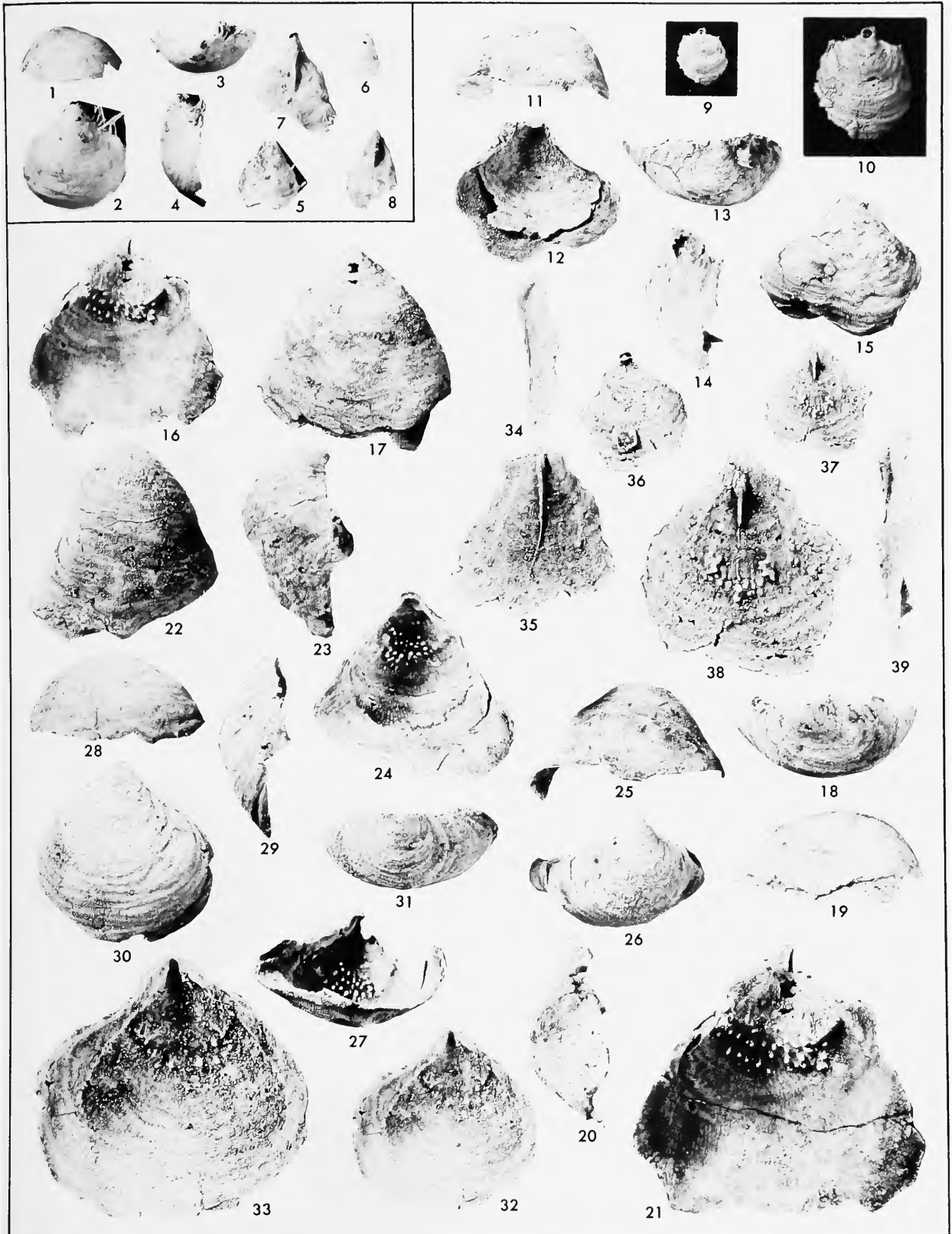


PLATE 461

Compressoproductus

Compressoproductus flabellatus, new species: 1-5, Ventral, interior, posterior, side, and anterior views of a rotund pedicle valve, $\times 1$, holotype USNM 152788a; 6, 7, interior and exterior of a pedicle valve showing thick endospines, $\times 1$, paratype USNM 152788j; 8-12, ventral, interior, side, posterior, and anterior views of another pedicle valve, $\times 1$, paratype USNM 152788e; 13-17, posterior, anterior, ventral, interior, and side views of a large pedicle valve, $\times 1$, paratype USNM 152788k; 18-20, ventral, side, and interior views of a specimen distorted in growth, $\times 1$, paratype USNM 152788-l; 21, 22, dorsal view of a specimen with both valves in place and with the brachial valve partially occupied by a Lyttoniid, $\times 1$, $\times 2$, paratype USNM 152788m; 23, 24, exterior and interior of a brachial valve, $\times 1$, paratype USNM 152788s; 25, 26, side and interior views of the preceding specimen, $\times 2$, showing the cardinal process and median septum; 27, 28, exterior and interior of another brachial valve, $\times 1$, paratype USNM 152788t; 29, 30, interior and side views of the preceding specimen, $\times 2$, showing the cardinal process and septum; 31-34, ventral, posterior, side, and anterior views of an immature specimen, $\times 1$, paratype USNM 152788o; 35-37, posterior, interior, and ventral views of a small pedicle valve with attachment spines, $\times 1$, paratype USNM 152788n; 38, cluster of small specimens cemented by their spines, $\times 1$, paratype USNM 152788p; 39-43 interior, posterior, anterior, ventral, and side views of a small rounded pedicle valve, $\times 1$, paratype USNM 152788c; 44-48, posterior, side, ventral, anterior, and interior views of a pedicle valve, $\times 1$, paratype USNM 152788b; 49, 50, exterior and interior of the preceding specimen, showing attachment spines and endospines anterior to the muscle field, $\times 2$; 51-55, anterior, posterior, interior, side, and ventral views of a wrinkled pedicle valve, $\times 1$, paratype USNM 152788f; 56, ventral view of the preceding valve, $\times 2$, showing the ornamentation; 57-59, interior, exterior, and side views of a small brachial valve, $\times 1$, paratype USNM 152788h; 60, side view of the preceding brachial valve, $\times 2$; 61-65, side, anterior, interior, posterior, and ventral views of a small pedicle valve, $\times 1$, paratype USNM 152788d; 66, interior of the preceding specimen, $\times 2$, showing endospines and rhizoid spines. [Cathedral Mountain Formation, USNM 721u.]

PLATE 461.—*Compressopproductus*

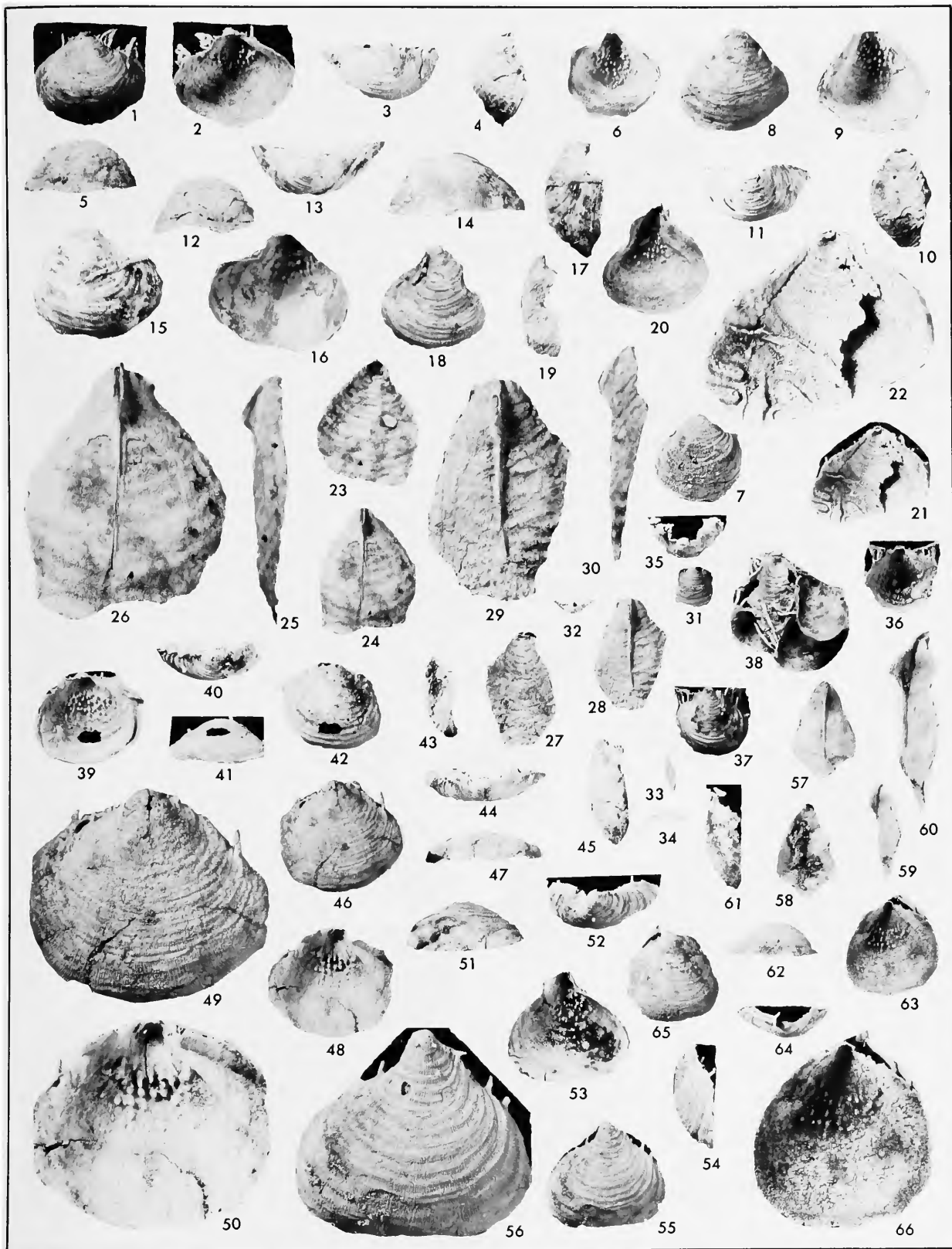


PLATE 462

Striatifera and *Compressoproductus*

Striatifera linoproductiformis, new species: 1–5, Side, ventral, anterior, posterior, and interior views, $\times 1$, of a small wrinkled individual, paratype USNM 151535; 6, interior of the pedicle valve of the preceding specimen, $\times 2$, showing endospines; 7, 8, interior and side of the brachial valve of the same specimen, $\times 2$, showing cardinal process and endospines. [Neal Ranch Formation (bed 4), USNM 701d.]

Compressoproductus acuminatus, new species: 9–13, Ventral, posterior, side, dorsal, and anterior views of a specimen, $\times 1$, preserving its rhizoid spines, paratype USNM 151546e; 53, ventral view, $\times 2$, of the preceding specimen; 14–18, interior, side, ventral, posterior, and interior views of another ventral valve, $\times 1$, paratype USNM 151546h (for enlarged view, see plate 463: figure 11); 19–21, interior, $\times 1$, side and interior of a brachial valve, $\times 2$, showing the cardinal process and median septum, paratype USNM 151546i; 22, interior, $\times 1$, of another brachial valve, paratype USNM 151546j; 23, 24, interior and side views, $\times 2$, of the preceding specimen; 25, interior of a brachial valve, $\times 1$, paratype USNM 151546k; 26, 27, interior and side views of the preceding specimen, $\times 2$, showing the cardinal process; 28–32, interior, ventral, side, anterior, and posterior views, of an attenuated ventral valve with lateral rhizoid spines, $\times 1$, paratype USNM 151546f (for an enlarged view of this specimen see plate 463: figure 9); 33–37, interior, side, ventral, dorsal, and posterior views, $\times 1$, of the holotype USNM 151546a; 43, interior of the preceding pedicle valve, $\times 2$, showing interior pustules; 38, 39, interior and exterior of the brachial valve of the holotype, $\times 1$; 40, 41, interior and side views of the brachial valve of the holotype, $\times 2$; 42, dorsal view, $\times 2$, of the holotype, showing both valves in place; 44–48, dorsal, ventral, interior, posterior, and side views of another, extremely attenuate individual, $\times 1$, paratype USNM 151546b; 49, interior of the brachial valve, $\times 1$, of the preceding specimen; 50, 51, interior and side views, $\times 2$, of the brachial valve of the preceding paratype; 52, dorsal view of the preceding paratype, $\times 2$, showing both valves in place. [Road Canyon Formation, USNM 722v.]

PLATE 462.—*Striatifera* and *Compressoproductus*

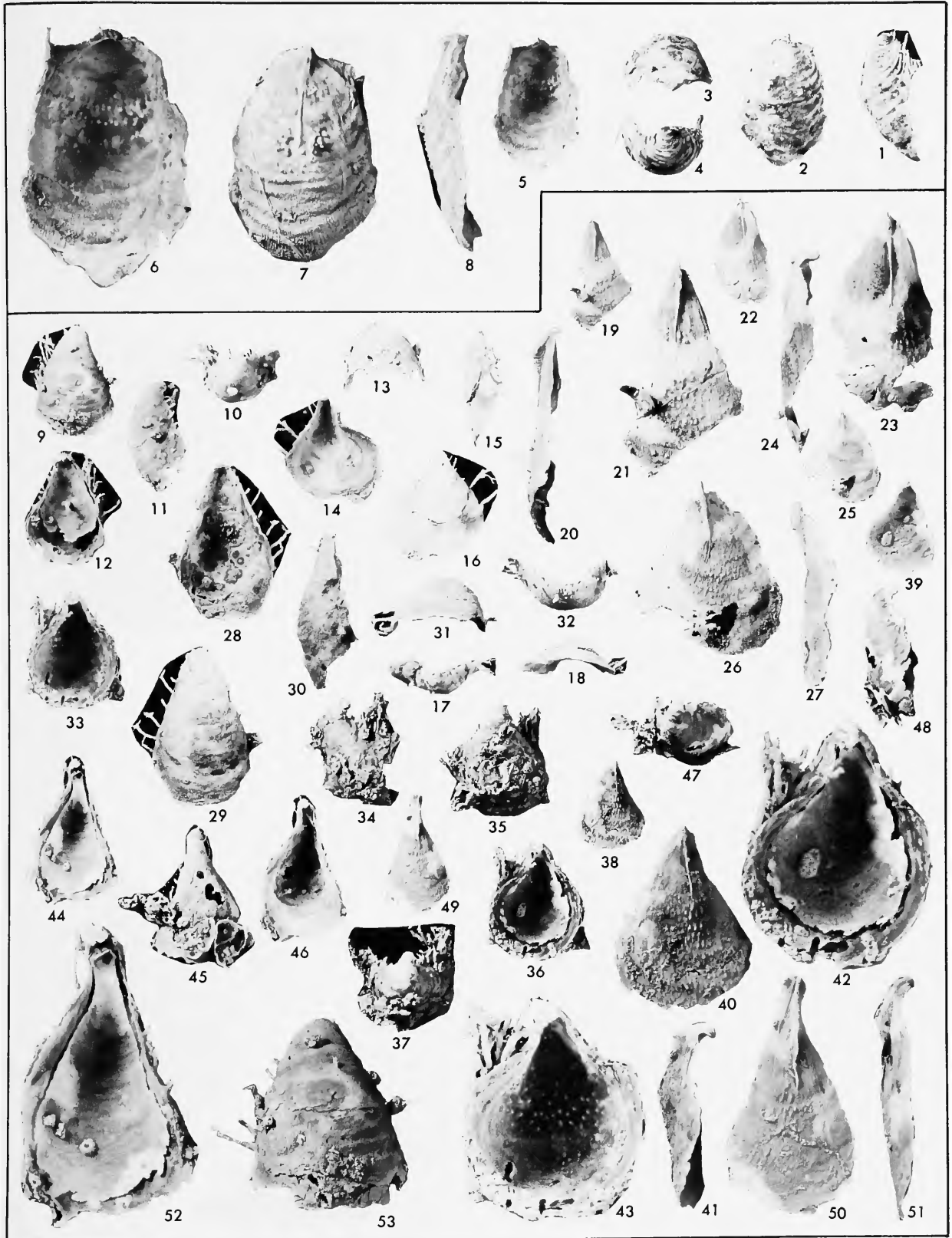


PLATE 463

Institella, *Mcgousia*, *Compressoproductus*, and *Striatifera*

Institella leonardensis (R. E. King): 1, 2, Ventral and interior views of a pedicle valve, $\times 1$, hypotype USNM 153970a; 3, 4, exterior and interior of the brachial valve, $\times 1$, hypotype USNM 153970b. [Cibolo Formation (Spicule Zone of Udden), USNM 738f.]

Megousia auriculata Muir-Wood and Cooper: 5, 6, Ventral view of a small pedicle valve with long halteroid spines, $\times 1$, $\times 2$, hypotype USNM 153971a; 7, 8, interior of the brachial valve, $\times 1$, $\times 2$, hypotype USNM 153971b. [Cibolo Formation (Thin-bedded Zone of Udden), USNM 738-1.]

Compressoproductus acuminatus, new species: 9-11, Exterior view of three specimens, $\times 2$, paratypes USNM 151546f, c, h (for $\times 1$ views of f and h, see plate 462: figures 16, 28-32). [Road Canyon Formation, USNM 722v.]

Compressoproductus species 6: 12, 13, Side and interior of a brachial valve, $\times 2$, figured specimen USNM 153969e (for an additional view, see plate 460: figure 8). [Road Canyon Formation, USNM 721j.]

Striatifera linoproductiformis, new species: 14-16, Side, ventral, and dorsal views of a complete specimen, $\times 1$, holotype USNM 153972b; 17, dorsal view, $\times 2$, of the preceding specimen; 18, posterior of the holotype, $\times 3$, showing wide hinge; 19, ornament of the holotype near midvalve, $\times 3$; 20-22, side, dorsal, and ventral views of another complete specimen, $\times 1$, paratype USNM 153972a; 23, posterior of the preceding specimen, $\times 3$, showing the wide hinge; 24, dorsal view of the preceding specimen, $\times 2$; 25, ventral view of a specimen $\times 2$, showing the lateral rhizoid spines and the mode of attachment, cementation by the beak, and anchoring by spines, paratype USNM 153972c. [Neal Ranch Formation (bed 4), USNM 721g.]

PLATE 463.—*Institella*, *Megousia*, *Compressoproductus*, and *Striatifera*

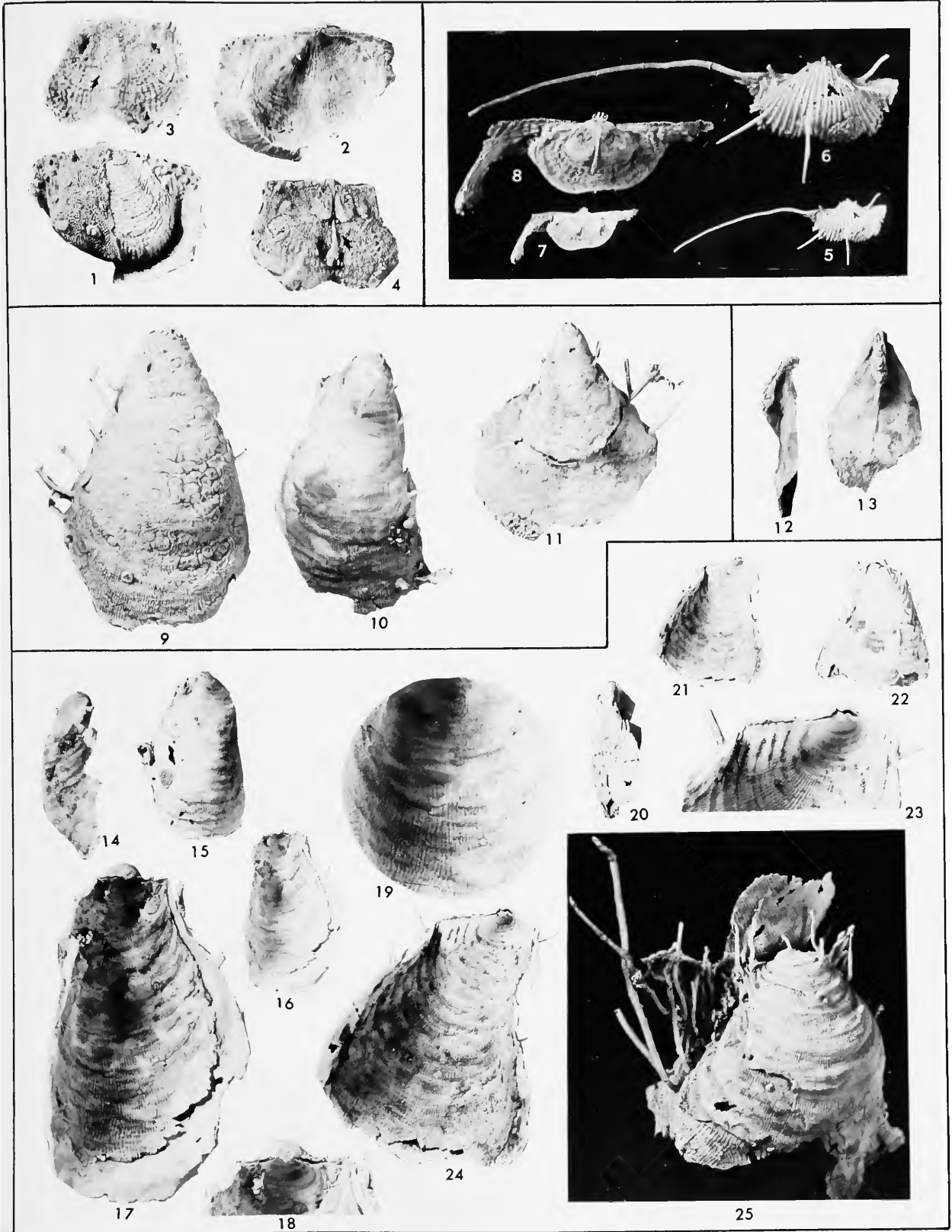


PLATE 464

Compressoproductus and *Polymorpharia*

Compressoproductus pinniformis (Girty): 1, 2, Side and dorsal views of a specimen with both valves, \times 1, hypotype USNM 153961a; 3-6, anterior, ventral, posterior, and side views of an adult, \times 1, hypotype USNM 151526e; 7-9, ventral, side, and posterior views of a wrinkled specimen, \times 1, hypotype USNM 151526c; 10-13, ventral, posterior, side, and anterior views of an average pedicle valve, \times 1, hypotype USNM 151526d; 14-17, posterior, anterior, ventral, and side views of a small adult, \times 1, hypotype USNM 153961b; 18-20, anterior, ventral, and side views, \times 1, of a wrinkled pedicle valve, hypotype USNM 151526b; 21, small slab with specimens of different size, \times 1, hypotype USNM 153961c; 22, largest specimen on preceding slab in ventral view, \times 2, showing the ornament; 23, an immature pedicle valve, \times 1, hypotype USNM 151526q. [Capitan Formation, USNM 750.]

Compressoproductus flabellatus, new species: 24-26, Ventral, posterior, and side views of an imperfect specimen, \times 1, figured specimen YPM 11634. [Cathedral Mountain Formation, R. E. King locality 120.]

Polymorpharia polymorpha new species: 27-29, Side, ventral, and interior views of a rare pedicle valve, \times 1, figured specimen USNM 154101. [Word Formation (Willis Ranch Member), USNM 724u.]

PLATE 464.—*Compressopproductus* and *Polymorpharia*

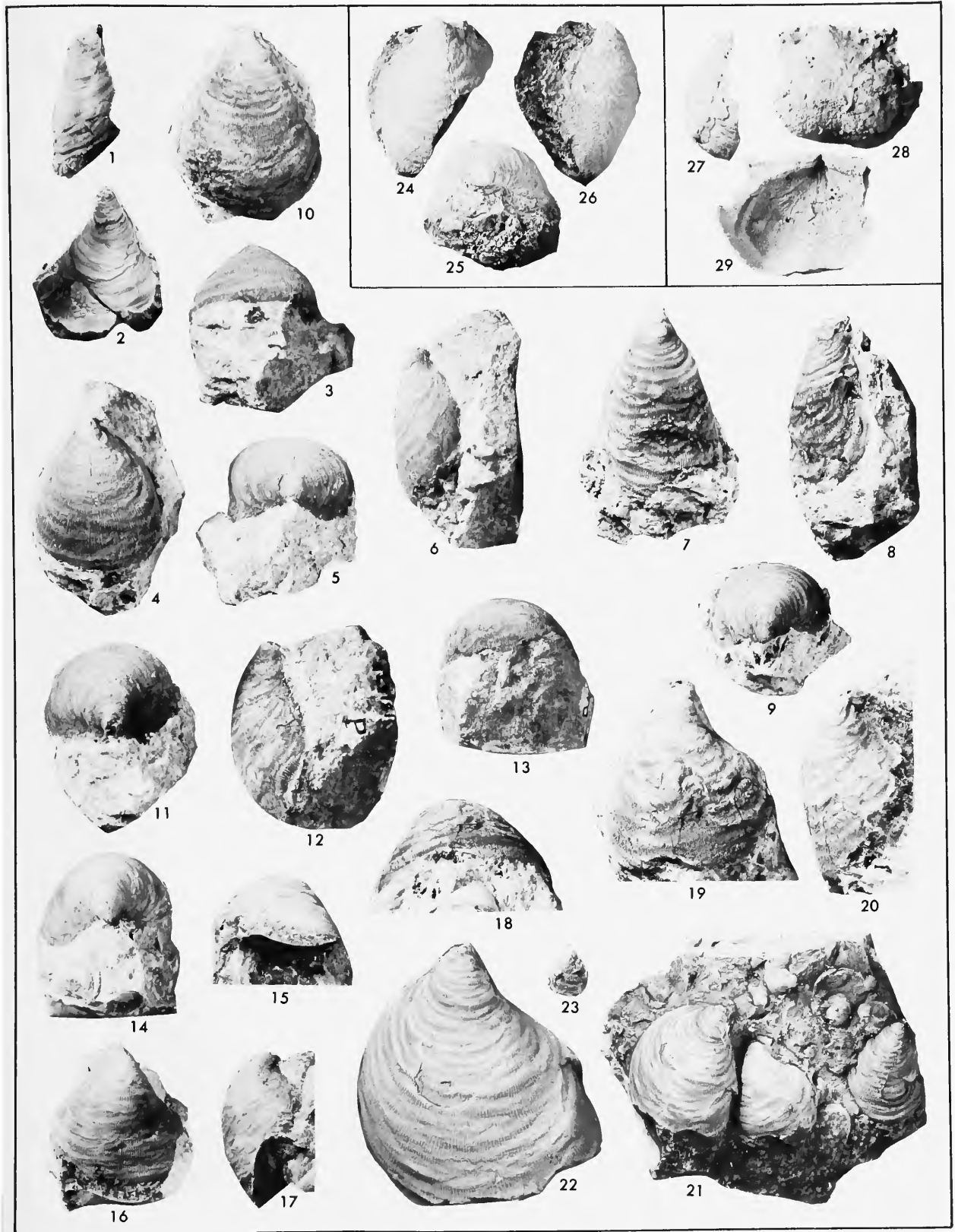


PLATE 465*Striatifera*

Striatifera linoproductiformis, new species: 1-4, Posterior, partial side, anterior, and ventral views of an attached specimen, $\times 1$, paratype USNM 153973a; 5, posterior view of a pedicle valve, showing the rhizoid spines, $\times 1$, paratype USNM 153973d; 6, 7, side and posterior views of a specimen with lateral rhizoid spines, $\times 1$, paratype USNM 153973b; 8, 9, posterior and side views of a specimen with numerous lateral rhizoid spines, $\times 1$, paratype USNM 153973c; 10-12, interior, $\times 1$, and interior and side, $\times 2$, of a brachial valve showing cardinal process, paratype USNM 153973e; 13, 14, interior of a large brachial valve, $\times 1$, $\times 2$, showing cardinal process, endospines, and median septum, paratype USNM 153973f; 15-18, interior, ventral, anterior, and side views of a pedicle valve, $\times 1$, paratype USNM 153973g; 19, interior of the preceding specimen, $\times 2$, showing endospines; 20-23, ventral, anterior, side, and dorsal views of a specimen with both valves in contact, $\times 1$, paratype USNM 151536a; 24-27, ventral, dorsal, anterior, and side views of a strongly wrinkled specimen, $\times 1$, paratype USNM 151536b; 28-31, anterior, ventral, side, and dorsal views of a complete specimen, $\times 1$, paratype USNM 151536h; 32, side view of the preceding specimen, $\times 2$, showing the ornament and lateral spines. [Neal Ranch Formation (bed 4), USNM 701d.]

PLATE 465.—*Striatifera*

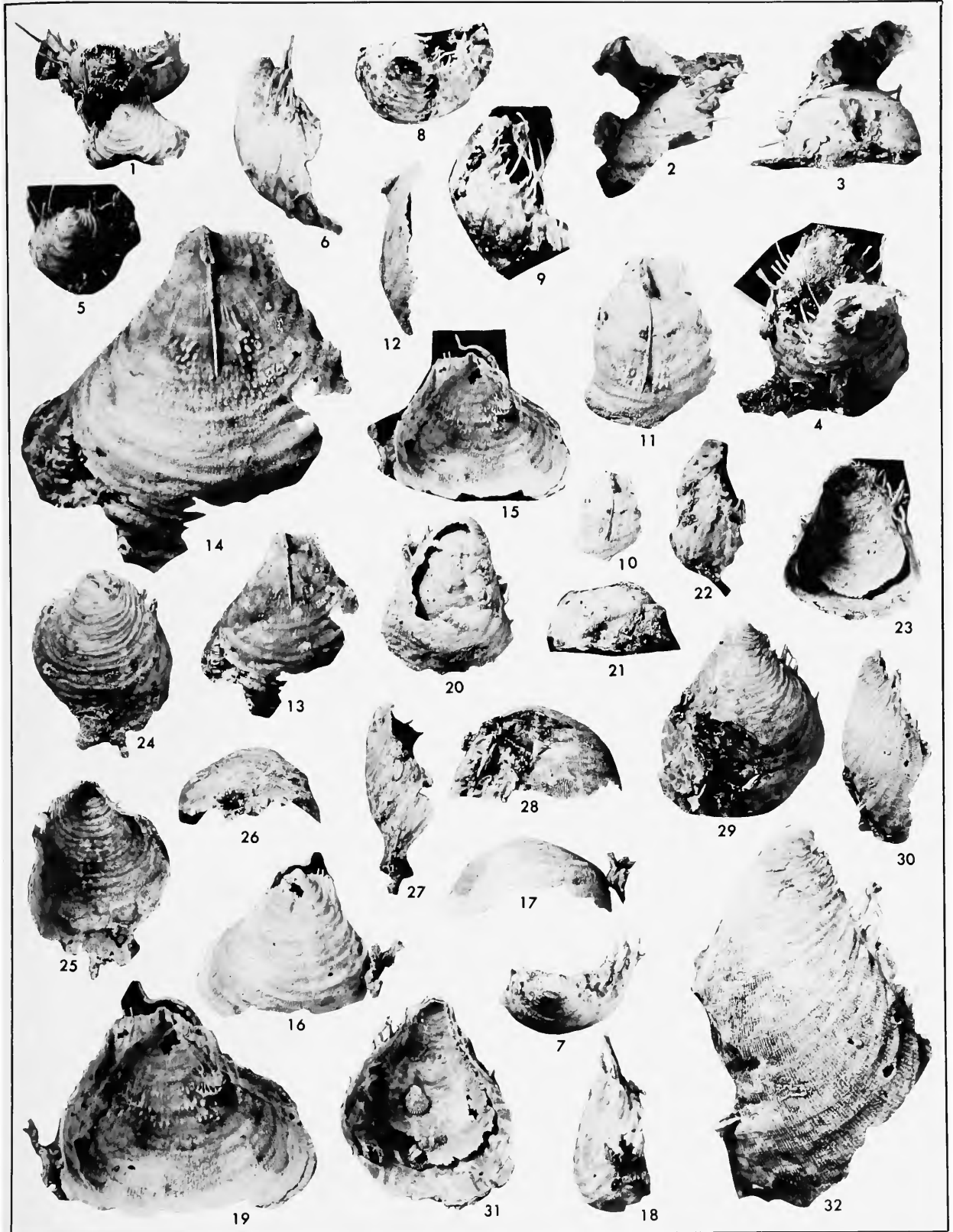


PLATE 466

Siphonostia

Siphonostia alleni, new species: 1, 2, Ventral and anterior views of a pedicle valve, $\times 1$, showing the early stage of tube development, paratype USNM 152789d; 3, 4, interior and side views of the preceding specimen, $\times 1.5$; 5, ventral view of the preceding specimen, $\times 2$, showing ornament; 6-9, side, posterior, and ventral views of another pedicle valve with early development of tube, $\times 1$, $\times 1.5$, paratype USNM 152789o; 10, ventral view of the preceding specimen, $\times 1$; 11, ventral view, $\times 1$, of a young adult in which the tube has not yet started to form, $\times 1$, paratype USNM 152789e; 12, 13, exterior and interior views, $\times 2$, of the preceding specimen; 14, 15, ventral view of a young specimen, $\times 1$, $\times 2$, paratype USNM 152789p; 16-19, ventral, side, anterior, and posterior views of a pedicle valve with well developed tube, $\times 1.5$, holotype USNM 152789a; 20-23, anterior, ventral, interior, and side views of the holotype, $\times 3$, showing tube, anchor spines, and anterior rim; 24, ventral view of the holotype, $\times 1$; 25, ventral view of a small paratype with strong ornament, $\times 1$, USNM 152789q; 26, posterior view of a pedicle valve, showing the rhizoid spines, $\times 2$, paratype USNM 152789r; 27, 28, exterior and interior of the brachial valve, $\times 1$, paratype USNM 152789t; 29, exterior of the preceding specimen, $\times 3$, showing ornament; 30, interior of the preceding specimen, $\times 4$, showing elongate brachial ridges, median ridge, and cardinal process; 31, 32, exterior, $\times 2$, and interior, $\times 4$, of another brachial valve, paratype USNM 152789u. [Cathedral Mountain Formation, USNM 721u.]

PLATE 466.—*Siphonostia*

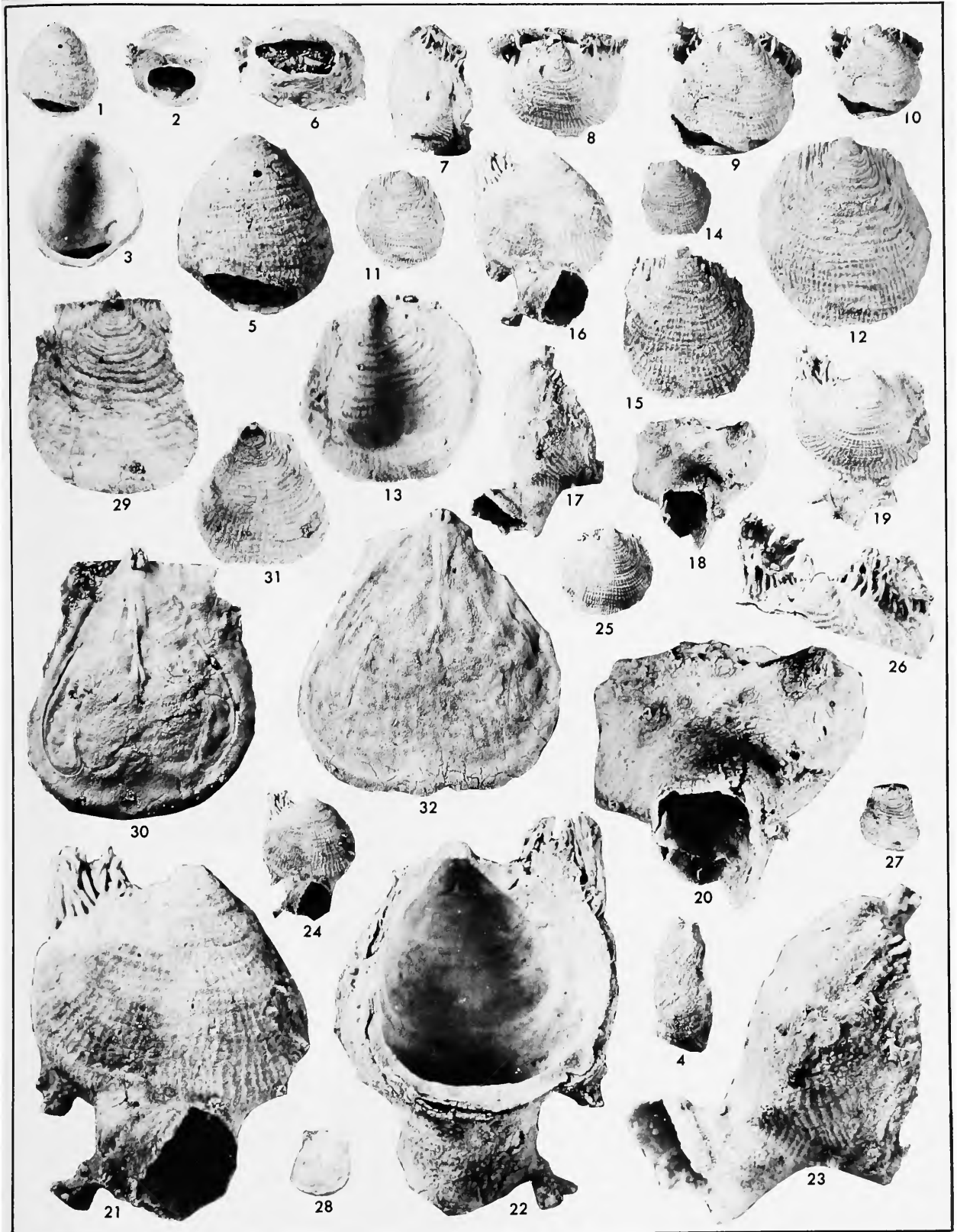


PLATE 467

Siphonostia, *Megousia*, and *Undellaria*

Siphonostia alleni, new species: 1-3, Ventral, interior, and anterior views of a pedicle valve with well formed tube, $\times 1$, paratype USNM 152789s; 4-8, posterior, side, ventral, interior, and anterior views, $\times 2$, of the preceding paratype. [Cathedral Mountain Formation, USNM 721u.]

Megousia auriculata Muir-Wood and Cooper: 9, Dorsal view of an immature specimen attached to a crinoid stem, $\times 1$, hypotype USNM 154026; 10, 11, posterior and dorsal views of the preceding specimen, $\times 3$; 12, 13, posterior and partial side views of the preceding specimen, $\times 5$, showing mode of attachment. [Road Canyon Formation, USNM 707e.]

Undellaria magnifica, new species: 14-17, Ventral, anterior, posterior, and side views, $\times 1$, of the pedicle valve, holotype USNM 152783b; 18-21, posterior, anterior, side, and ventral views of another pedicle valve, larger than the preceding, $\times 1$, paratype USNM 152783a; 22, interior of the preceding pedicle valve, $\times 1$, tilted to show the muscle scars; 23, 24, exterior 1.5 of a brachial valve, $\times 1$, $\times 1.5$, paratype USNM 152783c; 25, interior of the preceding brachial valve, $\times 2$, showing small size of cardinalia; 26, 27, posterior and interior views of the preceding brachial valve, $\times 3$, showing short brevisseptum, adductor platforms, and cardinal process; 28, 29, interior and posterior views of a fragmentary brachial valve, $\times 3$, showing the cardinal process, adductor platforms, and brevisseptum, paratype USNM 152783d. [Bone Spring Formation, USNM 728e.]

PLATE 467.—*Siphonosia*, *Megousia*, and *Undellaria*

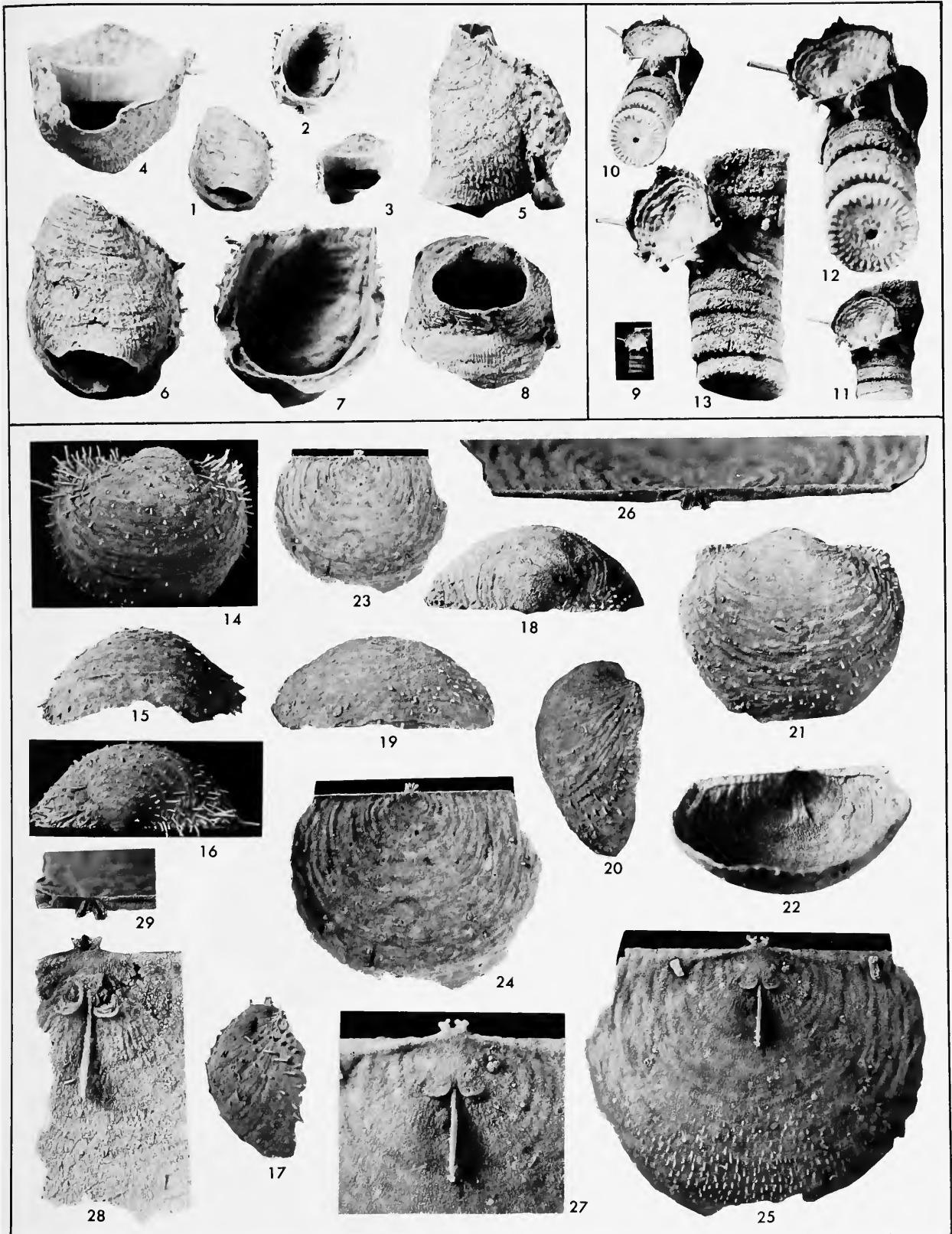


PLATE 468

Horridonia, *Echinauris*, *Institella*, *Glyptosteges*, *Siphonosis*, and *Nudauris*

Horridonia texana R. E. King: 1, 2, Exterior and interior of a young pedicle valve, $\times 1$, hypotype USNM 153915a; 3, 4, exterior and interior of a young brachial valve, $\times 1$, hypotype USNM 153915b. [Road Canyon Formation, USNM 703c.]

Echinauris lateralis Muir-Wood and Cooper: 5-9, Side, posterior, dorsal, anterior, and ventral views of an unusually large specimen, $\times 1$, hypotype USNM 153916. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 737w.]

Institella leonardensis (R. E. King): 10, Ventral view of an unusually large and strongly frilled pedicle valve, $\times 1$, hypotype USNM 153917. [Cathedral Mountain Formation, USNM 721u.]

Glyptosteges sulcatus, new species: 11-15, Ventral, anterior, posterior, side, and interior views of the pedicle valve, $\times 1$, paratype USNM 153918a; 16-18, interior, posterior, and ventral views, $\times 2$, of the preceding specimen; 19, exterior of the brachial valve, $\times 1$, paratype USNM 153918b; 20-22, posterodorsal, interior, and exterior views of the preceding brachial valve, $\times 2$, showing concentric ornament and cardinal process. [Cathedral Mountain Formation, USNM 721u.]

Siphonosis alleni, new species: 23, 24, Interior and exterior of the brachial valve, $\times 1$, paratype USNM 153919; 25, 26, exterior and interior of the preceding brachial valve, $\times 3$, showing median ridge, small cardinal process and wrinkled exterior; 27, 28, ventral and posterior views of the cardinal process of the preceding specimen, $\times 4$. [Cathedral Mountain Formation, USNM 721u.]

Nudauris whitei, new species: 29-33, Side, dorsal, posterior, anterior, and ventral views of a complete specimen, $\times 1$, holotype USNM 153920a. [Cibolo Formation (Transition Zone of Udden), USNM 738d.]

PLATE 468.—*Horridonia*, *Echinauris*, *Institella*, *Glyptosteges*, *Siphonosia*,
and *Nudauris*

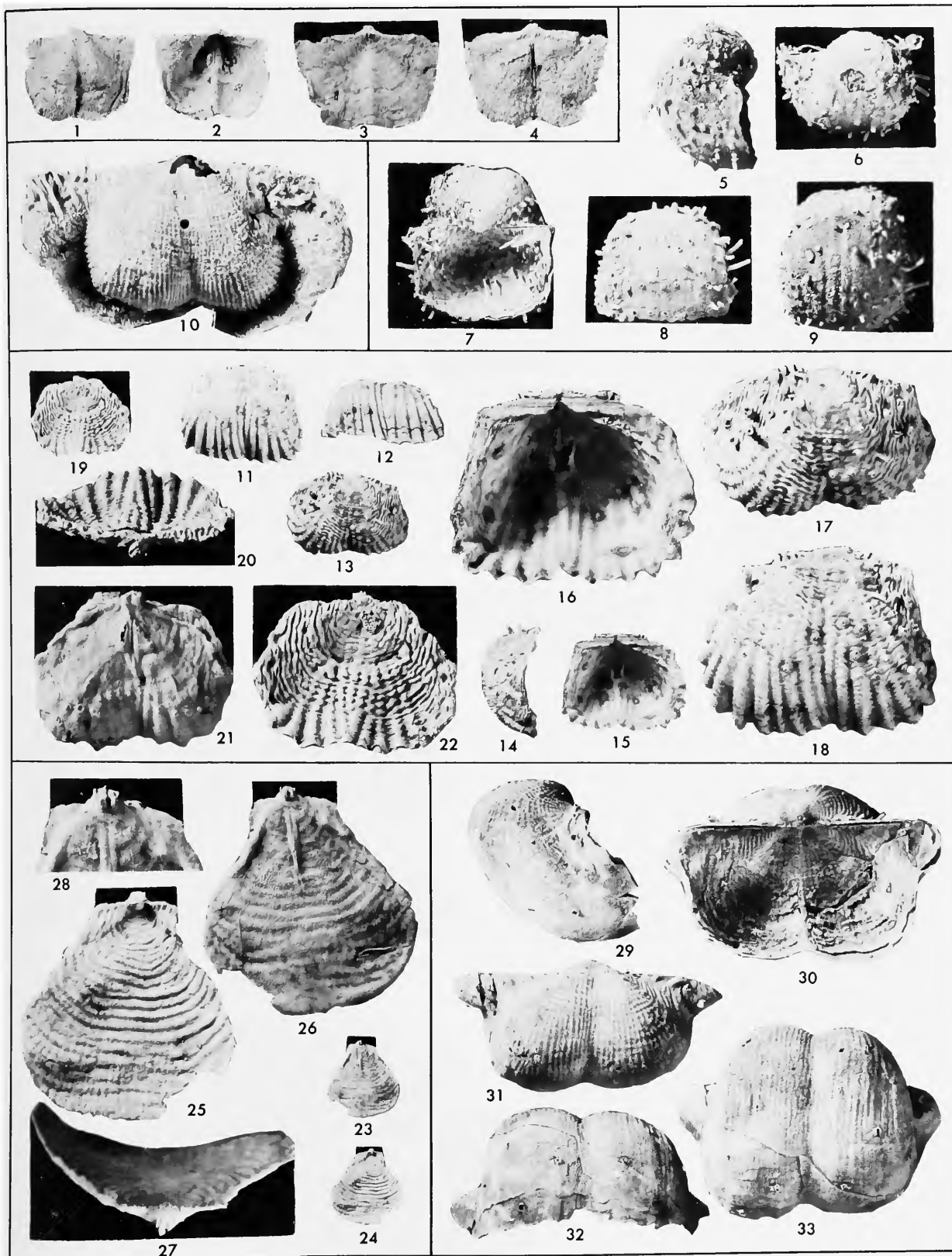


PLATE 469

Yakovlevia

Yakovlevia immatura, new species: 1–4, Dorsal, side, ventral, and anterior views of the holotype, × 1, USNM 151504a; 5–8, ventral, dorsal, anterior, and side views of another complete specimen, × 1, paratype USNM 151504b; 10, interior of the brachial valve, × 1, paratype USNM 151504g; 9, 11, pedicle valve exterior and interior, × 1, showing ginglymus and muscle scars, paratype USNM 151504d. [Road Canyon Formation, USNM 703d.]

Yakovlevia multistriata (Meek): 12–14, Anterior, posterior, and side views, × 1, holotype USNM 646. [Long Valley, northwestern White Pine County, Nevada.]

Yakovlevia costellata, new species: 15–18, Dorsal, anterior, posterior, and side views of the holotype, × 1, USNM 151502a; 19, interior of the pedicle valve, × 1, showing muscle scars and adductor platform, paratype USNM 151502d; 20–22, exterior, interior, and interior tilted of a brachial valve, × 1, paratype USNM 151502c; 23, 24, interior and posterior views of the preceding specimen, × 2, showing brachial ridges and endospines; 25, cardinal process of the preceding specimen, × 4; 26, 27, interior of the pedicle valve, × 1, × 2, showing muscle scars, paratype USNM 151502b. [Cherry Canyon Formation (Getaway Member), USNM 728.]

PLATE 469.—*Yakovlevia*

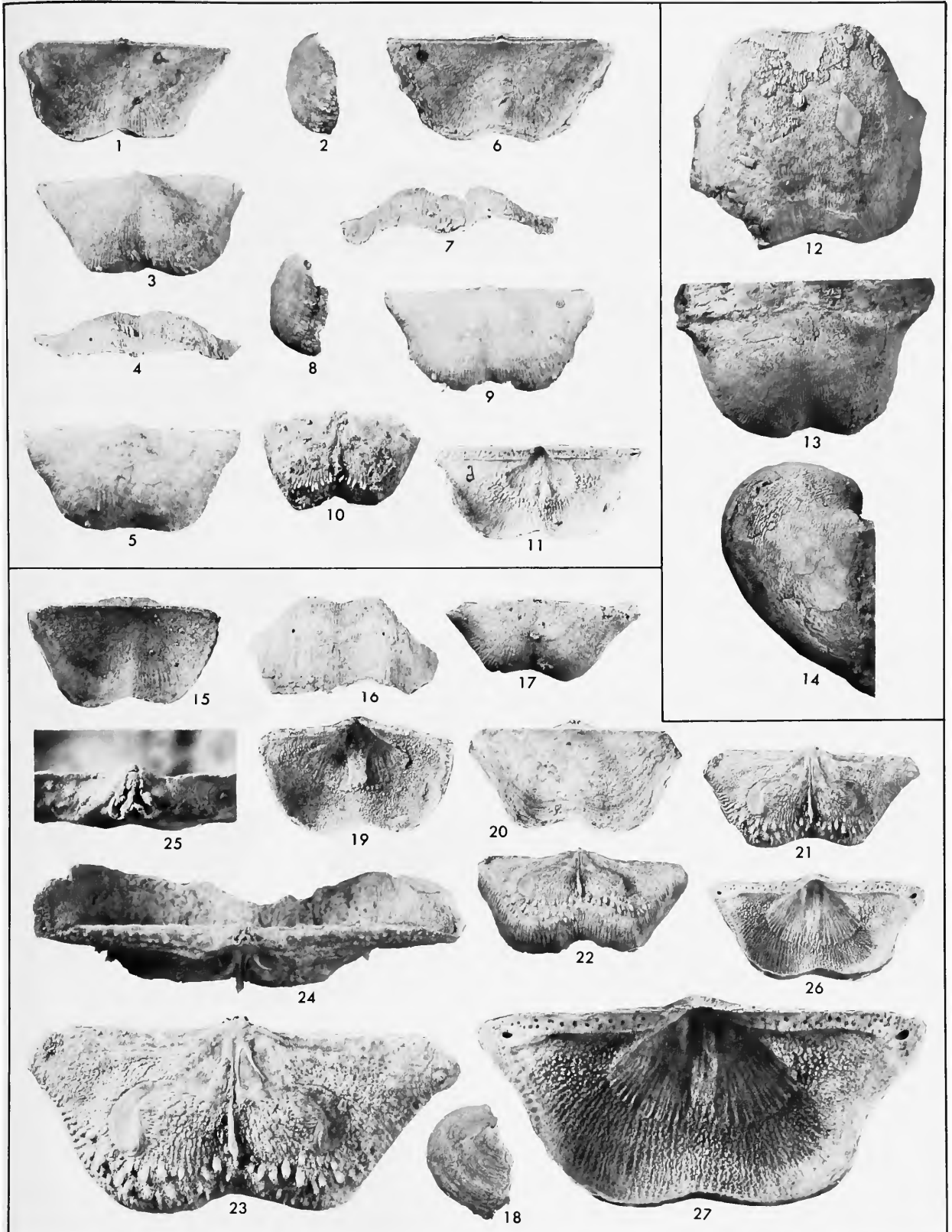


PLATE 470

Yakovlevia

Yakovlevia indentata, new species: 1-3, Interior, anterior, and ventral views of a pedicle valve, $\times 1$, paratype USNM 151513c; 4-7, posterior, anterior, side, and dorsal views of a complete specimen, $\times 1$, holotype USNM 151513e; 8-10, interior, anterior, and exterior views, of a brachial valve, $\times 1$, paratype USNM 151513f; 11, 12, posterior and interior views of the preceding specimen, $\times 2$, showing cardinal process, brachial ridges, brevisseptum, and adductor scars; 13, cardinal process, $\times 4$, of the preceding brachial valve; 23-25, exterior, interior, and anterior views of another brachial valve, $\times 1$, paratype USNM 151513d; 26, 27, posterior and interior views, $\times 2$, of the preceding brachial valve. [Word Formation (Appel Ranch Member), USNM 715i.]

14, 15, Anterior and ventral views of a pedicle valve, $\times 1$, paratype USNM 154038. [Word Formation (Appel Ranch Member), USNM 722t.]

16-18, Ventral, anterior and interior views of another pedicle valve, $\times 1$, paratype USNM 154039a (for an enlarged view of the interior of this specimen see plate 471: figure 24). [Word Formation (Appel Ranch Member), USNM 719z.]

19-22, Anterior, dorsal, side, and posterior views of a complete specimen, $\times 1$, paratype USNM 154040a; 28, interior of a brachial valve, $\times 1$, paratype USNM 154040b. [Word Formation (Appel Ranch Member), USNM 727j.]

PLATE 470.—*Yakovlevia*

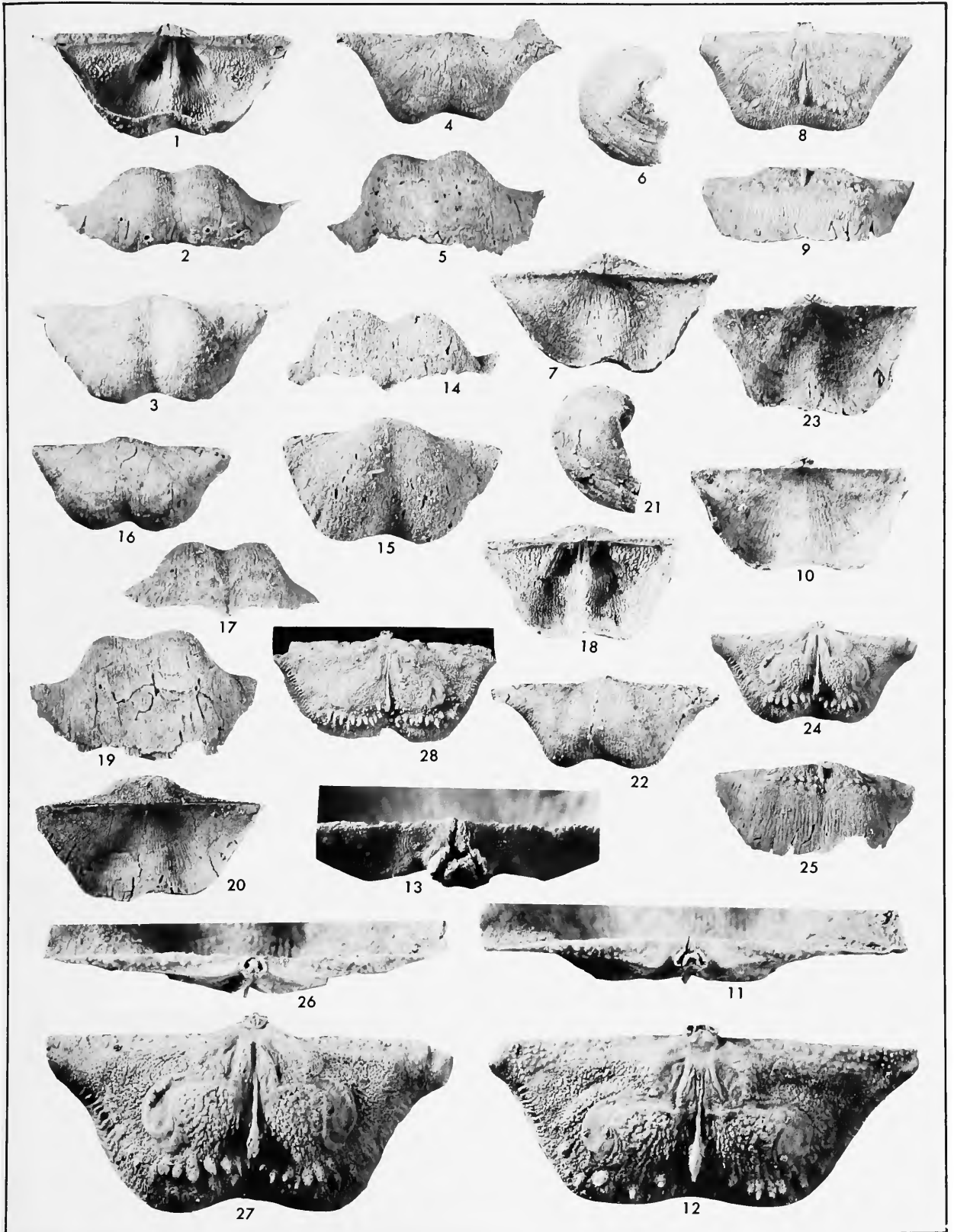


PLATE 471*Yakovlevia*

Yakovlevia intermedia, new species: 1–3, Dorsal, side, and anterior views of a complete specimen, × 1, holotype USNM 151501a; 4–6, anterior, ventral, and side views of a pedicle valve, × 1, paratype USNM 151501b; 7–9, side, dorsal, and anterior views of a complete specimen, × 1, paratype USNM 151501e; 10–12, side, ventral, and anterior views of a pedicle valve, × 1, paratype USNM 151501c; 13, 14, interior view of the preceding specimen, × 1, × 2, showing adductor platform and muscle scars; 15, 16, ventral and side views of a young specimen, × 1, paratype USNM 151501g; 17, interior of an imperfect brachial valve, × 1, paratype USNM 151501h. [Word Formation (China Tank Member), USNM 706c.]

Yakovlevia indentata, new species: 18–20, Dorsal, anterior, and interior views of a brachial valve, × 1, paratype USNM 154039b; 21, 22, posterior and interior views of the preceding specimen, × 2, showing brachial ridges, brevisseptum, and cardinal process; 23, cardinal process, × 4, of the preceding brachial valve; 24, interior of the pedicle valve, × 2, paratype USNM 154039a (for additional views of this specimen, see plate 470: figures 16–18). [Word Formation (Appel Ranch Member), USNM 719z.]

PLATE 471.—*Yakovlevia*

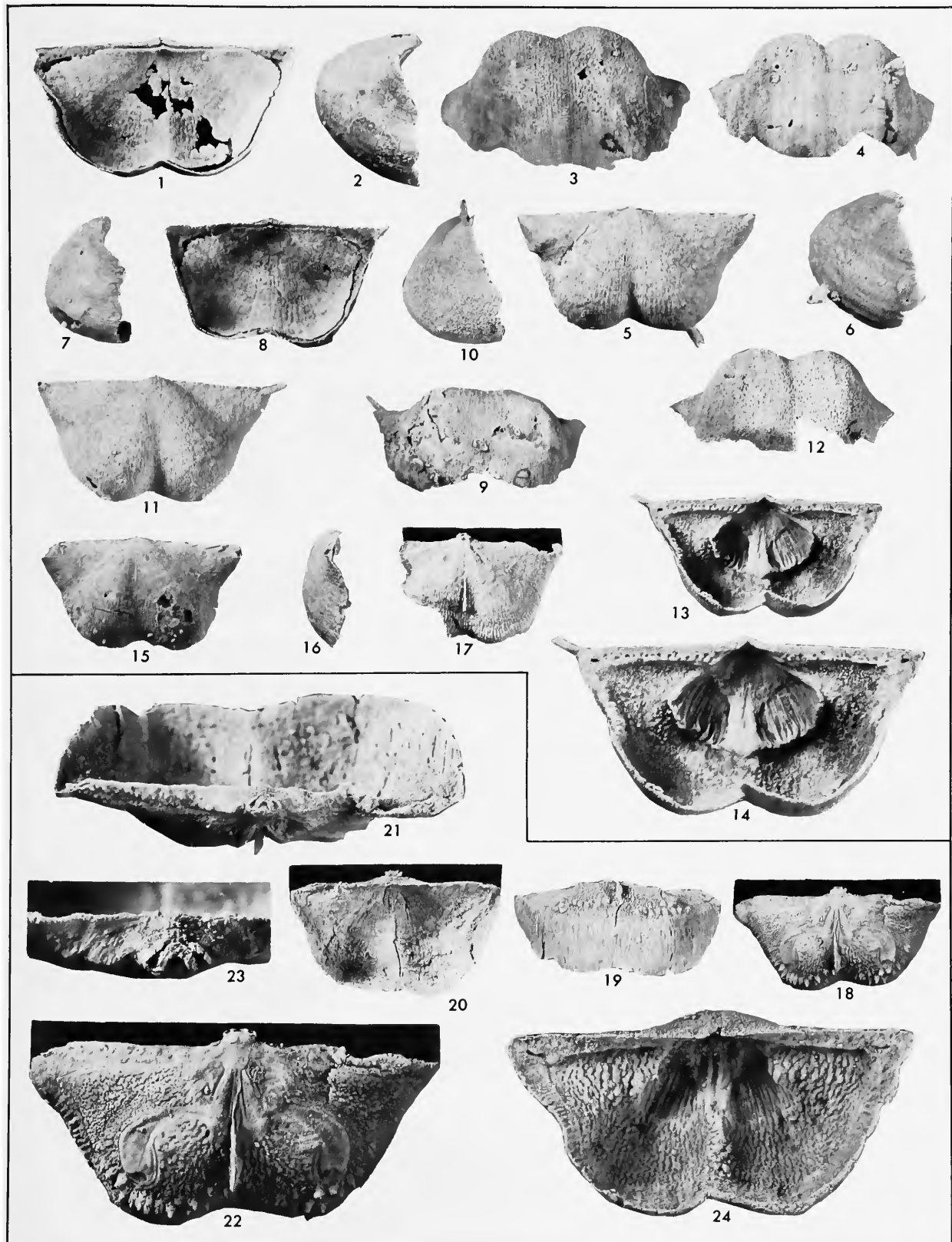


PLATE 472

Yakovlevia

Yakovlevia sulcata, new species: 1, 2, Dorsal and ventral views, $\times 1$, of a young specimen, $\times 1$, paratype USNM 151491h; 3, 4, dorsal and ventral views of another young specimen, $\times 1$, paratype USNM 151491i; 5, 6, ventral and dorsal views of a nongeniculated specimen, $\times 1$, paratype USNM 151491j; 7-10, side, dorsal, anterior, and posterior views of the holotype USNM 151491g; 11-13, ventral, posterior, and anterior views of a specimen preserving the anterior halteroid spines, $\times 1$, paratype USNM 151490a; 14-17, ventral, dorsal, anterior, and side views of a complete specimen, $\times 1$, paratype USNM 151491e; 18, ventral view, $\times 1$, showing anterior halteroid spines, paratype USNM 151491o; 19-21, side, ventral, and anterior views of another specimen with its halteroid spines, $\times 1$, paratype USNM 151490b; 22, fragmentary pedicle valve, $\times 1$, showing muscle scars and adductor platform, paratype USNM 151491k; 23, 24, ventral and interior views of another pedicle valve, $\times 1$, showing the muscle scars and adductor platform, paratype USNM 151491-l; 25, interior of a pedicle valve, $\times 2$, showing muscle area and pitted ginglymus, paratype USNM 151491m; 26, 27, posterior and interior views of a brachial valve, $\times 2$, showing brachial ridges, paratype USNM 151491n. [Road Canyon Formation, USNM 707e.]

28-30, Ventral, dorsal, and anterior views of a complete specimen, $\times 1$, paratype USNM 154041a; 31, interior of a pedicle valve, $\times 1$, showing a greatly thickened adductor platform, paratype USNM 154041b; 33, 34, exterior and interior of a brachial valve, $\times 1$, paratype USNM 154041d; 35, 36, posterior and interior views of the preceding specimen, $\times 2$, showing brachial ridges; 37, interior of another pedicle valve, $\times 1$, paratype USNM 154041e; 38, 39, posterior and interior views of the preceding specimen, $\times 2$, showing brachial ridges and endospines. [Road Canyon Formation, USNM 722g.]

32, Interior of a pedicle valve, $\times 2$, showing greatly thickened muscle region and adductor platform, paratype USNM 154042. [Road Canyon Formation, USNM 726d.]

PLATE 472.—*Yakovlevia*

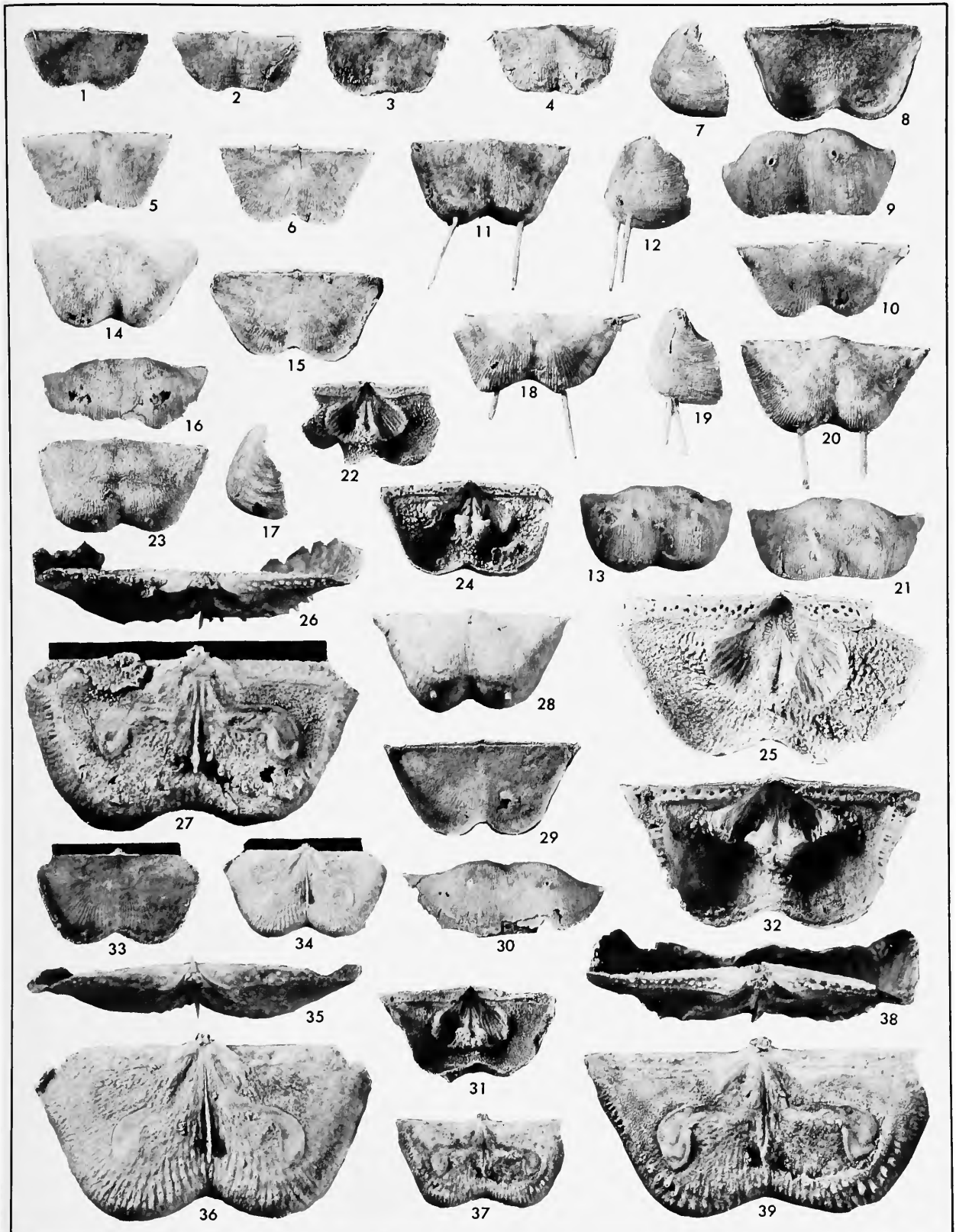


PLATE 473*Yakovlevia*

Yakovlevia hessorum, new species: 1, Interior of the pedicle valve, $\times 1.5$, showing muscle field with individual scars, paratype USNM 124051c; 2, ventral view of a young specimen, not yet geniculated, $\times 1$, paratype USNM 151486t; 3, ventral view of a pedicle valve preserving two of its long halteroid spines, $\times 1$, paratype USNM 151485a; 4, interior of another pedicle valve, $\times 1.5$, showing muscle scars, paratype USNM 154037a (for additional views of this specimen see plate 474: figures 7, 8); 5-7, anterior, interior, and exterior views of a brachial valve, $\times 1$, paratype USNM 124051e (for $\times 2$ view, see plate 434: figure 8); 8, exterior of another brachial valve, $\times 1$, paratype USNM 151485b; 9-10, interior and exterior views of the brachial valve, $\times 1$, paratype USNM 153980b; 11, interior of the preceding specimen, $\times 2$, showing brachial ridges and adductor scars; 12, cardinal process of the preceding specimen, $\times 3$; 13, 14, interior of another brachial valve, $\times 1$, $\times 2$, showing strong brevisseptum, paratype USNM 153980g; 15, posterior view of the preceding specimen, $\times 2$, showing the cardinal process; 16, posterior of the brachial valve, $\times 2$, showing anterior trails, paratype USNM 154037b; 17, interior of a pedicle valve, $\times 1.5$, showing a pathological muscle area, the diductors of the left side (observer's left) having been aborted, paratype USNM 153979h. [Word Formation (Willis Ranch Member), USNM 706e.]

PLATE 473.—*Yakovlevia*

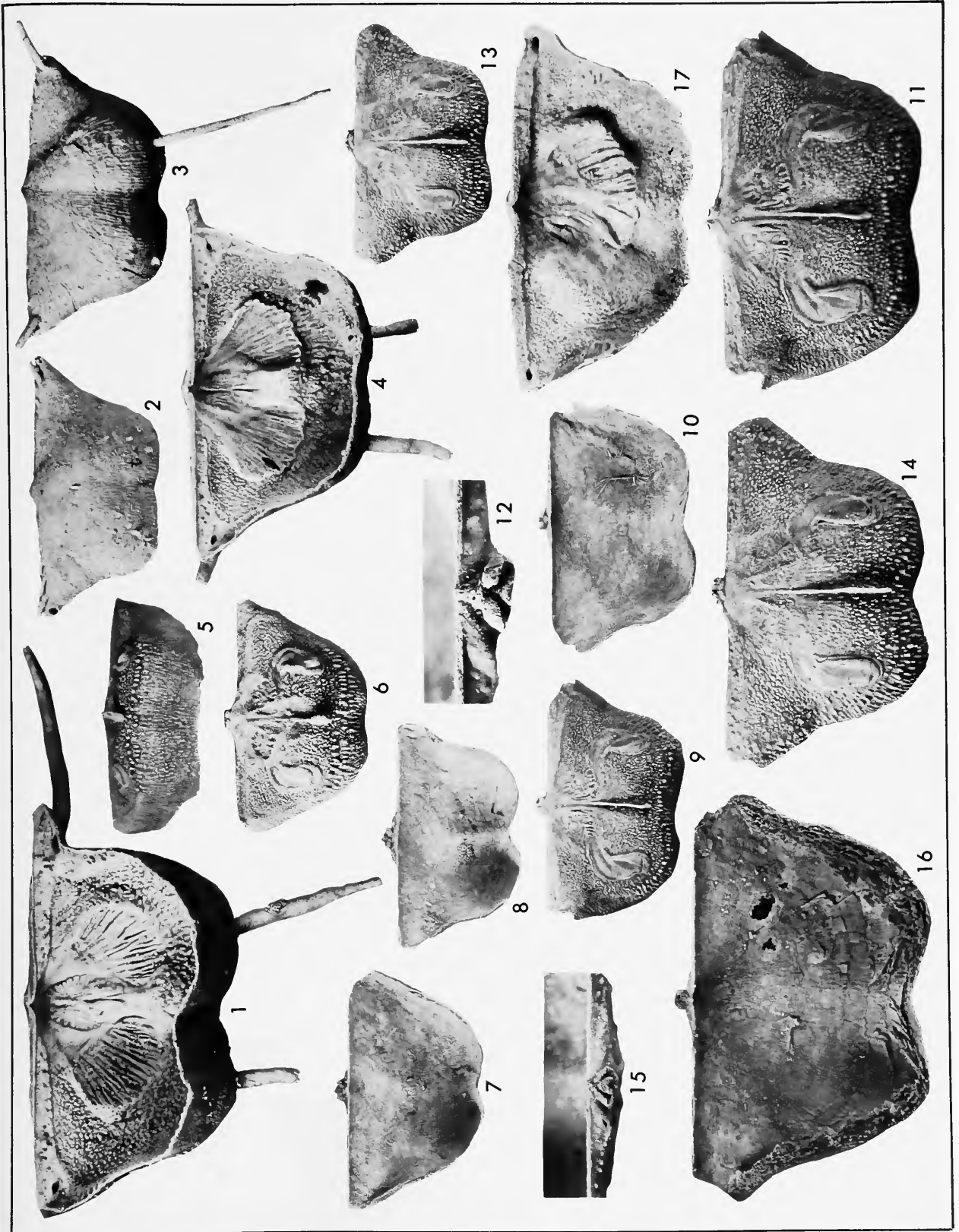


PLATE 474

Yakovlevia

Yakovlevia hessorum, new species: 1, 2, Ventral and side views of a pedicle valve with its halteroid spines preserved, $\times 1$, holotype USNM 153980h; 3, ventral view of a pedicle valve preserving an additional pair of halteroid spines, $\times 1$, paratype USNM 153980e; 4, ventral view of an immature pedicle valve preserving some of its early marginal spines, thus resembling a chonetid, $\times 1$, paratype USNM 151486u; 5, 6, exterior and interior of an immature, non-geniculated pedicle valve, $\times 1$, paratype USNM 153979d; 7, 8, interior and exterior of a pedicle valve with part of its halteroid spines preserved, $\times 1$, paratype USNM 154037a (for an enlarged view of the interior see plate 473: figure 4); 9, ventral view of another immature pedicle valve, $\times 1$, showing marginal spines, paratype USNM 151486n (for enlarged view see plate 434: figure 7); 10, 11, exterior and interior of a small brachial valve, $\times 1$, paratype USNM 153979e; 12-14, interior, side, and ventral views of a pedicle valve having remnants of its four halteroid spines, $\times 1$, paratype USNM 153980a; 15, ventral view of a pedicle valve, $\times 1$, having three anterior halteroid spines, paratype USNM 153980j; 16, another pedicle valve with three anterior halteroid spines, $\times 1$, paratype USNM 153980f; 17, 18, ventral and interior views of a young pedicle valve not yet geniculated, $\times 1$, paratype USNM 153979c; 19, 20, interior and exterior of a young brachial valve, $\times 1$, paratype USNM 153979g; 21, interior view of a young pedicle valve just beginning to geniculate and having just formed its anterior halteroid spines, $\times 1$, paratype USNM 153979a (see plate 452: figure 29); 22, side view of a pedicle valve, showing two of its halteroid spines, $\times 1$, paratype USNM 153980c; 23, ventral view of a young pedicle valve, not yet geniculated, $\times 1$, paratype USNM 153979b; 24, ventral view of a pedicle valve having all but one of its halteroid spines and showing the bases of small adventitious spines just posterior to the place of geniculation, $\times 1$, paratype USNM 124051b. [Word Formation (Willis Ranch Member), USNM 706c.]

PLATE 474.—*Yakovlevia*

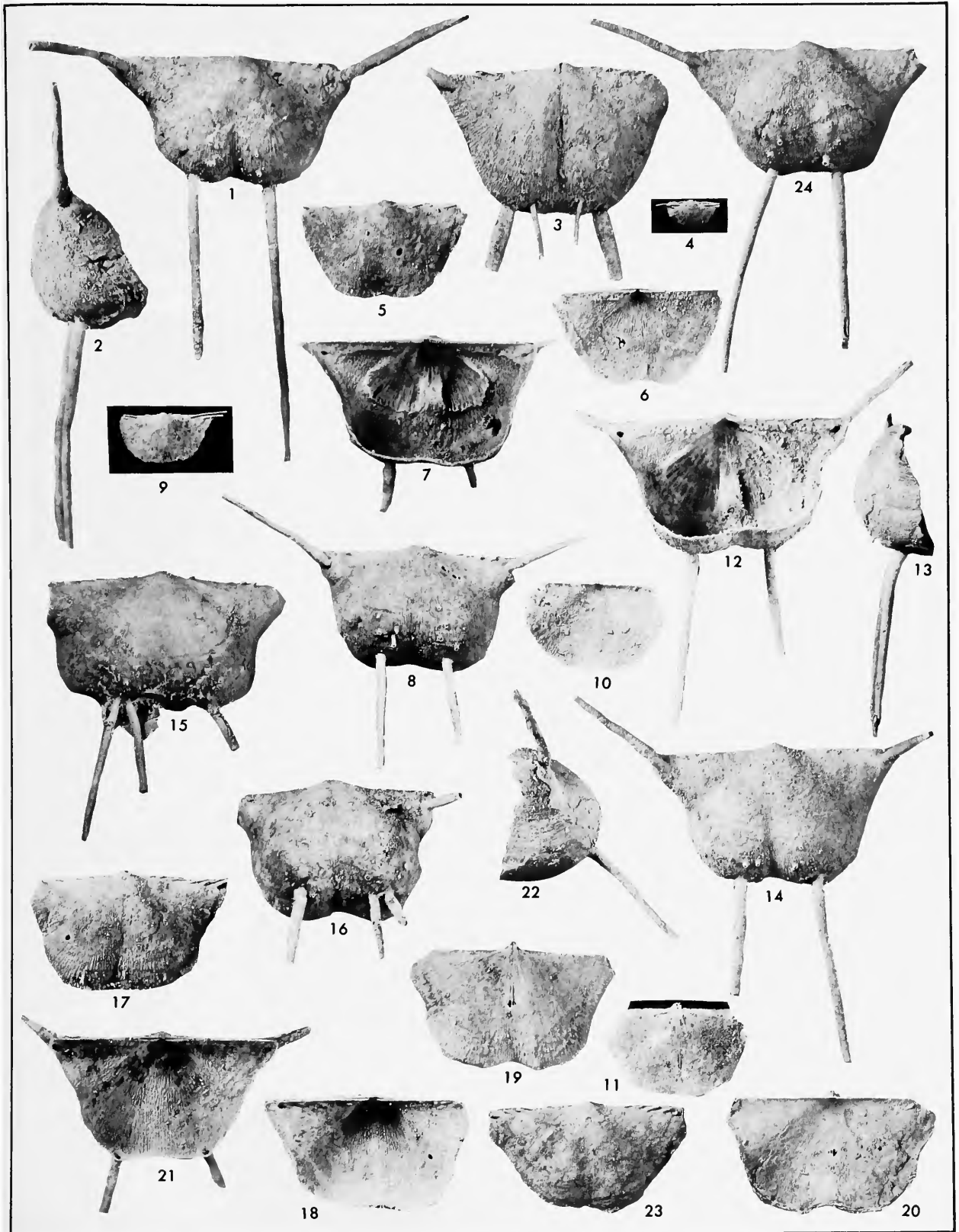


PLATE 475

Spyridiophora, *Paucispinifera*, *Limbella*, *Striatifera*, and *Orthotichia*

Spyridiophora reticulata (R. E. King): 1-5, Anterior, dorsal, side, posterior, and ventral views of a specimen preserving its rhizoid spines of attachment, $\times 1$, hypotype USNM 153921. [Skinner Ranch Formation (Sullivan Peak Member), USNM 733j.]

Paucispinifera magnispina, new species: 6, Interior of the pedicle valve, $\times 2$, showing the strong ear baffles and the thick adductor platform, paratype USNM 149563c. [Word Formation (China Tank Member), USNM 706c.]

Limbella limbata, new species: 7-9, Ventral, side, and interior views of a pedicle valve, $\times 1$, showing the rhizoid spines and anterior frill, paratype USNM 153922a; 10, interior of a brachial valve, $\times 1$, paratype USNM 153922b. [Skinner Ranch Formation (Sullivan Peak Member), USNM 733j.]

Striatifera linoproductiformis, new species: 11, 12, Dorsal and exterior views, $\times 1$, of a large specimen, showing part of the brachial valve in place, $\times 1$, paratype USNM 153923a; 13, interior of an obese brachial valve, $\times 1$, showing thickened median septum and cardinal process, paratype USNM 153923b. [Neal Ranch Formation (bed 4 of P. B. King), USNM 727e.]

Paucispinifera auriculata Muir-Wood and Cooper: 14, Interior of a *Cyclacantharia* with an immature specimen of *Paucispinifera* attached within and taking advantage of the shelter afforded by the dead richthofeniid, $\times 2$, hypotype USNM 153924; 15, side view of the preceding specimen, $\times 3$, showing attachment by clasping spines. [Word Formation (Willis Ranch Member), USNM 706e.]

Orthotichia newelli, new species (see volume 5): 16-20, Anterior, side, dorsal, posterior, and ventral views of a complete specimen, $\times 1$, paratype USNM 153925. [Cibolo Formation (Breccia Zone of Udden), USNM 738r.]

Paucispinifera sulcata, new species: 21, 22, Dorsal view of the cardinal process, $\times 3$, showing well developed zygidium, paratypes USNM 153926a, b. [Road Canyon Formation (base), USNM 702c.]

PLATE 475.—*Spyridiophora*, *Paucispinifera*, *Limbella*, *Striatifera*,
and *Orthotichia*

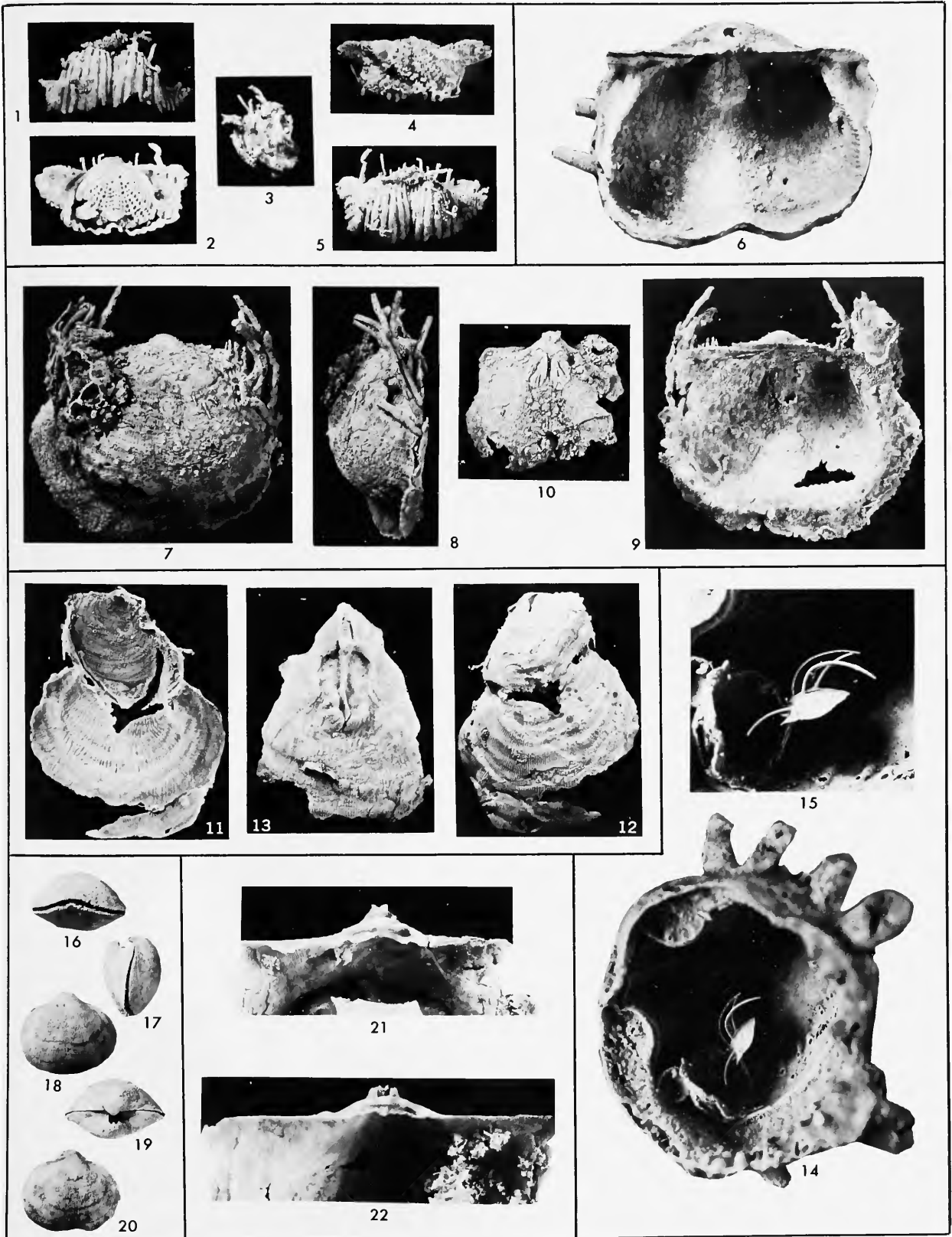


PLATE 476

Echinauris, Sestropoma, Paucispinifera, and Rugoclostus

Echinauris lappacea, new species: 1–4, Ventral, side, posterior, and anterior views, $\times 1$, of the paratype USNM 154520a; 5–8, anterior, posterior, ventral, and side views of another pedicle valve, $\times 1$, paratype USNM 154520b; 9–12, ventral, side, posterior, and anterior views of another pedicle valve, $\times 1$, paratype USNM 154520c; 13, 14, exterior and interior views of a brachial valve preserving its spines, $\times 2$, paratype USNM 154520d; 15, 16, exterior and interior views of a large brachial valve, showing the brachial ridges and muscle scars, $\times 2$, paratype USNM 154520e; 17, 18, exterior and interior of another brachial valve, $\times 2$, showing the cardinal process and muscle scars, paratype USNM 154520f. [Road Canyon Formation, USNM 732j.]

Sestropoma cribriferum Cooper and Grant: 19–21, Apertural (brachial), side, and anterior views of a large pedicle valve with the brachial valve in place, $\times 1$, hypotype USNM 154583a; 22, apertural view of the same specimen with the brachial valve removed, $\times 1$; 23, interior of the brachial valve of the preceding specimen, $\times 2$, showing the bilobed cardinal process; 24, side view of a small pedicle valve, showing the stout attachment spines, $\times 1$, hypotype USNM 154583b; 25, apertural view of a small specimen, showing coscinidium not yet completely united, $\times 1$, hypotype USNM 154583c; 26, apertural view of another young specimen with the coscinidium not yet started on the posterior side, $\times 1$, hypotype USNM 154583d. [Bell Canyon Formation (Rader Member), USNM 740j.]

Paucispinifera rara, new species: 27–31, Anterior, dorsal, side, posterior, and ventral views, $\times 1$, holotype, USNM 155119. [Bell Canyon Formation (Pinery Member), USNM 725h.]

Rugoclostus semistriatus (Meek): 32–35, Posterior, ventral, side, and anterior views, $\times 1$, of the holotype USNM 652. [Pennsylvanian (probably Manning Canyon Shale), Timpanogos Canyon, Southeast of Salt Lake, Utah.]

PLATE 476.—*Echinauris*, *Sestropoma*, *Paucispinifera*, and *Rugoclostus*

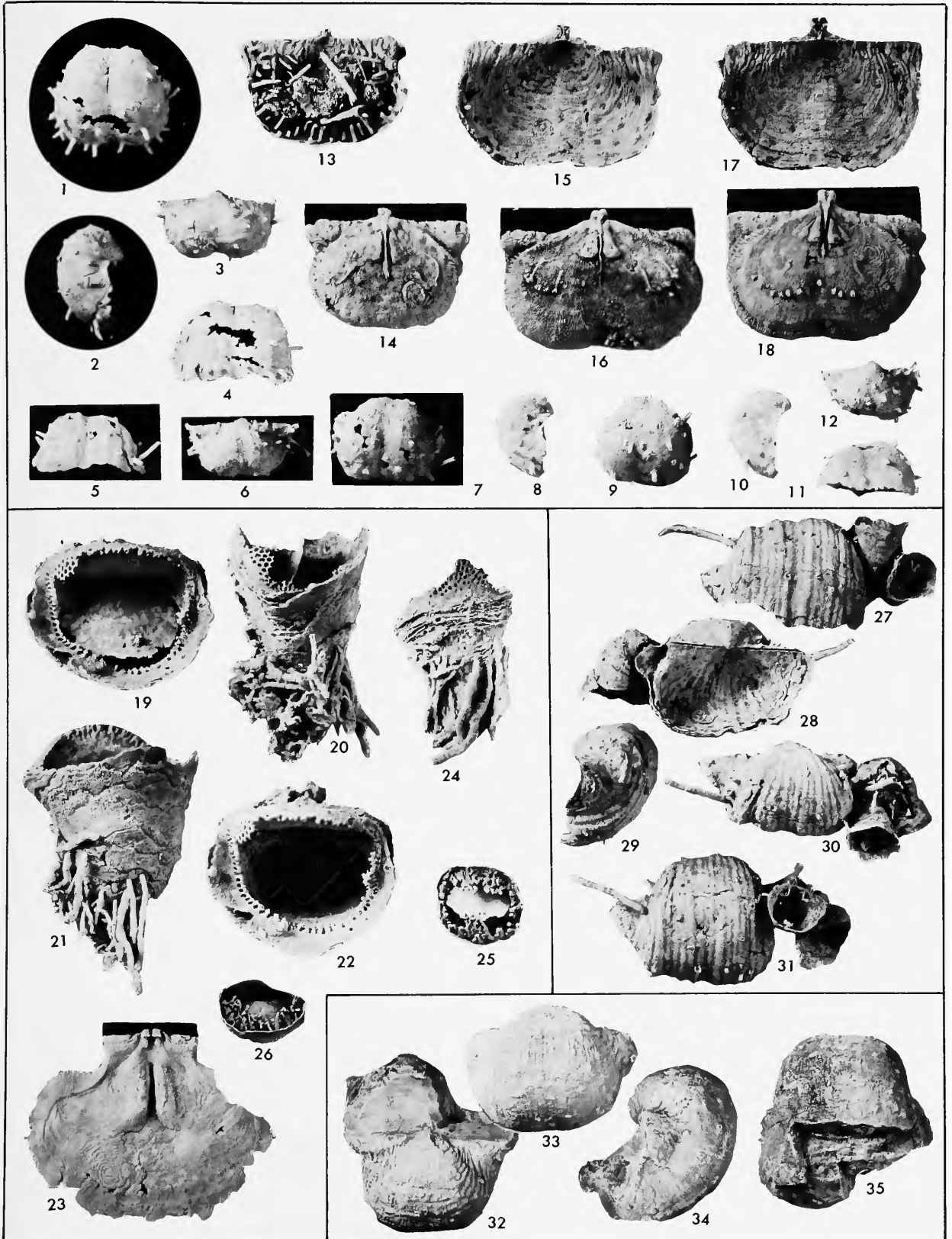


PLATE 477

Chonetinetes

Chonetinetes angustisulcatus, new species: 1, Dorsal view of two specimens, $\times 1$, paratype (top) and holotype USNM 151815c, a; 2–6, dorsal, anterior, posterior, side, and ventral views, $\times 3$, of the paratype USNM 151815c; 7–11, dorsal, side, ventral, posterior, and anterior views, $\times 3$, of the holotype USNM 151815a; 12, 13, interior and posterior views, $\times 3$, $\times 4$, showing thick median septum and slender anderidia, paratype USNM 151815i; 14, 15, interior and posterior views, $\times 3$, $\times 4$, of another brachial valve, showing lesser internal thickening than the preceding, paratype USNM 151815h. [Road Canyon Formation, USNM 721j.]

16, Dorsal views of two complete specimens, $\times 1$, paratypes 153676a, b; 17–21, posterior, anterior, side, dorsal, and ventral views of paratype 153676a, showing fine radial ornament, $\times 3$; 22–26, ventral, side, anterior, posterior, and dorsal views, $\times 3$, of paratype USNM 153676b; 27, interior of the pedicle valve, $\times 3$, paratype USNM 153676c; 28, interior of the brachial valve, $\times 3$, paratype USNM 153676d. [Road Canyon Formation, USNM 726d.]

Chonetinetes reversus Cooper and Grant: 29, Dorsal view of two complete individuals, $\times 1$, paratype and holotype USNM 153193d, a; 30–33, ventral, posterior, side, and anterior views, $\times 2.5$, holotype USNM 153193a; 34, dorsal view of the holotype $\times 4$; 35–38, anterior, posterior, ventral, and side views of another individual, $\times 3$, paratype USNM 153193c; 39, dorsal view of the preceding paratype, $\times 4.5$; 40, 41, interior and posterior views of a brachial valve, $\times 3$, showing short median septum and deep alveolus in cardinal process, paratype USNM 153193b; 42, 43, interior and posterior views of another brachial valve, $\times 3$, paratype USNM 153193–l; 44, exterior of the preceding paratype, $\times 2$; 45, 46, two views of the interior of a pedicle valve, $\times 2$, showing the median septum and pseudodeltidium, paratype USNM 153193k; 47, interior of the preceding paratype, $\times 3$, showing the pseudodeltidium; 48, interior of another pedicle valve with well preserved spine, $\times 2$, paratype USNM 153193f. [Road Canyon Formation, USNM 710h.]

Chonetinetes varians, new species: 49–53, Ventral, anterior, posterior, dorsal, and side views of a complete specimen with fine radial ornament, $\times 2$, holotype USNM 153677a (for an additional view of the holotype, see plate 502: figure 63); 54–58, side, ventral, anterior, posterior and dorsal views, $\times 2$, paratype USNM 153677b; 59, dorsal views of the two preceding specimens, $\times 1$; (lower is holotype); 60, dorsal view of a thick specimen, $\times 2$, paratype USNM 153678a; 61–65, dorsal, posterior, anterior, ventral, and side views of a small paratype, $\times 3$, USNM 153678b. [Bell Canyon Formation (Hegler Member), USNM 732a.]

66–70, Dorsal, posterior, ventral, anterior, and side views, $\times 2$, paratype USNM 151817c; 71–75, dorsal, side, ventral, anterior, and posterior views, $\times 2$, paratype USNM 151817a; 76, paratypes USNM 151817a, c, e, and f, respectively, showing, $\times 1$, dorsal view (upper left and right), pedicle valve interior (lower left), and brachial valve interior (lower right). [Bell Canyon Formation (Hegler Member), USNM 731.]

77, Interior of the brachial valve, showing the short septum and pit in the cardinal process, $\times 4$, paratype USNM 153679. [Bell Canyon Formation (Hegler Member), AMNH 635.]

PLATE 477.—*Chonetinetes*

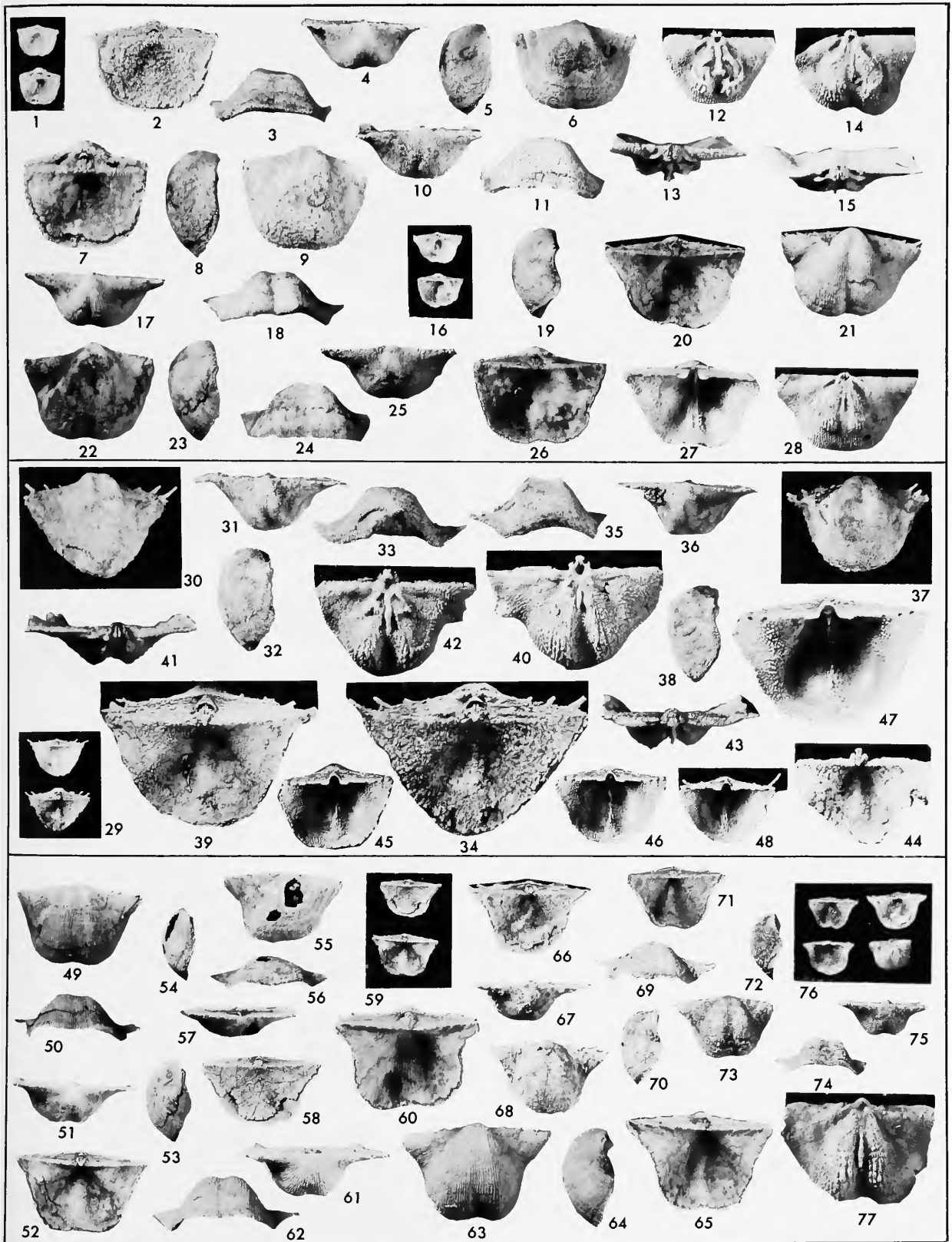


PLATE 478

Chonetinetes, *Chonetinella*, and *Sulcataria*

Chonetinetes varians, new species: 1, Dorsal view of four specimens, $\times 1$, paratypes (from upper left) 153680c, a, b, and d; 2-6, ventral, posterior, side, anterior, and dorsal views, $\times 2$, paratype USNM 153680a; 7, interior of the pedicle valve, $\times 2$, paratype USNM 153680c; 8-12, ventral, side, dorsal, anterior, and posterior views, $\times 2$, paratype USNM 153680b. [Bell Canyon Formation (Rader Member), USNM 725f.]

Chonetinella biplicata (R. E. King): 13-15, Ventral, side, and dorsal views, $\times 2$, holotype YPM 10824. [Bone Spring Formation, R. E. King locality 476.]

16-20, ventral, posterior, anterior, side, and dorsal views of a nearly complete individual, $\times 1$, hypotype USNM 151868a; 21, 22, ventral and dorsal views of the preceding specimen, $\times 2$, showing details of the ornament and the median fold; 23-27, dorsal, ventral, side, anterior, and posterior views of another complete individual, $\times 1$, hypotype USNM 153681a; 28, 29, dorsal views of the preceding hypotype, $\times 2$, $\times 3$, showing details of the ornament, cardinal process, and chilidium; 30, ventral view of four small specimens, $\times 1$, hypotypes (from upper left) USNM 153681b-e; 31, 32, interior and posterior views, $\times 3$, of a brachial valve, hypotype USNM 153681f; 33, interior of another brachial valve, $\times 3$, showing the thick median septum and spinose inner slope, hypotype USNM 153681g; 34, interior of a pedicle valve, $\times 1$, hypotype USNM 153681i; 35, hinge region of the preceding hypotype, $\times 2$; 36, interior of another brachial valve, $\times 2$, hypotype USNM 153681h; 37, 38, posterior and interior views of the preceding hypotype, $\times 3$, showing thickened anterior slope; 39, interior of a pedicle valve, $\times 2$, showing median septum, hypotype USNM 153681d. [Bone Spring Formation, USNM 728e.]

40-43, Side, dorsal, posterior, and ventral views of a complete specimen, $\times 1$, hypotype USNM 151853b; 44, dorsal view of the preceding specimen, $\times 2$; 45, interior of a small brachial valve, $\times 4$, hypotype USNM 151852. [Skinner Ranch Formation (base), USNM 705a.]

46, Dorsal view of a complete specimen, $\times 2$, hypotype USNM 151856. [Skinner Ranch Formation (base), USNM 720e.]

Chonetinella spinolirata (R. E. King): 47-51, Posterior, ventral, anterior, dorsal, and side views, $\times 4$, holotype YPM 10825. [Neal Ranch Formation, R. E. King locality 91a.]

Chonetinella victoriana (Girty): 52-56, Side, posterior, anterior, dorsal, and ventral views, $\times 3$, of YPM 10829, holotype of synonym *C. spinoliratus diabloensis* R. E. King [Bone Spring Formation, R. E. King locality 479.]

Sulcataria latisulcata, new species: 57-61, Dorsal, posterior, anterior, side, and ventral views, $\times 1$, holotype USNM 152082a; 62-66, dorsal, anterior, posterior, ventral, and side views of the holotype, $\times 2$; 67, 68, posterior and interior views of the brachial valve, $\times 3$, showing the cardinal process, anderidia, median septum, and visceral region, paratype USNM 152082b. [Neal Ranch Formation (top 15 feet of P. B. King's bed 2), USNM 701.]

PLATE 478.—*Chonetinetes*, *Chonetinella*, and *Sulcataria*

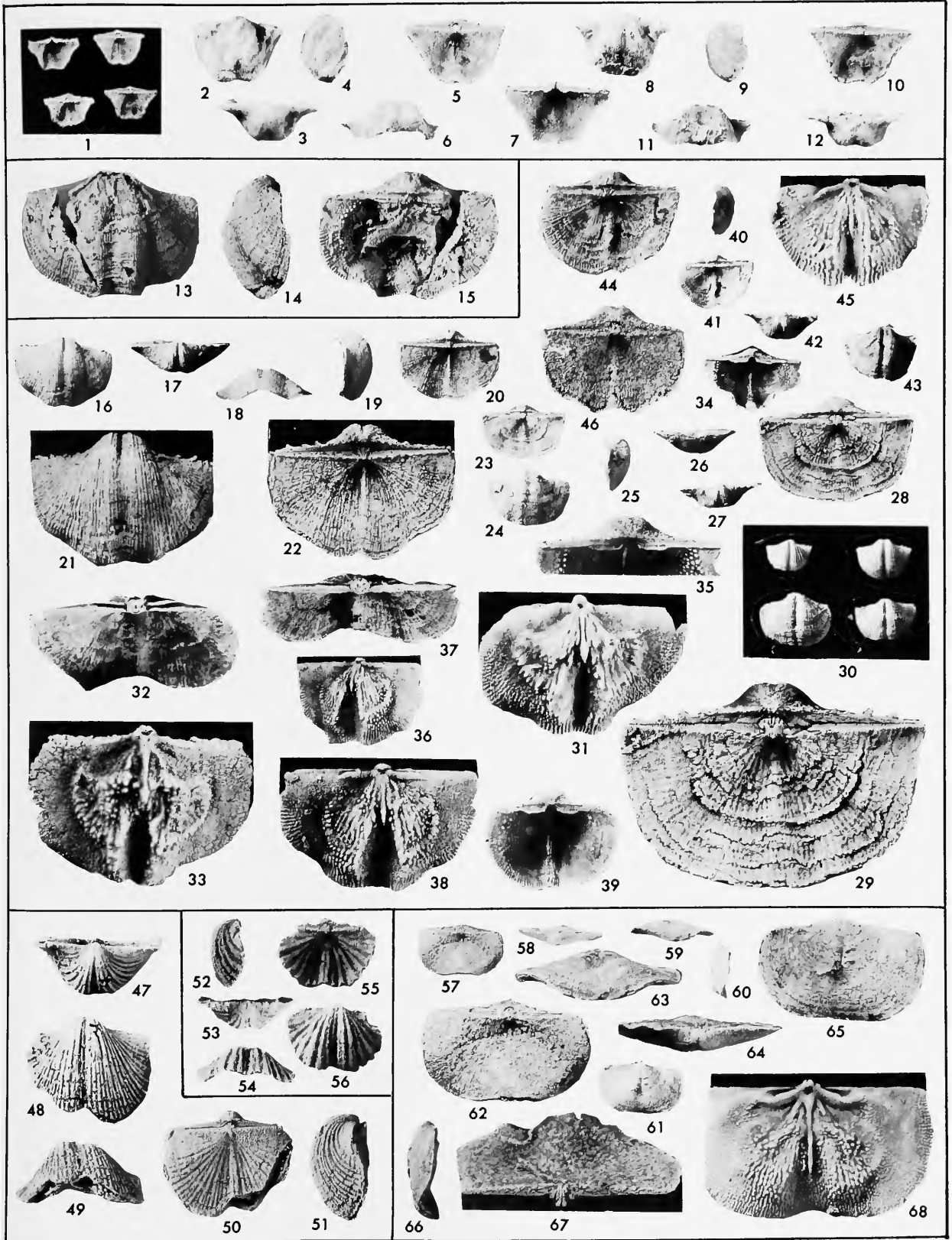


PLATE 479

Chonetinella and *Leurosina*

Chonetinella costellata, new species: 1, 2, Exterior and interior, \times 1, holotype USNM 151876f; 3–6, anterior, ventral, side, and posterior views of the holotype, \times 2, showing the fine radial ornament; 7, interior of the holotype, \times 2, showing short median septum; 8–11, posterior, side, anterior, and ventral views of another pedicle valve, \times 2, paratype USNM 151876g; 12, dorsal view, \times 1, paratypes (from the top) USNM 151876e, b, a; 13, ventral, exterior, \times 1, paratype USNM 151876a; 14, ventral view, \times 1, paratype USNM 151876b; 15, 16, exterior and interior of a brachial valve, \times 1, holotype USNM 151876f; 17, exterior of the holotype brachial valve, \times 2; 18, 19, interior and interior view tilted of the holotype brachial valve, \times 2, showing short septum and delicate anderidia; 20, posterior of the holotype brachial valve, \times 3, showing cardinal process and chilidium; 21, 22, posterior and interior views of another brachial valve with thickened interior details, \times 2, paratype USNM 151876h; 23, exterior, \times 2, of the preceding specimen. [Neal Ranch Formation (top 15 feet of P. B. King's bed 2), USNM 701.]

Chonetinella magna, new species: 24–26, Ventral, side, and anterior views of a pedicle valve, \times 1, holotype USNM 151884d; 27–30, ventral, side, posterior, and anterior views of another pedicle valve, \times 1, paratype USNM 151884b; 31–33, posterior, interior, and ventral views of a pedicle valve, \times 1, paratype USNM 151884j; 34, 35, interior tilted and interior views of a pedicle valve, \times 1, showing subdued median septum and papillose inner flanks, paratype USNM 151884e; 36, 37, interior and exterior of a brachial valve, \times 1, paratype USNM 151884h; 38, interior of the preceding paratype, \times 2, showing median septum, anderidia, and endospinose anterior slope; 39, posterior of the preceding specimen, \times 3, showing the cardinal process; 40, 41, interior views of another brachial valve, \times 1, paratype USNM 151884c; 42, interior of the preceding paratype, \times 2, showing cardinalia and anderidia; 43, posterior view of the preceding specimen, \times 3; 44, 45, exterior and interior of a fragmentary brachial valve, \times 2, showing cardinal process and anderidia, paratype USNM 151884k. [Bone Spring Formation, USNM 725c.]

Chonetinella parva, new species: 46, Ventral, posterior, side, anterior, and dorsal views, \times 1, paratypes (top) USNM 151872b and (bottom) 151872a; 47–50, dorsal, ventral, side, and anterior views, \times 2, paratype USNM 151872b; 51–55, posterior, ventral, anterior, side, and dorsal views, \times 2, paratype USNM 151872a. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 701q.]

56, Dorsal view, \times 1, holotype USNM 151870b (upper) and paratype USNM 151870a (lower); 57–61, anterior, posterior, dorsal, ventral, and side views, \times 2, holotype USNM 151870b; 62, dorsal view of the holotype, \times 3; 63–67, side, posterior, anterior, dorsal, and ventral views, \times 2, paratype USNM 151870a. [Gaptank Formation (*Uddenites*-bearing Shale Member), USNM 701e.]

Leurosina lata, new species: 68–72, Posterior, anterior, side, dorsal, and ventral views of a complete specimen, \times 1, paratype USNM 153682a; 73, 74, interior and exterior of a pedicle valve, \times 1, paratype USNM 153682b; 75, interior of the preceding specimen, \times 2; 76, 77, interior and exterior of a brachial valve, \times 1, paratype USNM 151682c; 78, interior of the preceding specimen, \times 2, showing cardinalia. [Road Canyon Formation, USNM 732j.]

PLATE 479.—*Chonetinella* and *Leurosina*

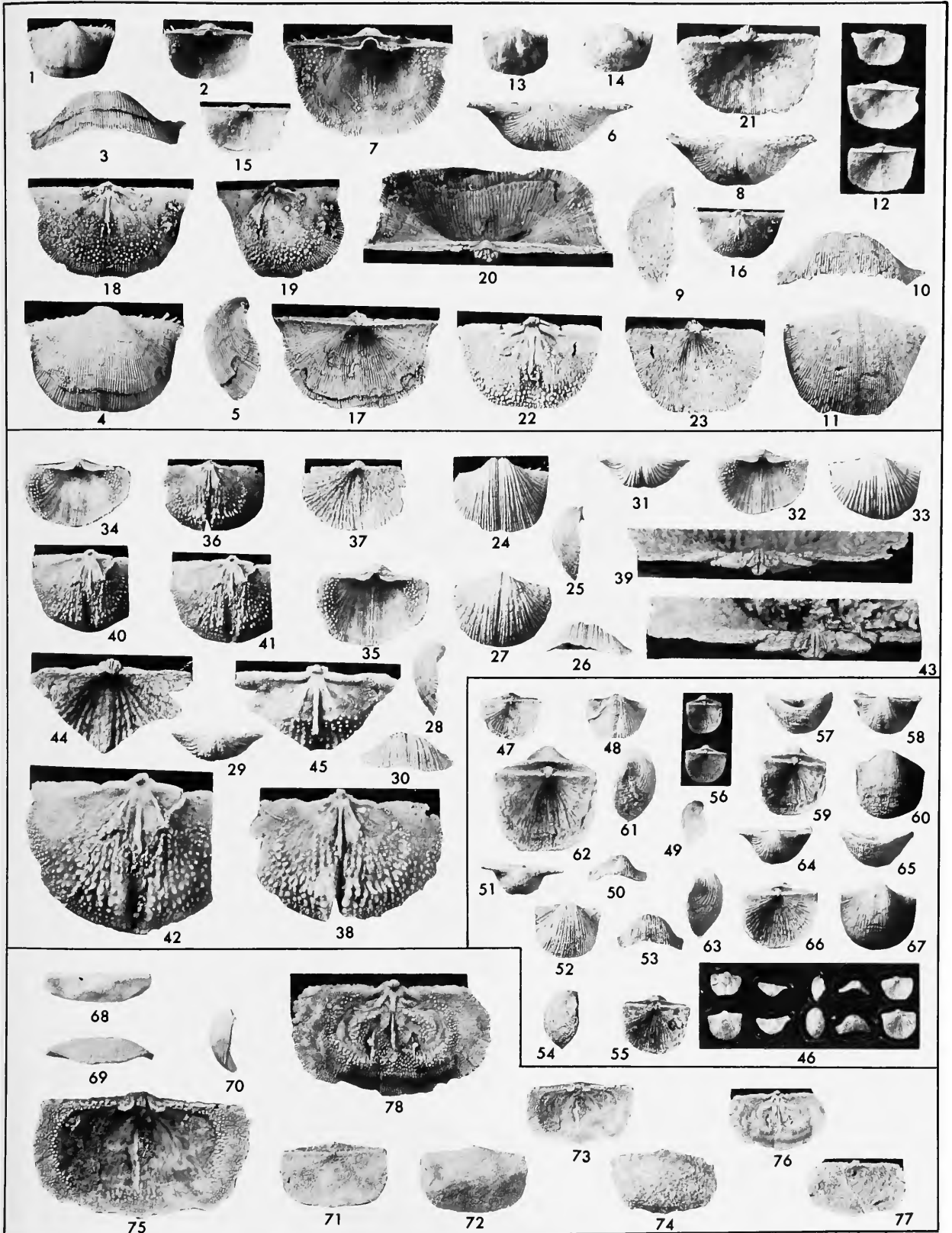


PLATE 480

Chonetinella and *Sulcataria*

Chonetinella victoriana (Girty): 1, 2, Ventral and dorsal views of four immature specimens, $\times 1$, hypotypes (from top) USNM 153683a-d; 3-7, ventral, posterior, side, anterior, and dorsal views of a complete adult, $\times 1$, hypotype USNM 151863d; 8-11, anterior, ventral, dorsal, and side views of the preceding hypotype, $\times 2$; 12-16, posterior, ventral, side, dorsal, and anterior views, $\times 1$, hypotype USNM 151863c; 17-20, ventral, side, dorsal, and anterior views of the preceding specimen, $\times 2$; 21-25, dorsal, posterior, side, anterior, and ventral views, $\times 1$, hypotype USNM 151863b; 26-29, ventral, side, anterior, and dorsal views of a small hypotype, $\times 2$, USNM 151863g; 30, interior of a pedicle valve, $\times 2$, hypotype USNM 153683e; 31, exterior of a brachial valve, $\times 1$, hypotype USNM 153683f (for additional views of this species see plate 500: figures 13-19). [Bone Spring Formation, USNM 728f.]

Sulcataria latisulcata, new species: 32, 33, Interior and exterior of a pedicle valve interior, $\times 1$, paratype USNM 152084a; 34, 35, interior and exterior of the preceding paratype, $\times 2$. [Neal Ranch Formation, USNM 701d.]

Chonetinella species 2: 36, Ventral view of two pedicle valves, $\times 1$, figured specimens USNM 152790a,b. [Neal Ranch Formation (top 15 feet of P. B. King's bed 2), USNM 701.]

Sulcataria rostrata (Dunbar and Condra): 37, 38, Ventral and dorsal views, $\times 1$, of two hypotypes, USNM 153684a, b; 39, dorsal view of hypotype 153684a, enlarged, $\times 4$, to show pits on exterior; 40-43, ventral, side, posterior, and anterior views of another complete specimen, $\times 1$, hypotype USNM 153684c; 44, exterior of a complete but somewhat crushed individual, $\times 1.5$, showing interareas, hypotype USNM 153684d; 45, exterior of a pedicle valve, $\times 1$, hypotype USNM 153684e; 46, 47, interior and tilted views of the preceding, $\times 1$, showing the thick median callosity bearing the adductor scars; 48, interior of another pedicle valve, showing the muscle scars and papillose lateral margins, $\times 2$, hypotype USNM 153684f; 49, 50, interior of a brachial valve, $\times 1$, $\times 4$, showing cardinalia, strong median septum, and anderidia, hypotype USNM 153684g; 51, exterior of a brachial valve, $\times 2$, showing minute pits, hypotype USNM 153684h; 52, 53, interior and laterally tilted views of another brachial valve, $\times 2$, showing cardinalia and anderidia, hypotype USNM 153684i; 54, posterior of the preceding hypotype, $\times 3$, showing cardinal process; 55, dorsal view of a complete specimen, $\times 4$, showing cardinal process, pseudodeltidium, and chilidium, hypotype USNM 153684b. [Graham Formation (Wayland Member), USNM 510a.]

Sulcataria compacta, new species: 56, Posterior, ventral, side, anterior, and dorsal views of the holotype, ca. $\times 1$, USNM 152080a; 57-61, ventral, posterior, anterior, dorsal and side views of the holotype, $\times 2$; 62, interior of the brachial valve, $\times 3$, paratype USNM 152080d. [Neal Ranch Formation (top 15 feet of P. B. King's bed 2), USNM 701.]

PLATE 480.—*Chonetinella* and *Sulcataria*

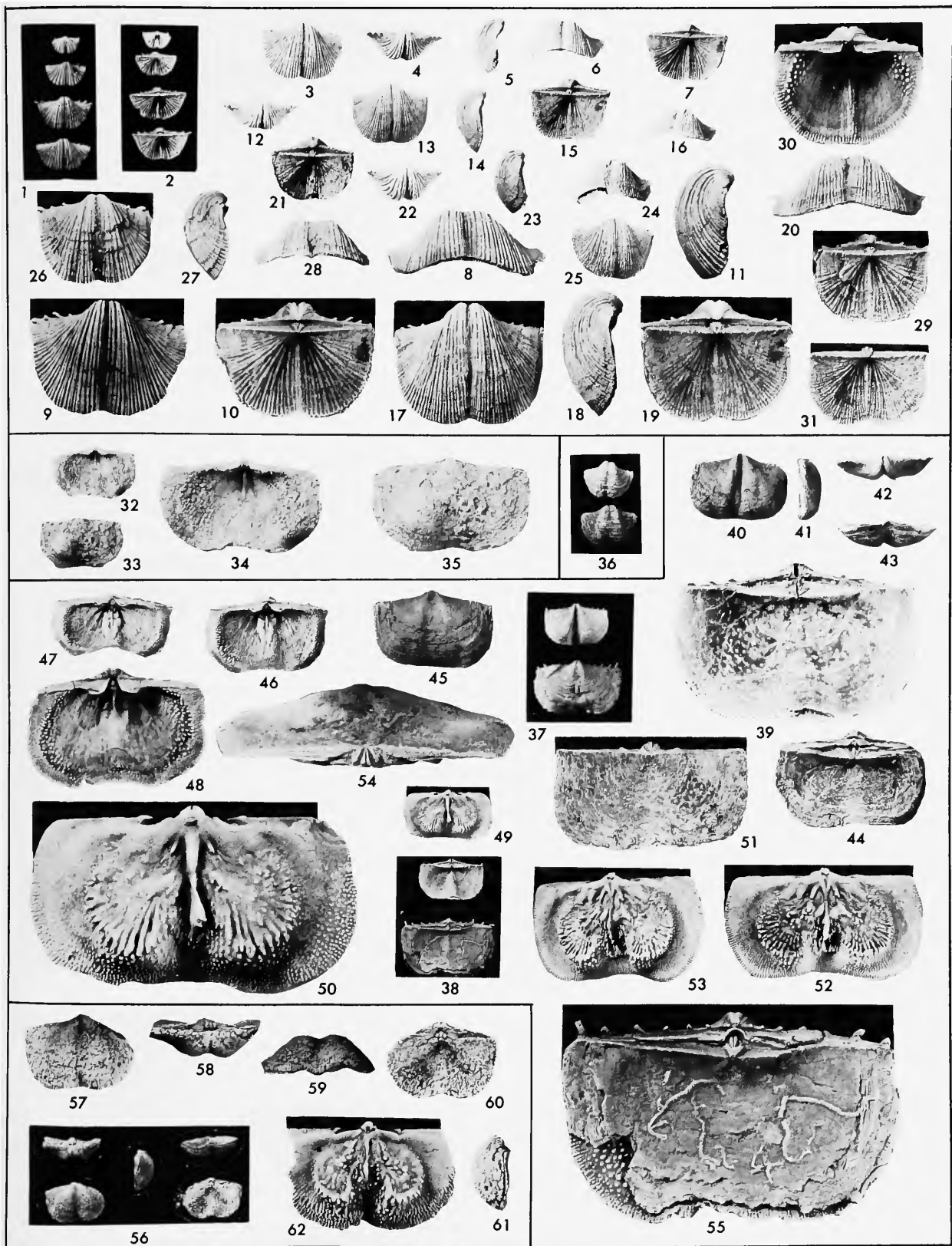


PLATE 481

Dyoros (Dyoros)

Dyoros (Dyoros) attenuatus, new species: 1–3, Posterior, ventral, and side views of a pedicle valve, × 1, paratype USNM 151989; 4, interior of the preceding paratype, × 2, showing short median septum. [Bell Canyon Formation (Hegler Member), AMNH 635.]

5–9, Ventral, posterior, anterior, dorsal, and side views, × 1, of the strongly alate holotype, USNM 151990; 10, same, × 2. [Bell Canyon Formation, USNM 731.]

Dyoros (Dyoros) angulatus, new species: 11, 12, Ventral and dorsal views of a complete specimen, × 1, holotype USNM 153685a; 13–17, anterior, posterior, dorsal, ventral, and side views of the preceding specimen, × 2; 18–21, dorsal, side, anterior, and posterior views of another individual, × 2, paratype USNM 153685b. [Road Canyon Formation, USNM 710z.]

22, 23, Ventral and dorsal views of a complete specimen, × 1, paratype USNM 153686a; 24–28, ventral, dorsal, side, anterior, and posterior views, × 2, of the preceding paratype; 29–32, ventral, posterior, side, and anterior views of another specimen, × 2, paratype USNM 153686b. [Road Canyon Formation, USNM 724a.]

33, 34, Dorsal and ventral views of a complete, mucronate specimen, × 1, paratype USNM 151969a; 35, dorsal view of the preceding paratype, × 2; 36, dorsal view of another paratype, × 2, USNM 151969b; 38, interior of a brachial valve, × 1, paratype USNM 153688; 39, interior of the preceding specimen, × 2, showing the anderidia; 40, posterior of the preceding specimen, × 3, showing the cardinal process. [Road Canyon Formation, USNM 707e.]

37, Interior of a pedicle valve, × 2, paratype USNM 153687a; 41, interior of another brachial valve, × 1, paratype USNM 153687b; 42, 43, interior and laterally tilted views of the preceding paratype, × 2, showing anderidia and median septum; 44, posterior of the preceding specimen, × 3, showing the cardinal process. [Road Canyon Formation, USNM 721j.]

Dyoros (Dyoros) consanguineus (Girty): 45–49, Ventral, posterior, anterior, dorsal, and side views of a complete but small individual, × 1, hypotype USNM 151946j; 50–54, anterior, dorsal, side, posterior, and ventral views of another small complete specimen, × 1, hypotype USNM 151946s; 69, dorsal exterior of the preceding specimen, × 2, showing the smooth shell and median fold; 55–57, anterior, ventral, and interior views of a large pedicle valve, × 1, hypotype USNM 151946o; 58, four small pedicle valves in ventral view, × 1, hypotypes USNM 151946–l, k, m, n; 59, 60, interior of another pedicle valve, × 1, × 2, hypotype USNM 151946r; 61, interior of a pedicle valve having mucronate ears, × 1, hypotype USNM 151946q; 62, interior of a pedicle valve, × 1, hypotype USNM 151946p; 63, interior of a brachial valve, × 1, hypotype USNM 151946y; 64, posterior of the preceding specimen, × 3, showing the cardinal process; 65, 66, interior of another brachial valve, × 1, × 2, showing the cardinalia, hypotype USNM 151946u; 67, 68, interior of another brachial valve, × 1, × 4, showing endospines on distal end of median septum, well developed anderidia, and endospines on the anterior slope, hypotype USNM 151946x. [Bone Spring Formation, USNM 728f.]

PLATE 481.—*Dyoros* (*Dyoros*)

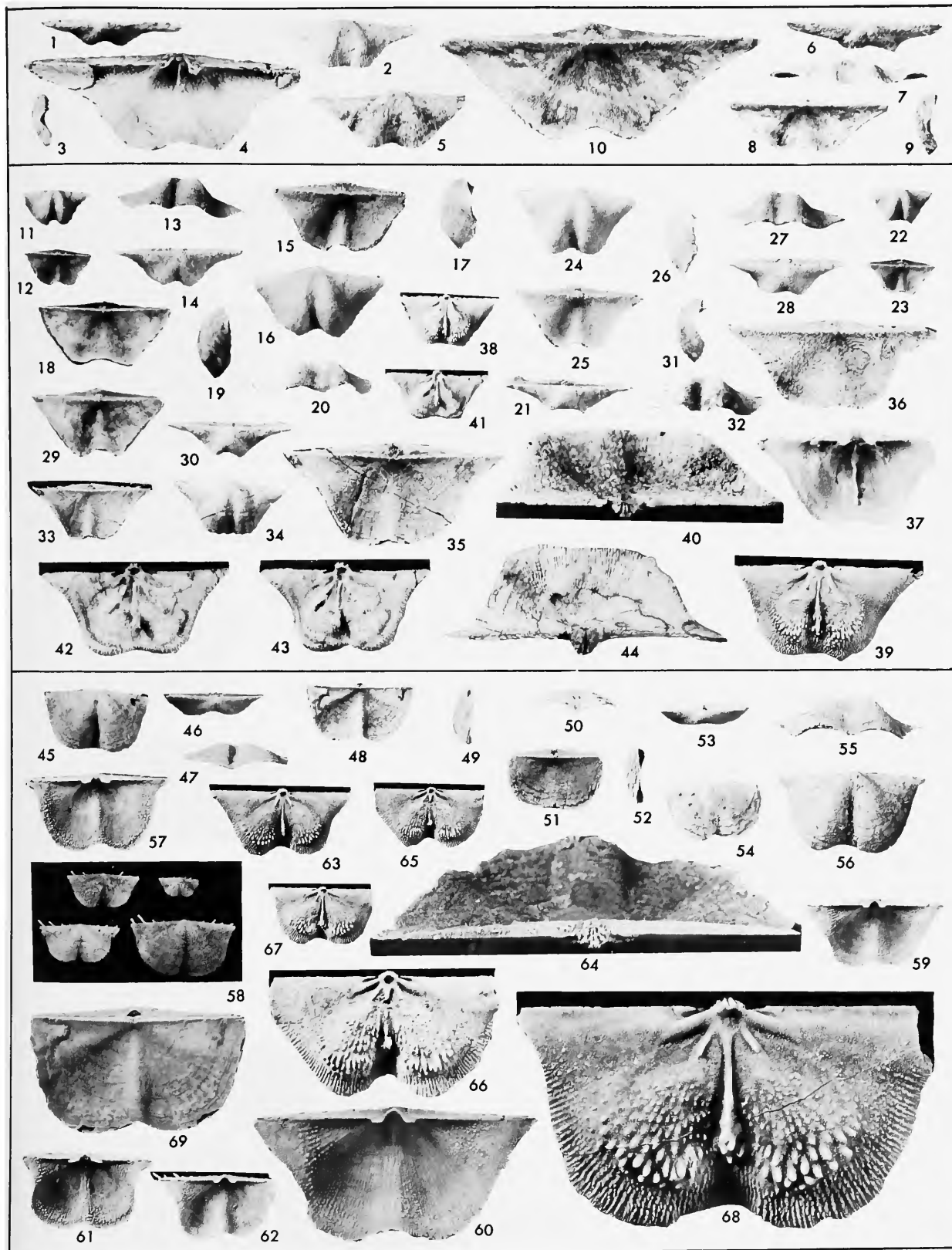


PLATE 482

Dyoros (Dyoros)

Dyoros (Dyoros) consanguineus (Girty): 1-5, Anterior, ventral, dorsal, posterior, and side views of a complete specimen, $\times 1$, hypotype USNM 153689. [Bone Spring Formation, USNM 728e.]

Dyoros (Dyoros) convexus, new species: 6, Ventral view of five immature specimens, $\times 1$, paratypes (from top and left) USNM 151950k, j, i, h, g; 7-11, ventral, side, dorsal, anterior, and posterior views of a small adult, $\times 1$, paratype USNM 151950c; 12-16, ventral, dorsal, posterior, anterior, and side views of a large adult, $\times 1$, paratype USNM 151950o; 17-21, dorsal, side, ventral, posterior, and anterior views of an adult, $\times 1$, holotype USNM 151950a; 22, beak region of the preceding specimen, $\times 4$, showing the cardinal process and chilidium; 23, interior of a young brachial valve, $\times 2$, showing cardinalia, paratype USNM 153690a; 24, posterior of the preceding specimen, $\times 3$; 25, median region of the preceding specimen, $\times 4$, showing anderidia and cardinal process; 26, 27, partial side and side views of another brachial valve, showing endospinose median septum and anderidia, $\times 2$, paratype USNM 153690b; 28, 29, partial side and interior views of a brachial valve showing cardinalia, anderidia, and median septum, $\times 2$, paratype USNM 153690c; 30, posterior view of the preceding, $\times 3$, showing cardinal process and chilidium; 31, interior of the pedicle valve, $\times 1.5$, showing median septum, paratype USNM 151950-1. [Cherry Canyon Formation (Getaway Member), USNM 728.]

32, Interior of an old adult, showing excessive development of endospines, $\times 2$, paratype USNM 153691. [Cherry Canyon Formation (Getaway Member), AMNH 519.]

Dyoros (Dyoros) magnus Stehli: 33-37, Interior, ventral, side, posterior, and anterior views of a pedicle valve, $\times 1$, hypotype USNM 153692. [Bone Spring Formation, AMNH 631.]

38-42, Dorsal, anterior, posterior, ventral, and side views of a complete but imperfect specimen, $\times 1$, hypotype USNM 151939. [Bone Spring Formation, AMNH 628.]

43, 44, Exterior and interior, $\times 1$, of an incomplete brachial valve, hypotype USNM 153693; 45, interior of the preceding hypotype, $\times 2$, showing median septum, endospines and anderidia. [Bone Spring Formation, USNM 725c.]

Dyoros (Dyoros) cf. D. (Dyoros) magnus Stehli: 46-50, Posterior, ventral, side, anterior, and dorsal views of a large, stout, thick-shelled specimen, $\times 1$, figured specimen USNM 151943. [Cibolo Formation (Breccia Zone of Udden), AMNH 703.]

PLATE 482.—*Dyoros (Dyoros)*

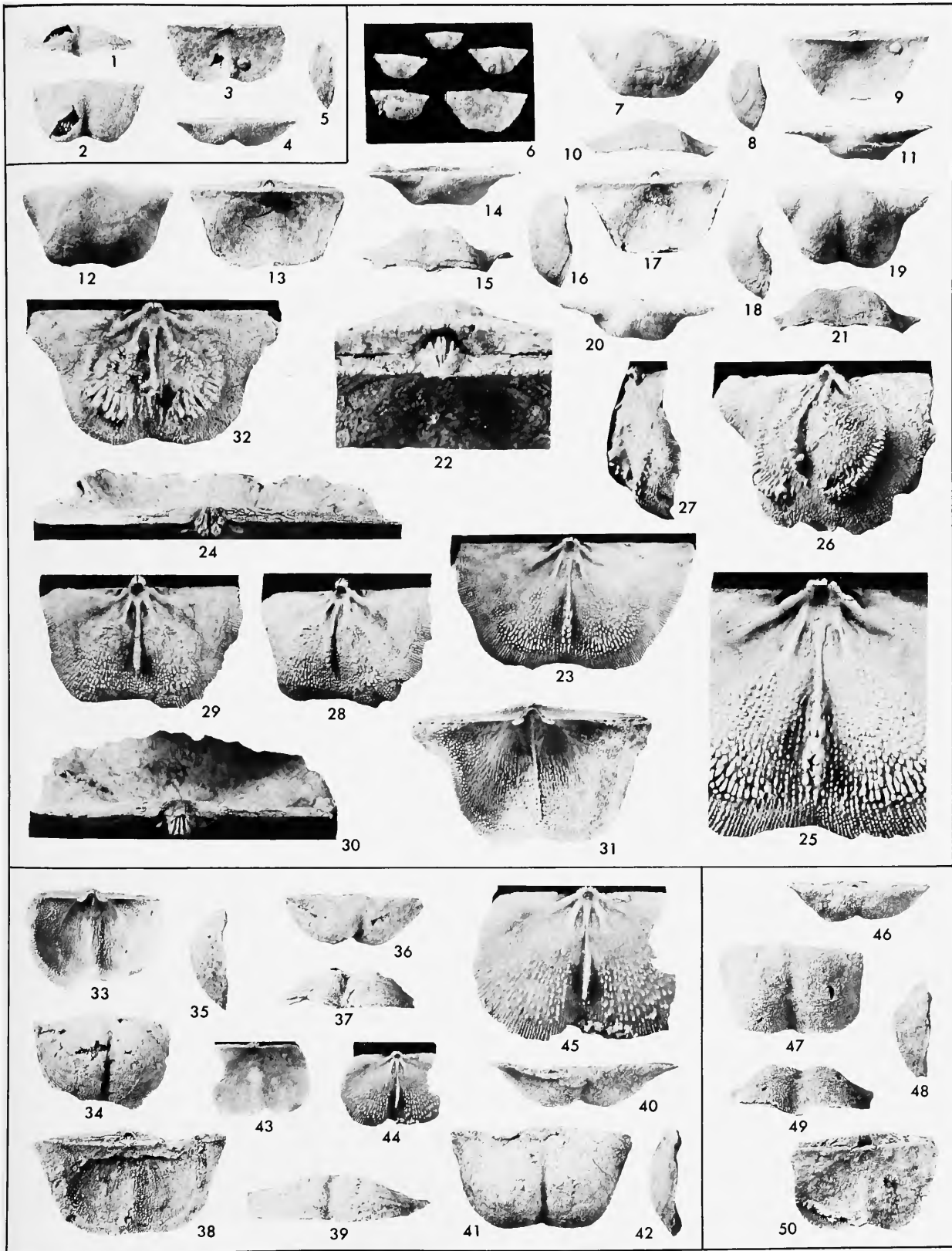


PLATE 483

Dyoros (Dyoros)

Dyoros (Dyoros) extensiformis, new species: 1–5, Ventral, posterior, anterior, side, and dorsal views, $\times 1$, paratype USNM 151971a; 6–10, anterior, dorsal, posterior, side, and ventral views of a specimen smaller than the preceding, $\times 1$, paratype USNM 151971b. [Cathedral Mountain Formation, USNM 702un.]

Dyoros (Dyoros) extensus, new species: 11–14, Dorsal, ventral, posterior, and side views of a complete specimen, $\times 1$, paratype USNM 151922c. [Word Formation (Appel Ranch Member), USNM 715i.]

15–19, Ventral, anterior, posterior, side, and dorsal views, $\times 1$, of a large, alate specimen, holotype USNM 153694a; 20–24, anterior, posterior, side, ventral, and dorsal views of an adult less alate than the preceding, $\times 1$, paratype USNM 151915p; 25, hinge region of the preceding paratype, $\times 4$, showing pseudodeltidium and chilidium; 26, 27, dorsal and ventral views of three small individuals, $\times 1$, showing oblique spines and youthful alate form, paratypes (from top) USNM 153694b–d; 28, ventral view of a young specimen with most spines intact, $\times 1$, paratype USNM 151914; 35–37, exterior, interior, and laterally tilted interior views of a large brachial valve, $\times 1$, paratype USNM 153694e; 38, interior of another brachial valve, $\times 1.5$, showing anteriorly expanding median septum, paratype USNM 153694f; 43, interior of the median part of an old adult, $\times 4$, showing cardinalia, anderidia, endospines, and overgrown median septum, paratype USNM 153694g. [Word Formation (Willis Ranch Member), USNM 706e.]

29, 30, Ventral and dorsal views of an immature specimen, $\times 1$, paratype USNM 151911d; 31, dorsal views of two specimens smaller than the preceding, $\times 1$, and showing strong alation, paratype USNM 151911f, e; 32, interior of a large pedicle valve, $\times 1.5$, showing muscle scars and median elevations, paratype USNM 153695a; 39, interior of another adult brachial valve, valve, $\times 1$, paratype USNM 153695b; 40, 41, interior and laterally tilted views of the preceding paratype, $\times 2$, showing endospinose median septum, anderidia, and cardinalia; 42, posterior view of the preceding specimen, $\times 3$, showing the cardinal process; 44, interior of an old adult brachial valve, $\times 2$, showing anterior thickening of the median septum, paratype USNM 153695c. [Word Formation (Lens between the Willis Ranch and Appel Ranch members), USNM 706b.]

33, 34, Interior and laterally tilted views of an old adult, $\times 1$, showing endospinose median septum, paratype USNM 153696. [Word Formation (Appel Ranch Member), USNM 722t.]

PLATE 483.—*Dyoros* (*Dyoros*)

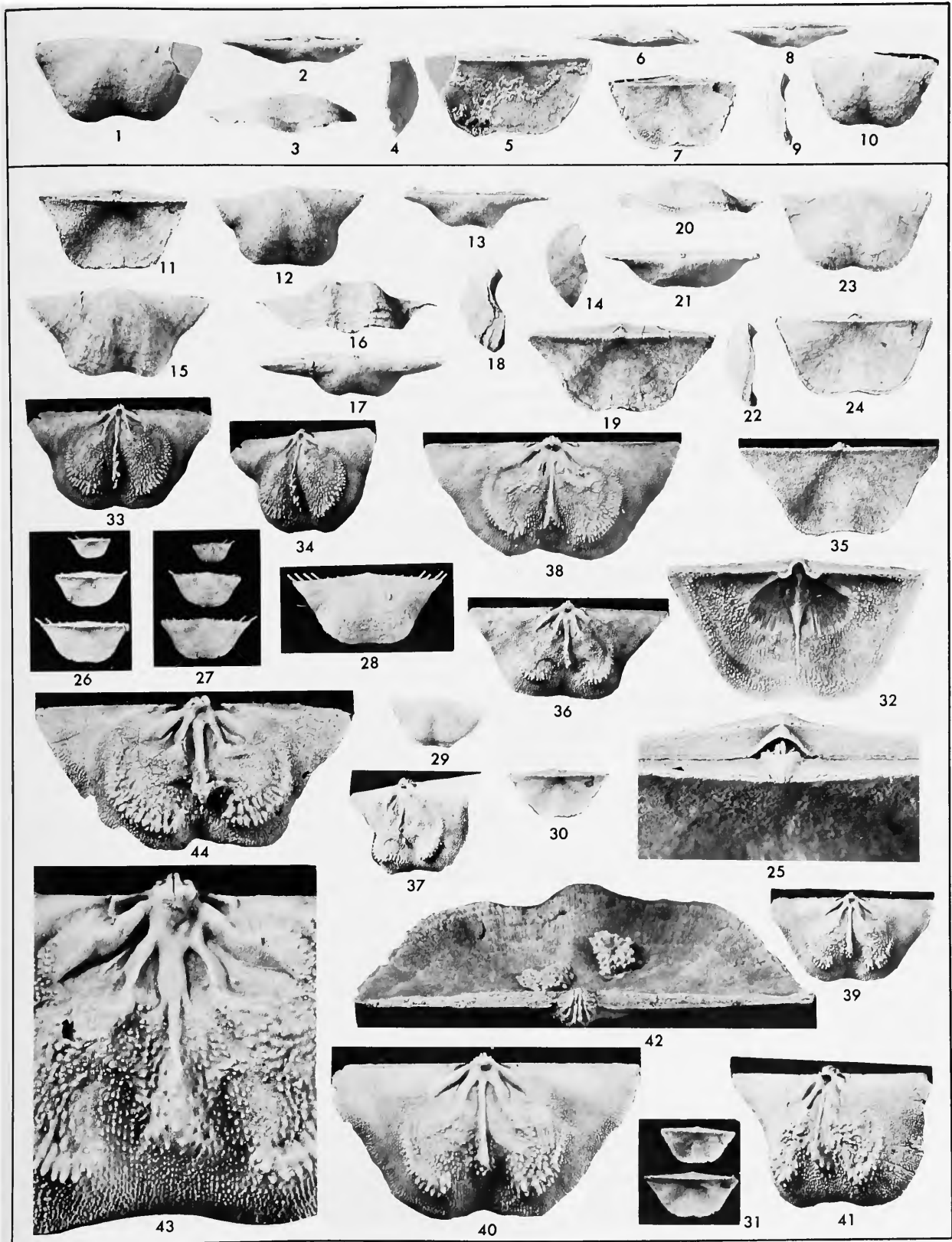


PLATE 484

Dyoros (Dyoros)

Dyoros (Dyoros) hillanus (Girty): 1, 2, Mould of the brachial valve and plasticine cast prepared from it, $\times 1$, paratype USNM 118518c; 3, 4, side and ventral views of the pedicle valve, $\times 1$, lectotype USNM 118518a; 5, ventral view of another, smaller pedicle valve, $\times 1$, paratype USNM 118518b. [Capitan Formation, USGS 2926 (green).]

Dyoros (Dyoros) intrepidus, new species: 6–10, Dorsal, ventral, side, anterior, and posterior views of a complete specimen, $\times 1$, paratype USNM 153697a; 11, interarea of the preceding paratype, $\times 4$, showing cardinal process and pseudodeltidium; 12, interior of the brachial valve, $\times 2$, paratype USNM 152794b; 13, posterior of the preceding specimen, $\times 4$, showing cardinal process; 14, 15, laterally tilted and interior views of another brachial valve having a high median septum, $\times 2$, paratype USNM 152794a; 16, interior of the brachial valve, $\times 2$, paratype USNM 153697c. [Bell Canyon Formation (Hegler Member), USNM 731.]

17–21, Dorsal, posterior, anterior, side, and ventral views of a complete specimen, $\times 1$, holotype USNM 152795a; 22, dorsal view of the preceding specimen, $\times 1.5$; 23, 24, interior of the pedicle valve, $\times 1$, $\times 1.5$, paratype USNM 152795b. [Bell Canyon Formation (Rader Member), USNM 725g.]

25–29, Side, ventral, dorsal, anterior, and posterior views of a small, complete specimen, $\times 1$, paratype USNM 152796e; 30, interior of the pedicle valve, $\times 1.5$, paratype USNM 152796c; 31, 32, interior of the brachial valve, $\times 1$, $\times 2$, paratype USNM 152796b. [Bell Canyon Formation (Rader Member), USNM 725f.]

Dyoros (Dyoros) sublliratus (Girty): 33–37, Ventral, side, posterior, anterior, and dorsal views of a complete specimen, $\times 1$, hypotype USNM 151960. [Bell Canyon Formation, AMNH 524.]

Dyoros (Dyoros) planiextensus, new species: 38–42, Dorsal, ventral, anterior, posterior, and side views of the holotype, $\times 1$, USNM 152064a; 53, part of the interarea of the holotype, $\times 4$, showing the pseudodeltidium and chilidium; 43–47, ventral, posterior, anterior, dorsal, and side views of another complete specimen, $\times 1$, paratype USNM 152064d; 48–52, ventral, dorsal, anterior, posterior, and side views of another paratype, $\times 1$, USNM 152064m; 54, dorsal view of a young adult, $\times 1$, paratype USNM 152064e; 55, dorsal view (upper left) of paratype USNM 152064h, ventral and dorsal views (middle and lower left) of immature paratype USNM 152064g, and ventral and dorsal views (right) of very young adult paratype USNM 152064i, all $\times 1$; 56, 57, interior of a pedicle valve, showing the muscle scars, $\times 1$, paratype USNM 153699a; 58, interior of another pedicle valve interior, $\times 1.5$, paratype USNM 153699b; 59, interior of part of a pedicle valve, $\times 1.5$, showing teeth and pseudodeltidium, paratype USNM 153699c; 60, interior of a brachial valve, $\times 2$, showing cardinalia and anderidia, paratype USNM 153699d; 61, 62, interior of a young brachial valve, $\times 1$, $\times 2$, showing beginning of development of endospines, paratype USNM 153699e. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 484.—*Dyoros* (*Dyoros*)

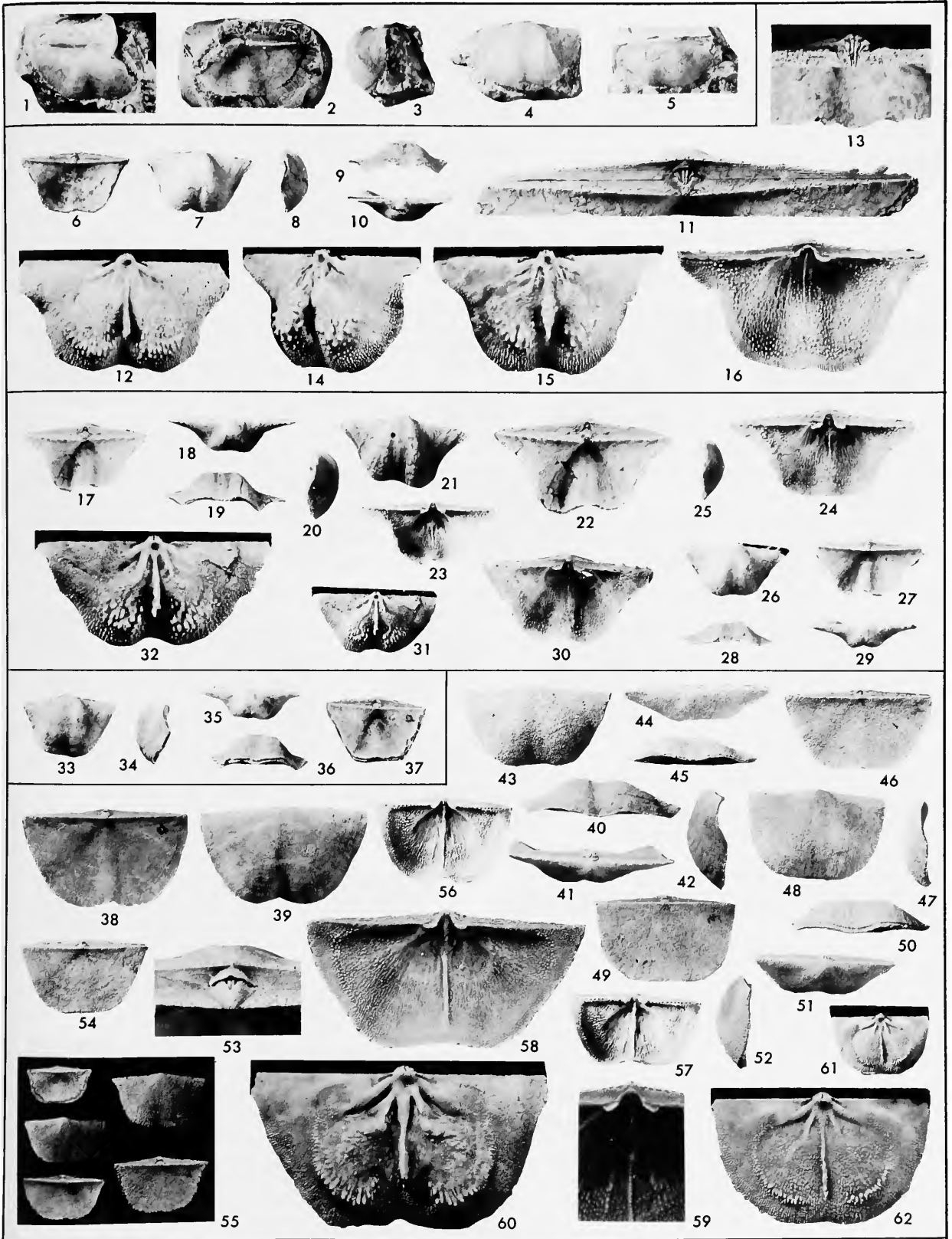


PLATE 485

Dyoros (Dyoros)

Dyoros (Dyoros) robustus, new species: 1–5, Posterior, ventral, anterior, interior, and side views of a large pedicle valve, × 1, holotype USNM 151992a; 6–9, ventral, anterior, interior, and posterior views of another pedicle valve, × 1, paratype USNM 151992b; 10–12, posterior, interior, and exterior views of an incomplete brachial valve, × 1, paratype USNM 151992c. [Bell Canyon Formation (Hegler Member), USNM 731.]

Dyoros (Dyoros) intrepidus, new species: 13–17, Ventral, side, anterior, posterior, and dorsal views of a complete specimen, × 1, paratype USNM 153698a; 18–22, ventral, side, anterior, dorsal, and posterior views of another complete specimen, × 1, paratype USNM 153698b; 23, dorsal view of the preceding paratype, × 2; 24, interarea of the preceding, showing the pseudo-deltidium and chilidium, × 4; 25, 26, ventral and dorsal views of an alate specimen, × 1, paratype USNM 153698c; 27, 28, interior and exterior of an alate pedicle valve, × 1, paratype USNM 153698d; 29, interior of the preceding pedicle valve, × 2; 30, 31, exterior and interior of another pedicle valve, × 1, paratype USNM 153698e; 32, exterior of a small pedicle valve, × 1, paratype USNM 153698f; 33, 34, interior of the brachial valve, × 1, × 3, paratype USNM 153698g. [Bell Canyon Formation (Hegler Member), USNM 731.]

Dyoros (Dyoros) subliratus (Girty): 35, Ventral view of a small pedicle valve, × 1, paratype USNM 118519b; 36, 37, ventral and side views of a large pedicle valve, × 1, lectotype USNM 118519a. [Capitan Formation (Bell Canyon equivalent), USGS 2930 (green).]

Dyoros (Dyoros) planiextensus, new species: 38, Interior of a brachial valve with moderately developed endospines, × 1, paratype USNM 153699f; 39, interior of a well thickened adult, × 1, paratype USNM 153699g; 40, interior of the preceding specimen, × 2, showing median septum; 41, cardinalia of the preceding, showing anderidia, × 3; 42, median portion of a young brachial valve, × 3, showing median septum, endospines, and well developed anderidia, paratype USNM 153699h; 43, 44, another youthful brachial valve, × 1, × 3, showing incipient development of median septum and anderidia, paratype USNM 153699i; 45–47, views tilted posteriorly, interior, and tilted laterally to show median septum, endospines, and anderidia, × 1, paratype USNM 153699j; 48, interior of the preceding specimen, × 2; 49, median portion of a young adult, × 2, showing well developed anderidia, paratype USNM 153699k; 50, 51, posterior and interior views of a well formed adult, × 3, showing cardinal process, median septum, endospines, and anderidia, paratype USNM 153699–l. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

PLATE 485.—*Dyoros* (*Dyoros*)

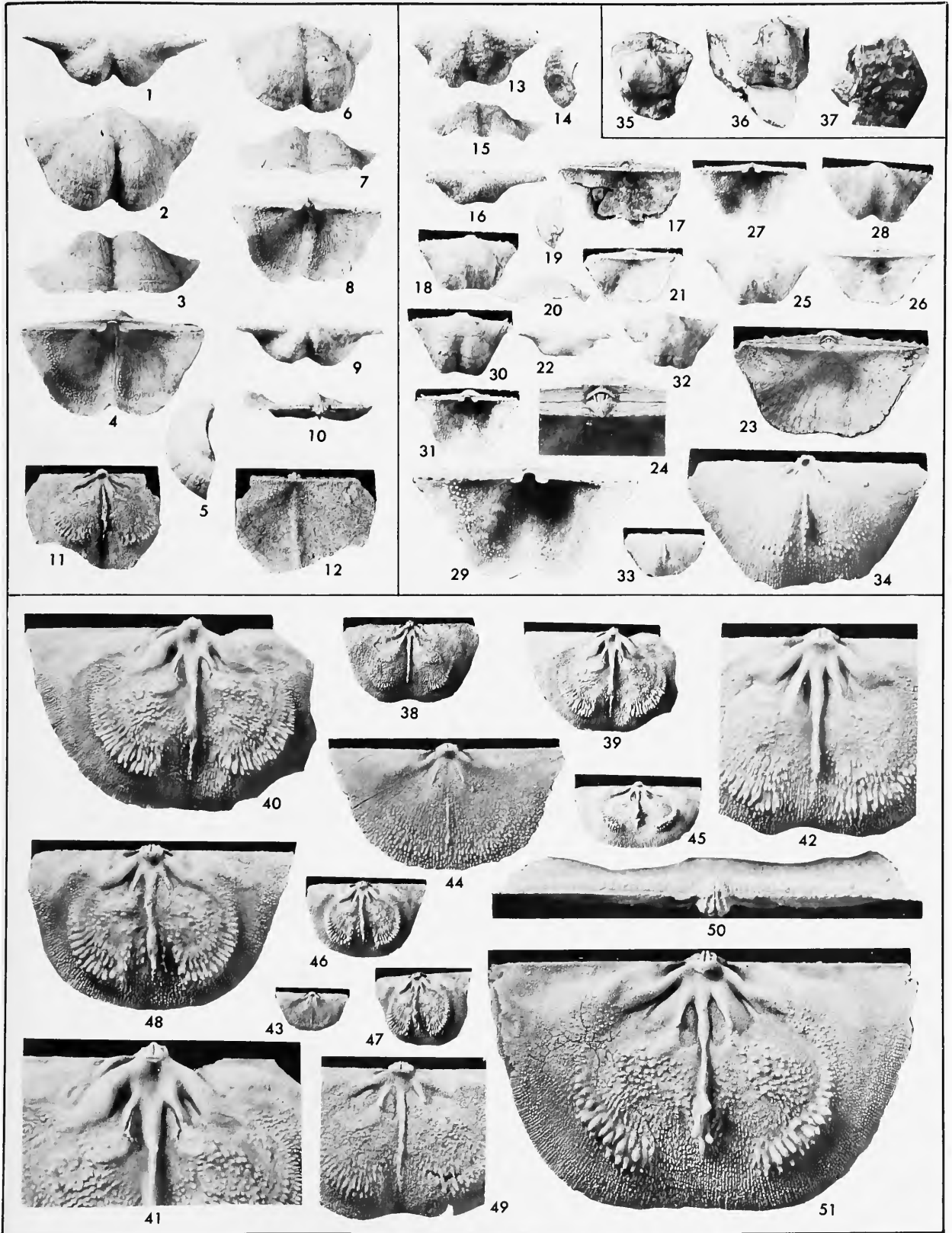


PLATE 486

Dyoros (Dyoros)

Dyoros (Dyoros) tenuis, new species: 1, Dorsal view of four immature specimens, $\times 1$, showing transverse and alate form, paratype USNM 151996j, k, f, i, from left to right; 2–6, ventral, side, posterior, anterior, and dorsal views, $\times 1$, holotype, USNM 151996a; 7, dorsal view of the holotype, $\times 2$; 8, pseudodeltidium and chilidium of the holotype, $\times 4$; 9–13, ventral, posterior, anterior, dorsal, and side views, $\times 1$, paratype USNM 151996c; 14, 15, pedicle valve interior, $\times 1$, $\times 2$, showing thickened muscle region, paratype USNM 151996-l; 16, 17, interior of another pedicle valve, $\times 1$, showing well developed muscle scars, paratype USNM 151996m; 18, interior of an alate pedicle valve with internal features poorly developed, $\times 1$, paratype USNM 151996n; 19, 20, interior of an obese brachial valve, $\times 1$, $\times 2$, showing exaggerated internal structures, paratype USNM 151996o; 21, 22, laterally tilted and interior views of a large brachial valve, $\times 1$, paratype USNM 151996p; 23, interior of the preceding specimen, $\times 2$, showing anderidia and endospines; 24, interior of another brachial valve, $\times 1$, paratype USNM 151996q; 25, 26, laterally tilted and interior views of the preceding paratype, $\times 2$, showing anderidia and endospines; 27, posterior view of the cardinal process of the preceding specimen, $\times 4$. [Word Formation (Willis Ranch Member-lower), USNM 706.]

Dyoros (Dyoros) transversus, new species: 28, Dorsal view of an immature specimen, $\times 1$, paratype USNM 151980c; 29–33, ventral, anterior, posterior, side, and dorsal views of an alate specimen, $\times 1$, paratype USNM 153700d; 34–38, ventral, anterior, posterior, side, and dorsal views of another alate specimen with remnants of spine on the posterior margin, $\times 1$, paratype USNM 153700b; 39, 40, interior and exterior of a pedicle valve, $\times 1$, paratype USNM 151980t; 41, 42, dorsal and ventral views of a young alate specimen, $\times 1$, paratype USNM 151980h; 43, 44, dorsal and ventral views of a strongly alate young adult, $\times 1$, paratype USNM 151980w; 45, 46, dorsal and ventral views of a moderately alate specimen, $\times 1$, paratype USNM 153700c; 47–51, dorsal, ventral, posterior, side, and anterior views of a large alate specimen, $\times 1$, holotype USNM 151980a; 52, 53, exterior and interior views of an alate pedicle valve, $\times 1$, paratype USNM 151980s; 54, dorsal view of a young, strongly alate specimen, $\times 1$, paratype USNM 151980e; 55–57, interior, posterior, and exterior views of an alate brachial valve, $\times 1$, paratype USNM 151980m; 58–60, interior, posteriorly tilted, and exterior views of another alate brachial valve, $\times 1$, paratype USNM 151980n. [Road Canyon Formation, USNM 707e.]

61, Dorsal view of an alate specimen, $\times 1$, paratype USNM 153701. [Road Canyon Formation, USNM 721j.]

62, Interior of a strongly endospinose, alate brachial valve, $\times 1$, paratype USNM 151976 (for additional views of this see plate 487: figure 3). [Road Canyon Formation, USNM 703c.]

63, Dorsal view of a pedicle valve exterior, $\times 1$, paratype USNM 153702. [Road Canyon Formation, USNM 710z.]

64–67, Exterior, laterally tilted, interior, and posterior views of a large brachial valve, $\times 1$, paratype USNM 151997d. [Road Canyon Formation, USNM 703d.]

PLATE 486.—*Dyoros* (*Dyoros*)

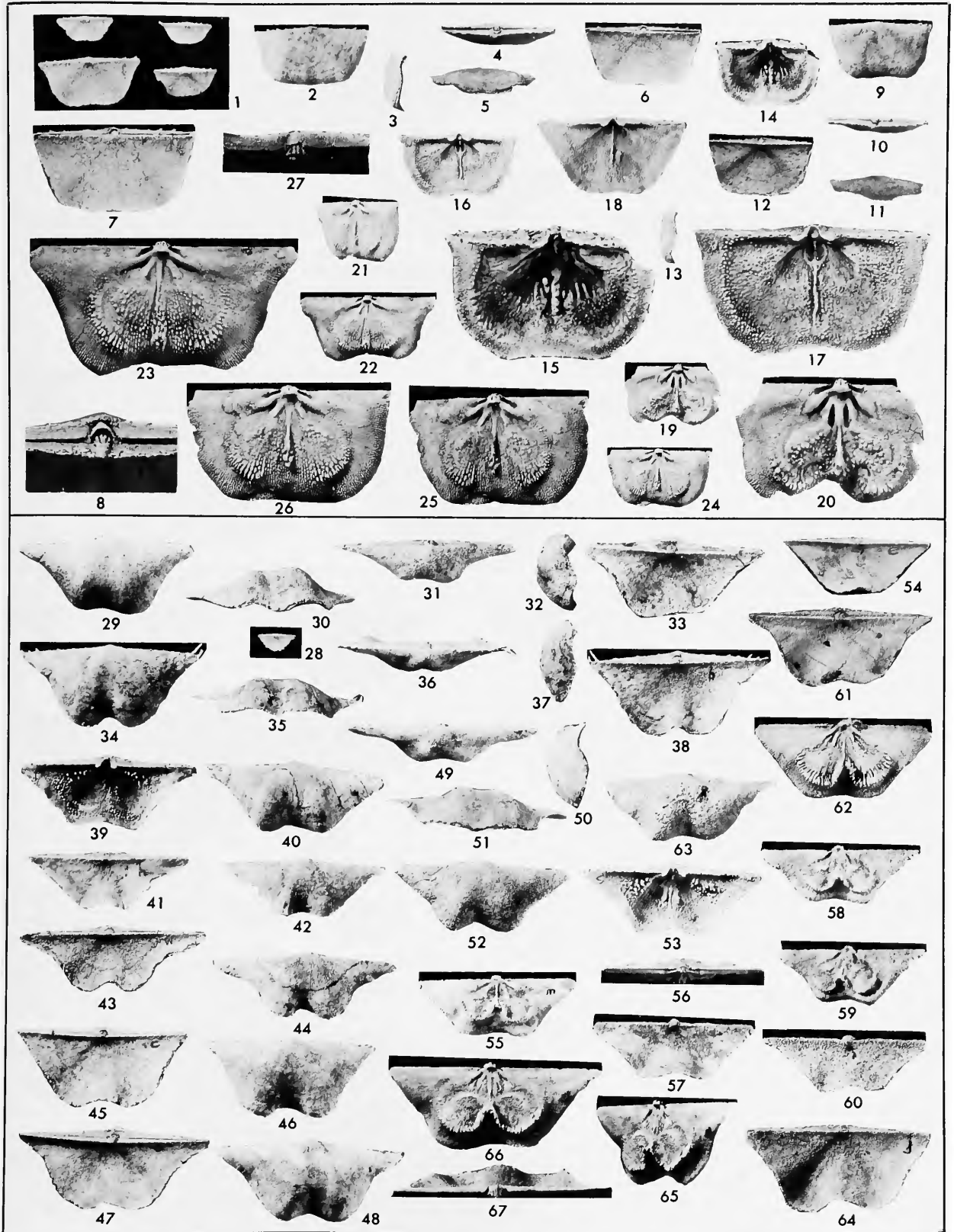


PLATE 487

Dyoros (Dyoros) and *Dyoros (Lissosia)*

Dyoros (Dyoros) transversus, new species: 1, 2, Interior, $\times 1$, $\times 1.5$, showing lateral endospinose thickenings, paratype USNM 153703a. [Road Canyon Formation, USNM 724c.]

3, 4, Interior and laterally tilted views of a brachial valve, $\times 2$, showing anterior endospinose thickenings, and anderidia, paratype USNM 151976 (for additional view of this specimen, see plate 486: figure 62). [Road Canyon Formation, USNM 703c.]

5, 6, Interior of an alate pedicle valve, $\times 1$, $\times 1.5$, showing lateral thickenings and extra tissue deposited around the adductor scars, paratype USNM 153704a; 7, 8, interior of a large brachial valve, $\times 1$, $\times 2$, showing only a moderate development of the endospines, paratype USNM 153704b; 9, posterior of the preceding specimen showing the cardinal process, $\times 2$. [Road Canyon Formation, USNM 726d.]

10, Interior, $\times 2$, of a much thickened pedicle valve interior, paratype USNM 153700e; 11, interior of a brachial valve, $\times 2$, showing anderidia and endospines, paratype USNM 153700f. [Road Canyon Formation, USNM 707e.]

12, 13, Exterior and interior of a large pedicle valve, $\times 1$, paratype USNM 153706a; 14, interior of the preceding paratype, $\times 2$, showing lateral endospinose thickening; 15, 16, interior and exterior of a brachial valve, $\times 1$, paratype USNM 153706b; 17, interior of the preceding specimen, $\times 2$, showing endospinose thickenings. [Cibolo Formation (Thin-bedded Zone of Udden), USNM 738-1.]

Dyoros (Lissosia) concavus, new species: 18-22, Ventral, anterior, posterior, dorsal, and side views of a young adult having fine radial ornament, $\times 1$, paratype USNM 152147h; 23-27, dorsal, ventral, side, posterior, and anterior views of another paratype, $\times 1$, USNM 152147f; 28-32, ventral, posterior, side, anterior, and dorsal views of an adult, $\times 1$, paratype USNM 152147b; 33-37, ventral, side, posterior, anterior, and dorsal views of a large, alate specimen, $\times 1$, paratype USNM 152147a; 38-42, ventral, posterior, anterior, side, and dorsal views of well formed specimen, $\times 1$, paratype USNM 152147d; 43, interior of a pedicle valve, $\times 1$, paratype USNM 153706a; 44-46, interior, laterally tilted, and posterior views of a brachial valve, $\times 1$, paratype USNM 153706b. [Word Formation (China Tank Member), USNM 706c.]

PLATE 487.—*Dyoros (Dyoros)* and *Dyoros (Lissosia)*

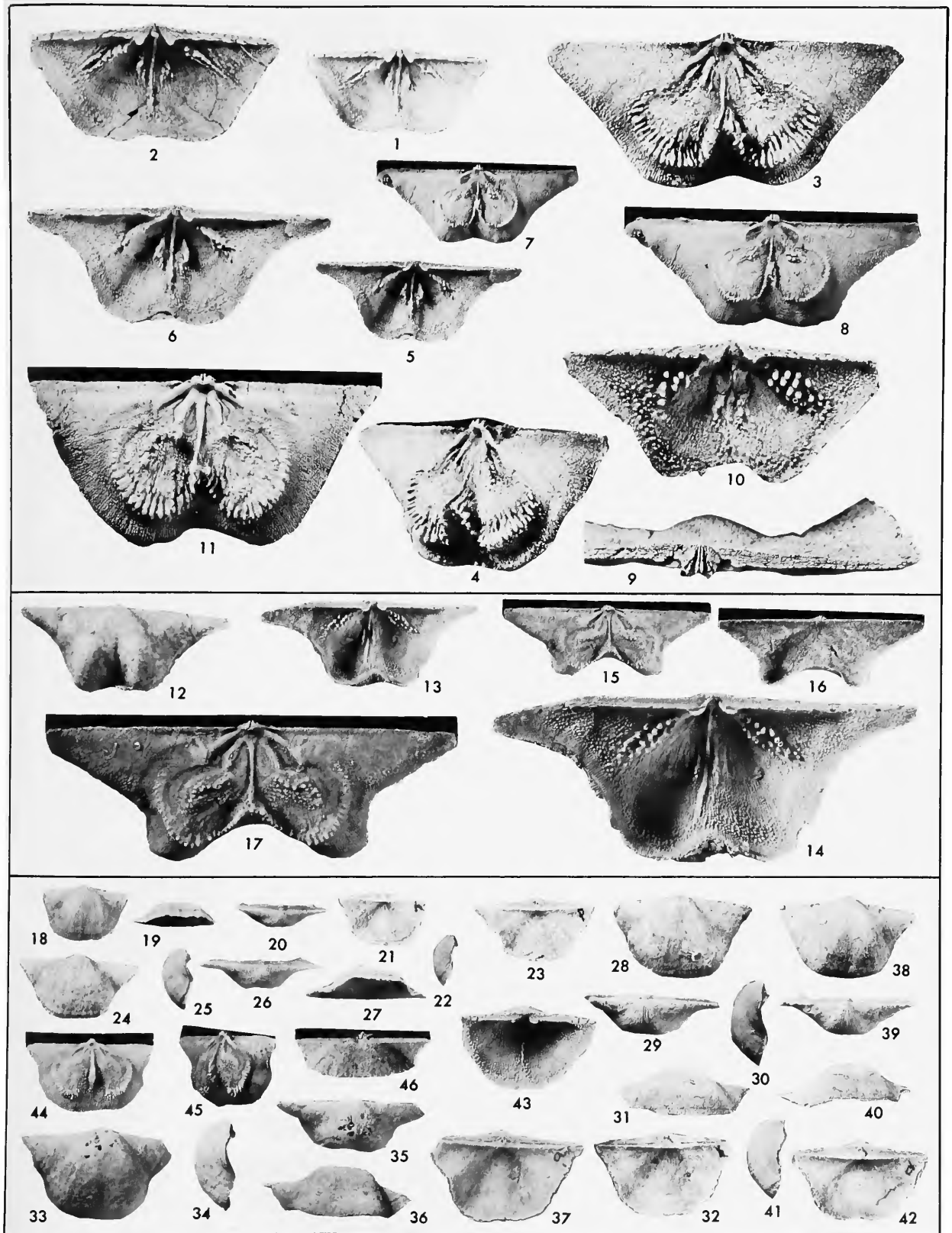


PLATE 488

Dyoros (Lissosia)

Dyoros (Lissosia) concavus, new species: 1–5, Ventral, side, anterior, posterior, and dorsal views of a complete specimen with radial ornament, $\times 1$, holotype USNM 152144a; 6, 7, pedicle valve interior, $\times 1$, $\times 1.5$, paratype USNM 153707b; 8, 9, posteriorly tilted and interior views of an obese brachial valve, $\times 1$, paratype USNM 153707c; 10–12, interior, posteriorly tilted, and laterally tilted views of the preceding paratype, $\times 2$, showing thickening of median septum, and strong endospines; 13, 14, laterally tilted and interior views of another brachial valve, $\times 1$, paratype USNM 153707e; 15, interior of the preceding specimen, $\times 2$, showing anderidia and endospines; 16, interior of a pedicle valve, $\times 1.5$, paratype USNM 153707f. [Word Formation (Willis Ranch Member, lower), USNM 706.]

17–21, Ventral, dorsal, posterior, side, and anterior views of a small adult, $\times 1$, paratype USNM 152149e; 22, 23, interior of a brachial valve, $\times 1$, $\times 2$, paratype USNM 153708a; 24, 25, preceding specimen, $\times 2$, tilted posteriorly and laterally to show median septum and endospines; 26, 27, interior and laterally tilted views of a brachial valve, $\times 1$, paratype USNM 153708b; 28, 29, laterally tilted and interior views of the preceding specimen, $\times 2$, showing anderidia. [Word Formation (Willis Ranch Member, top), USNM 706e.]

Dyoros (Lissosia) parvus, new species: 30–34, Ventral, side, anterior, posterior, and dorsal views of a complete specimen, $\times 1$, holotype USNM 152154a; 35, dorsal view of the beak region, $\times 4$, showing pseudodeltidium and cardinal process of the holotype; 36–40, ventral, posterior, anterior, side, and dorsal views of a small paratype, $\times 1$, USNM 152154e; 41, 42, interior of the pedicle valve, $\times 1$, $\times 2$, paratype USNM 153709a; 43, interior of the brachial valve, $\times 1$, paratype USNM 153709b; 44, laterally tilted view of the preceding specimen, $\times 2$; 45, interior of the preceding brachial valve, $\times 3$, showing anderidia. [Road Canyon Formation, USNM 707e.]

Dyoros (Lissosia) vagabundus, new species: 46–50, Ventral, posterior, dorsal, side, and anterior views of a complete specimen, $\times 1$, holotype USNM 152163a; 51–55, ventral, anterior, posterior, dorsal, and side views of another paratype, $\times 1$, USNM 152163d; 56, interior of the pedicle valve, $\times 1$, paratype USNM 152163e; 57, 58, posteriorly tilted and interior views of a brachial valve, $\times 2$, paratype USNM 152163f; 59, posterior view of part of the preceding, $\times 4$, showing the cardinal process. [Cathedral Mountain Formation, USNM 702.]

PLATE 488.—*Dyoros (Lissosia)*

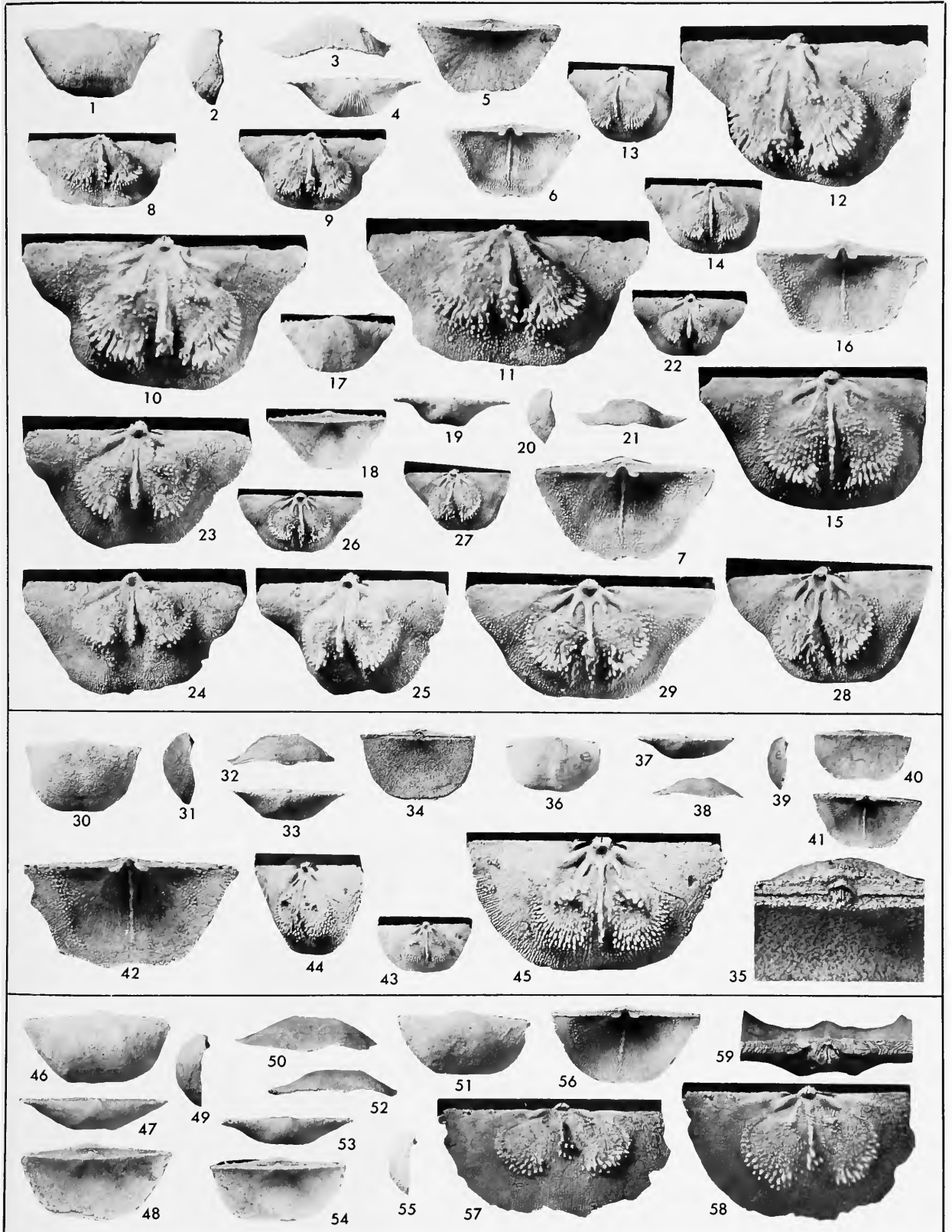


PLATE 489

Dyoros (Lissosia) and Dyoros (Tetragonetes)

Dyoros (Lissosia) vagabundus, new species: 1, Dorsal view of three immature specimens, \times 1, paratype USNM 152166k, j, i; 2–6, anterior, ventral, posterior, dorsal, and side views of a small, complete specimen, \times 1, paratype USNM 152166e; 7–11, ventral, dorsal, side, anterior, and posterior views of another complete specimen, \times 1, paratype USNM 152166a; 12, interior of a young brachial valve, \times 1, paratype USNM 153710d; 13, dorsal view of two pedicle valves preserving some of their spines, \times 1, paratype USNM 153710a, b; 14, interior of a brachial valve, \times 1, paratype USNM 153710c; 15, 16, laterally tilted and interior views of the preceding brachial valve, \times 2; 17, median portion of a young brachial valve (illustrated in figure 12), \times 4, showing anderidia and median septum, paratype USNM 153710d. [Cathedral Mountain Formation, USNM 702b.]

18, 19, Exterior and interior of a pedicle valve, \times 1, paratype USNM 152162a; 20, 21, exterior and interior of a large pedicle valve, \times 1, paratype USNM 152162b. [Cathedral Mountain Formation, USNM 702.]

22, Interior of another brachial valve with distally expanded median septum, \times 1, paratype USNM 153711a; 23, 24, interior and laterally tilted views of the preceding specimen, \times 2, showing anderidia and endospines; 25, posterior view of the preceding brachial valve, \times 3, showing the cardinal process. [Cathedral Mountain Formation, USNM 721u.]

Dyoros (Tetragonetes) auriculatus, new species: 26–29, Ventral, dorsal, anterior, and side views of a complete specimen, \times 1, holotype USNM 152180f; 30, 34, posterior and dorsal views of a complete specimen, \times 1, paratype USNM 152180e; 31, dorsal exterior of the holotype, \times 2; 33, exterior of a small pedicle valve having strong radial ornament, \times 1, paratype USNM 152180h; 35, exterior of another radially ornamented pedicle valve, \times 1, paratype USNM 152180k; 36–38, interior, posteriorly tilted, and exterior views of an average pedicle valve, \times 1, paratype USNM 152180b; 39, interior of a pedicle valve, \times 2, paratype USNM 152180j; 40, interior of a brachial valve, \times 1, paratype USNM 152180n; 41, 42, laterally tilted and interior views of the preceding paratype, \times 2, showing anderidia and modest endospines; 43, interior of another brachial valve, \times 2, paratype USNM 152180m. [Cherry Canyon Formation (Getaway Member), USNM 728.]

32, Exterior of a pedicle valve, \times 2, showing strong radial ornament, paratype USNM 153714. [Word Formation (Appel Ranch Member), USNM 722t.]

Dyoros (Tetragonetes) complanatus, new species: 44–48, Dorsal, posterior, anterior, ventral, and side views of a complete specimen, \times 1, holotype USNM 153712a; 49, dorsal view of the preceding, \times 2; 50, 51, exterior and interior of a brachial valve, \times 1, paratype, USNM 153712b; 52, interior of the preceding brachial valve, \times 2, showing well developed anderidia and poorly developed median septum. [Cherry Canyon Formation (Getaway Member), Moore locality 31.]

53, Interior of another, but obese, brachial valve, \times 1, paratype USNM 153713a; 54, 55, interior and laterally tilted views of the preceding paratype, \times 2, showing highly developed anderidia and median septum; 56, posterior of the preceding specimen, \times 4, showing the cardinal process; 57, 58, interior of the pedicle valve, \times 1, \times 2, showing median septum and muscle scars, paratype USNM 153713b. [Cherry Canyon Formation (Getaway Member), AMNH 600.]

PLATE 489.—*Dyoros (Lissosia)* and *Dyoros (Tetragonetes)*

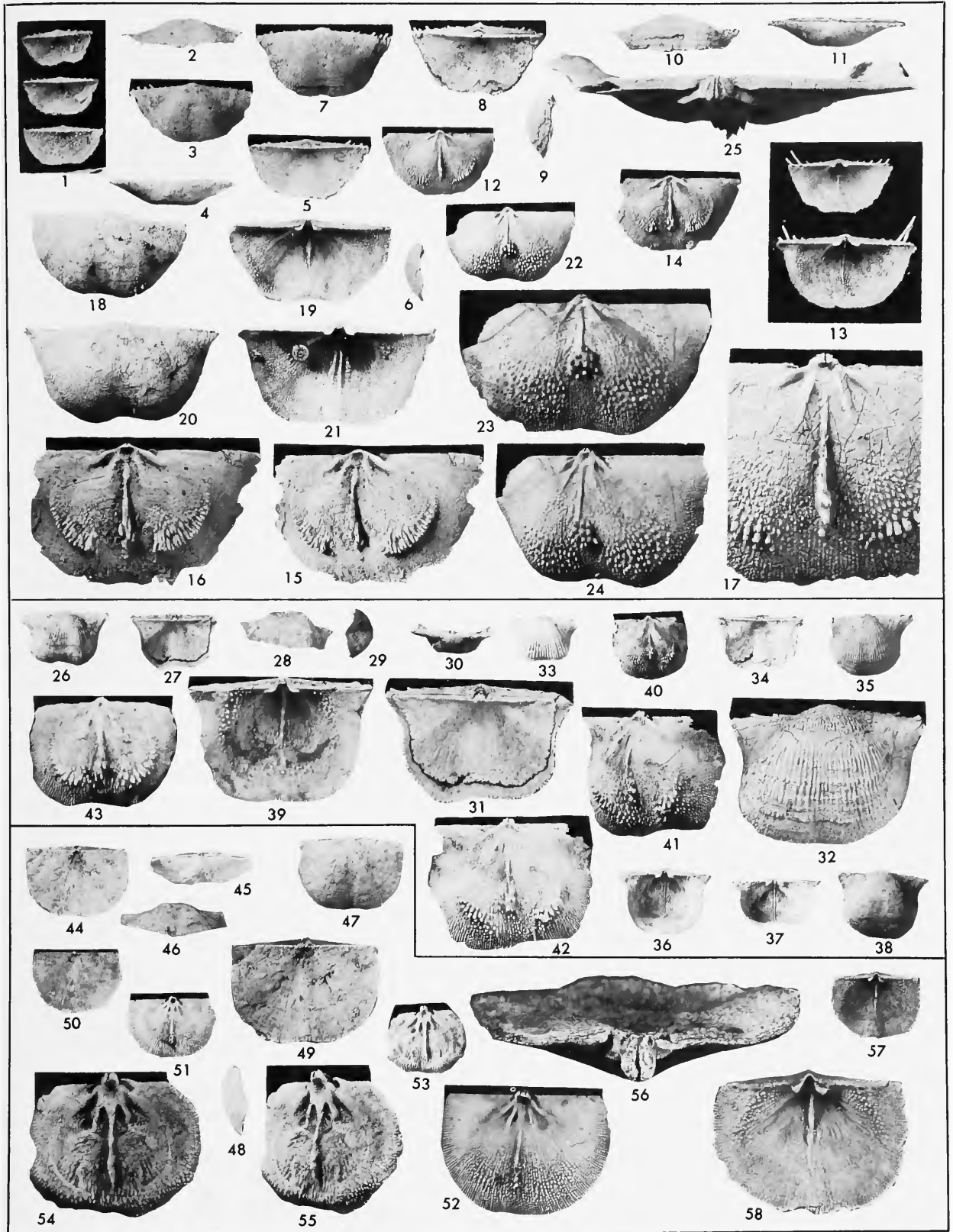


PLATE 490

Dyoros (Tetragonetes)

Dyoros (Tetragonetes) quadrangulatus, new species: 1–5, Ventral, side, anterior, posterior, and dorsal views of the holotype, × 1, USNM 153715a; 6–9, anterior, posterior, side, and ventral views of a pedicle valve, × 1, paratype USNM 152187b; 10, interior of the preceding pedicle valve, × 1.5, showing muscle scars; 11, exterior of a small pedicle valve, × 1, showing traces of radial ornament, paratype USNM 152187k; 12, 13, laterally tilted and interior views of a brachial valve, × 2, showing anderidia and serrate median septum, paratype USNM 153715b; 14, median portion of another brachial valve, × 3, showing endospinose median septum and well developed anderidia, paratype USNM 153715c; 15, interior of another brachial valve with slender anderidia and median septum, × 2, paratype USNM 153715d; 16, posterior of the preceding paratype, × 3, showing the cardinal process; 17, interior of a pedicle valve, × 1.5, paratype USNM 152187f; 18, 19, interior and posteriorly tilted views of another pedicle valve, × 1, paratype USNM 153715f. [Word Formation (Appel Ranch Member), USNM 715i.]

Dyoros (Tetragonetes) wordensis, new species: 20–24, Dorsal, anterior, posterior, side, and ventral views, × 1, of the holotype USNM 152026c; 25–29, dorsal, side, anterior, posterior, and ventral views of a complete paratype, × 1, USNM 152026g; 30, posterior of interarea, × 4, showing pseudodeltidium and chilidium, paratype USNM 152026a; 31, interior of the pedicle valve, × 2, paratype USNM 152026–1; 32, 33, interior and posteriorly tilted views, × 2, of the brachial valve, showing anderidia and endospines, paratype USNM 152026m; 34, 35, interior and laterally tilted views, × 2, of another brachial valve, showing anteriorly thickened median septum, paratype USNM 152026n; 36, posterior view of the preceding specimen, × 4, showing the cardinal process. [Word Formation (Willis Ranch Member), USNM 706e.]

Dyoros (Tetragonetes) rectangulatus, new species: 37–41, Ventral, posterior, anterior, side, and dorsal views of a complete specimen, × 1, paratype USNM 153716. [Cathedral Mountain Formation, AMNH 500G.]

42–46, Anterior, posterior, side, dorsal, and ventral views of another paratype, × 1, USNM 153717; 47, posterior view of the preceding specimen, × 3, showing cardinal process. [Road Canyon Formation, USNM 703a.]

48, 49, Ventral and dorsal views of a paratype, × 1, preserving some of its long spines, paratype USNM 152043. [Cathedral Mountain Formation, USNM 703a¹.]

50–52, Dorsal, side, and ventral views of a small paratype, × 1, USNM 153718a; 58–61, posterior, side, dorsal, and ventral views of a large paratype, × 1, USNM 153718b. [Cathedral Mountain Formation, USNM 702.]

53–57, Dorsal, side, posterior, anterior, and ventral views of a complete specimen, × 1, holotype USNM 152039a; 62, interior of a pedicle valve, × 2, paratype USNM 152039e; 63, interior of a young brachial valve, × 2, paratype USNM 152039f; 64, posterior of the preceding specimen, × 4, showing the cardinal process; 65, 66, laterally tilted and interior views of a brachial valve, × 2, showing well formed anderidia, paratype USNM 152039g. [Cathedral Mountain Formation, USNM 702b.]

Dyoros (Tetragonetes) subquadratus, new species: 67–71, Anterior, ventral, posterior, dorsal, and side views of a complete specimen, × 1, holotype USNM 151988a; 72, exterior of the preceding, × 4, showing fine radial lines; 73–77, side, anterior, dorsal, posterior, and ventral views of another complete individual, × 1, paratype USNM 151988b (for interior views, see plate 491: figures 20–32). [Cherry Canyon Formation (Getaway Member), USNM 728 = AMNH 512.]

PLATE 490.—*Dyoros* (*Tetragonetes*)

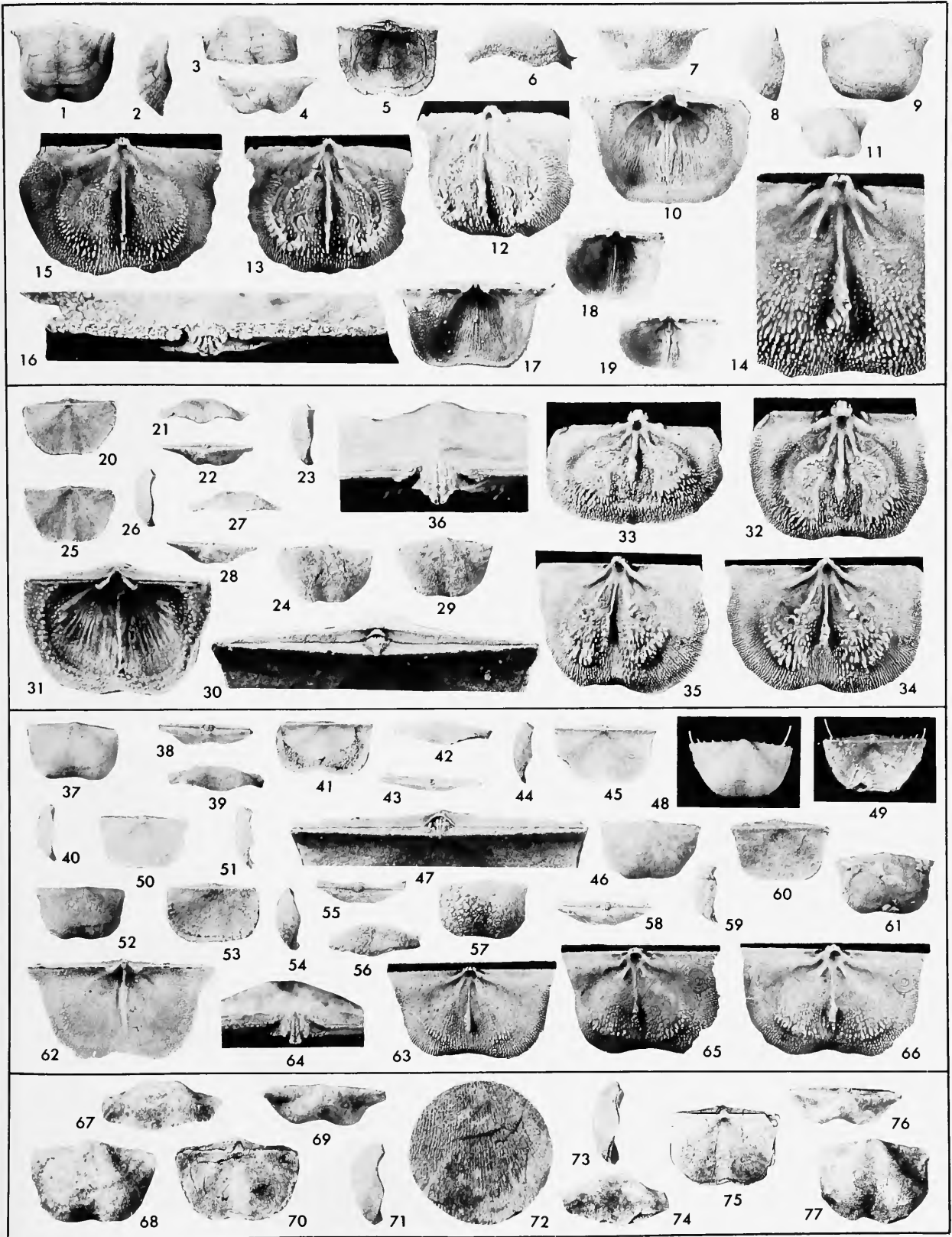


PLATE 491

Dyoros (Tetragonetes), *Lissochonetes*, and *Quadrochonetes*

Dyoros (Tetragonetes) solidus, new species: 1, Dorsal views of four immature specimens, $\times 1$, paratypes USNM 152015j, i, k, g; 2, ventral, anterior, side, posterior and dorsal views of three paratypes larger than the preceding ones, $\times 1$, USNM 152015h, l, m; 3-7, ventral, posterior, anterior, dorsal, and side views of a large adult, $\times 1$, holotype USNM 152015a; 8-12, dorsal, posterior, anterior, ventral, and side views, $\times 1$, of another large paratype, USNM 152015p; 13, interior of a pedicle valve, $\times 2$, paratype USNM 153719a; 14, interior of a brachial valve, $\times 2$, paratype USNM 153719b; 15, 16, interior and laterally tilted views of a brachial valve, $\times 2$, paratype USNM 153719c; 17, posterior of the preceding specimen, $\times 4$, showing the cardinal process; 18, 19, interior and exterior of a brachial valve, $\times 1$, paratype USNM 153720. [Road Canyon Formation, USNM 703d.]

Dyoros (Tetragonetes) subquadratus, new species: 20-23, Posterior, anterior, side, and ventral views of a large pedicle valve, $\times 1$, paratype USNM 151988h; 24, interior, $\times 1.5$, of the preceding specimen; 25-27, anterior, ventral, and side views of another pedicle valve, $\times 1$, paratype USNM 151988i; 28, interior, $\times 1.5$, of the preceding specimen; 29, interior of a brachial valve, $\times 2$, paratype USNM 151988k; 30-32, posterior and laterally tilted views, $\times 2$, and posterior view, $\times 3$, of another brachial valve, showing the anderidia, paratype USNM 151988j (for exterior views of this species, see plate 490: figures 67-77). [Cherry Canyon Formation (Getaway Member), USNM 728 = AMNH 512.]

Dyoros (Tetragonetes) strigosus, new species: 33-37, Ventral, dorsal, side, posterior, and anterior views of a large specimen, $\times 1$, holotype USNM 152036a; 38-42, ventral, dorsal, side, anterior, and ventral views of a smaller specimen than the preceding, $\times 1$, paratype USNM 152036b. [Road Canyon Formation, USNM 703d.]

Lissochonetes parvisulcatus, new species: 43, Standard views of two specimens, paratype on left and holotype on right, $\times 1$; 44, dorsal view, $\times 2$, of the holotype USNM 151993a; 45, dorsal views of a paratype, $\times 2$, USNM 151993c. [Gaptank Formation (*Uddenites*-bearing Shale Member of P. B. King), USNM 701p.]

Quadrochonetes girtyi Stehli: 46, Interior of a pedicle valve, $\times 2$, hypotype USNM 153721a; 47, interior of another pedicle valve, $\times 3$, hypotype USNM 153721b; 48, hinge region of a pedicle valve, $\times 4$, showing the pseudodeltidium, paratype USNM 153721c; 49, interior of a brachial valve, $\times 3$, paratype USNM 153721d; 50, posterior of the preceding specimen, $\times 4$, showing the cardinal process; 51, interior of another brachial valve, $\times 3$, showing anderidia and short septum, paratype USNM 153721e; 52, posterior view of the preceding paratype, $\times 4$, showing the cardinal process; 53, interior of an unusually wide brachial valve, $\times 3$, showing anderidia and well defined brachial ridge areas, paratype USNM 153721f; 54, interior of a brachial valve, $\times 3$, showing anderidia and septum, paratype USNM 153721g. [Bone Spring Formation, USNM 728f.]

PLATE 491.—*Dyoros (Tetragonetes)*, *Lissochonetes*, and *Quadrochonetes*

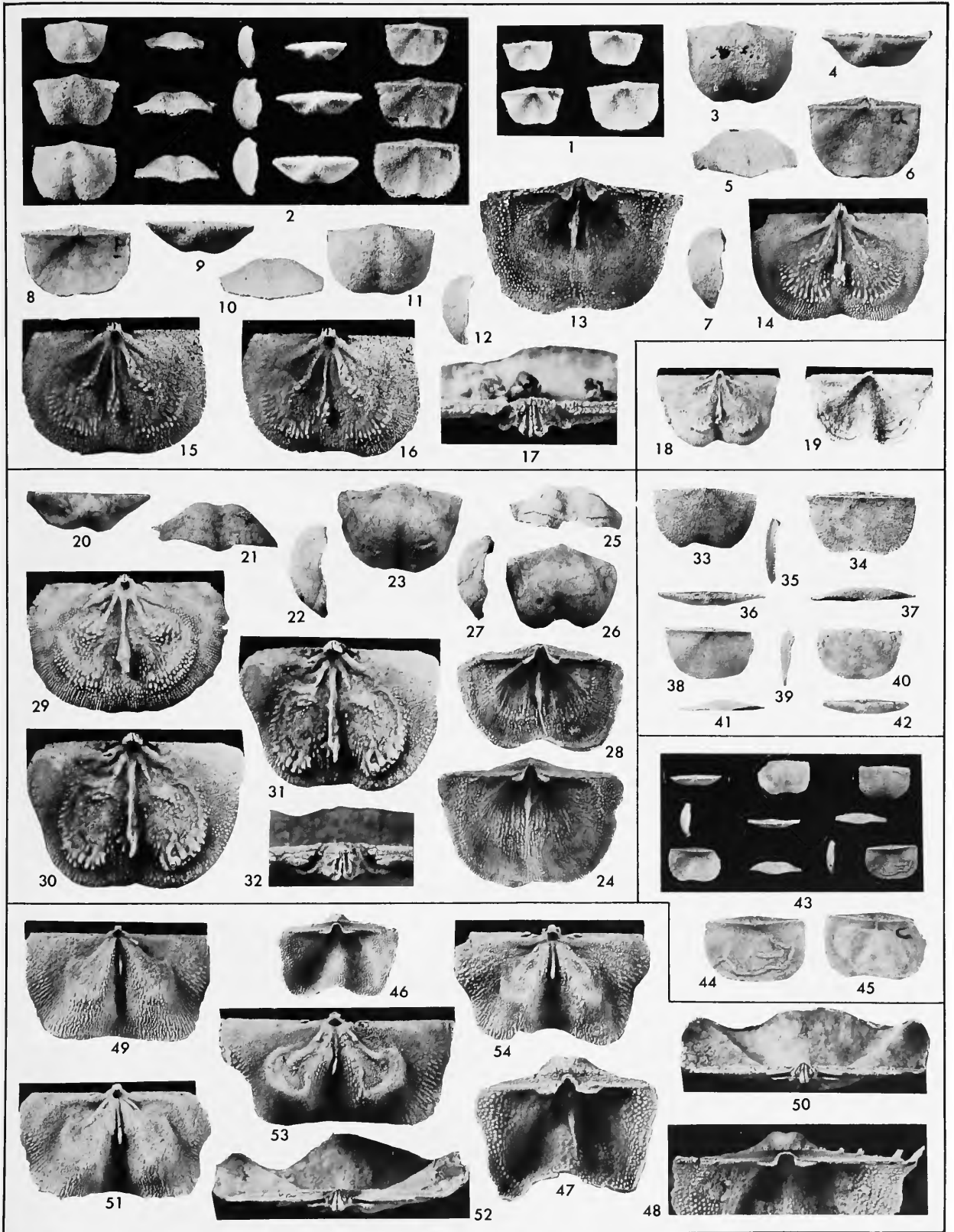


PLATE 492

Dyoros (Tetragonetes) and Undulella

Dyoros (Tetragonetes) quadrangulatus, new species: 1, Interior and exterior of a pedicle valve preserving some of the spines in place, $\times 1$, paratype USNM 153722. [Word Formation (Appel Ranch Member), USNM 719z.]

Undulella guadalupensis, new species: 2, Ventral, posterior, side, anterior, and dorsal views of a complete specimen, $\times 1$, holotype USNM 152077a; 3, dorsal view of the holotype, $\times 3$; 10, interior of a brachial valve, $\times 3$, paratype USNM 152077f; 11, 12, interior of pedicle valve, $\times 3$, paratypes USNM 152077b, c. [Cherry Canyon Formation (Getaway Member), USNM 732.]

4, Ventral, posterior, side, anterior, and dorsal views of a complete specimen, $\times 1$, paratype USNM 152078a; 5, dorsal view of preceding, $\times 3$; 8, interior of a brachial valve, $\times 3$, paratype USNM 152078d; 9, posterior view of the preceding specimen, $\times 4$, showing the cardinal process; 13, interior of a pedicle valve, $\times 3$, paratype USNM 152078b. [Cherry Canyon Formation (Getaway Member), AMNH 600.]

6, Ventral, posterior, side, anterior, and dorsal views of a complete specimen, $\times 1$, paratype USNM 152076; 7, dorsal view of the preceding paratype, $\times 3$. [Cherry Canyon Formation (Getaway Member), USNM 730.]

Undulella undulata Cooper and Grant: 14, Ventral view of two small specimens, $\times 1$, showing the vertical spines, paratypes USNM 153186a, b; 15, ventral view of another specimen with ventral spines, $\times 2$, hypotype USNM 152069; 16, ventral, posterior, side, anterior, and dorsal views $\times 1$, of (from top) paratypes USNM 152070h, g, and holotype USNM 152070b; 17, posterior of the holotype, $\times 4$, showing the pseudodeltidium and chilidium; 18, 19, dorsal view, $\times 2$, $\times 4$, of another paratype USNM 152070-l; 20-22, interior of three pedicle valves, $\times 3$, paratypes USNM 152070m, n, o; 23, interior of a brachial valve, $\times 3$, paratype USNM 152070p; 24, interior of another brachial valve, $\times 3$, paratype USNM 152070q; 25, posterior of the preceding specimen, $\times 4$, showing the cardinal process; 26, 27, interior of brachial valve, $\times 3$, showing minute anderia, paratypes USNM 152070s, t; 28, interior of another brachial valve, $\times 3$, paratype USNM 152070r; 29, posterior margin of the preceding, $\times 4$, showing the cardinal process and chilidium. [Word Formation (Willis Ranch Member), USNM 706e.]

30, Interior of a pedicle valve, $\times 3$, hypotype USNM 153723a; 31, interior of another pedicle valve tilted to show low median septum, $\times 3$, hypotype USNM 153723b; 32, interior of a brachial valve, $\times 3$, showing short septum and anderia, hypotype USNM 153723c. [Word Formation (Willis Ranch Member), USNM 706.]

PLATE 492.—*Dyoros (Tetragonetes)* and *Undulella*

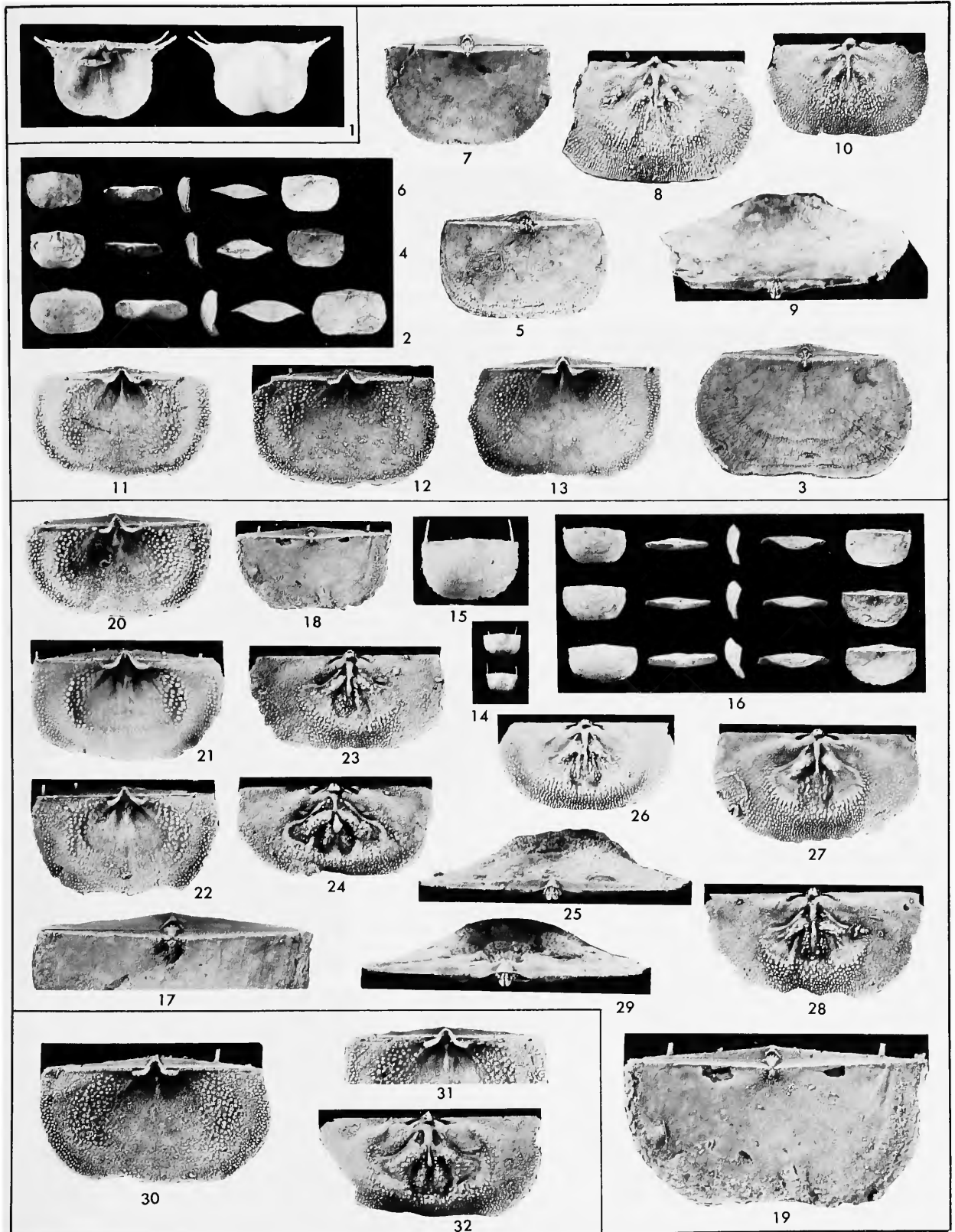


PLATE 493

Micraphelia

Micraphelia pumilis, new species: 1, Ventral, posterior, side, anterior, and dorsal views, \times 1, of (from top) holotype USNM 152073a and paratypes USNM 152073b, c; 2, dorsal view of the holotype, \times 3; 3, dorsal view, \times 3, paratype USNM 152073b; 4, dorsal view, \times 2, paratype USNM 152073c; 5, 6, interior of two pedicle valves, \times 3, paratypes USNM 153724a; 7, 8, interior of two brachial valves, \times 3, paratypes USNM 153724c, d; 9, 10, interior of two brachial valves, \times 3, showing anderidia and median thickening, paratypes USNM 153724e, f. [Bone Spring Formation, AMNH 46.]

Micraphelia scitula Cooper and Grant: 11, Posterior, ventral, side, anterior, and dorsal views of a complete specimen, \times 1, hypotype USNM 151899a; 12, dorsal view of the preceding specimen, \times 2; 13, ventral, posterior, side, anterior, and dorsal views, \times 1, hypotypes USNM 151899b, g. [Bell Canyon Formation (Hegler Member), AMNH 635.]

14, Ventral, posterior, side, anterior, and dorsal views, \times 1, of (top) paratype USNM 153725a and (bottom) holotype USNM 153725b; 15, dorsal view of the preceding paratype, \times 2; 16, dorsal view of the holotype, \times 2; 17, interior of a pedicle valve, \times 2, paratype USNM 153725c; 18, 19, laterally tilted and interior views of a brachial valve, \times 3, showing septa and endospines, paratype USNM 153725d. [Bell Canyon Formation (Hegler Member), USNM 731.]

20–22, Interior, laterally tilted, and anteriorly tilted views of a brachial valve, \times 3, paratype USNM 153194a; 23, interior of the pedicle valve, \times 2, paratype USNM 153194b. [Bell Canyon Formation (Rader Member), USNM 725f.]

Micraphelia subalata, new species: 24, Anterior, dorsal, side, posterior, and ventral views of a complete specimen, \times 1, paratype USNM 153726a; 25, dorsal view of the preceding paratype, \times 2; 26, interior of a pedicle valve, \times 3, paratype USNM 153726b; 27–29, interior of brachial valves, \times 3, paratypes USNM 153726c–e. [Bell Canyon Formation (Hegler Member), USNM 732a.]

30, Ventral, posterior, side, anterior, and dorsal views of two complete specimens, \times 1, paratypes USNM 153727a, b; 31, dorsal view, \times 2, of paratype USNM 153727b; 32, 33, interior of two pedicle valves, \times 3, paratypes USNM 153727c, d; 34, 35, interior of two brachial valves, \times 3, paratypes USNM 153727e, f; 36, interior of another brachial valve, \times 3, showing short median septum, paratype USNM 153727g; 37, interior of a youthful brachial valve not much thickened, \times 3, paratype USNM 153727h. [Bell Canyon Formation (Rader Member), USNM 725f.]

PLATE 493.—*Micraphelia*

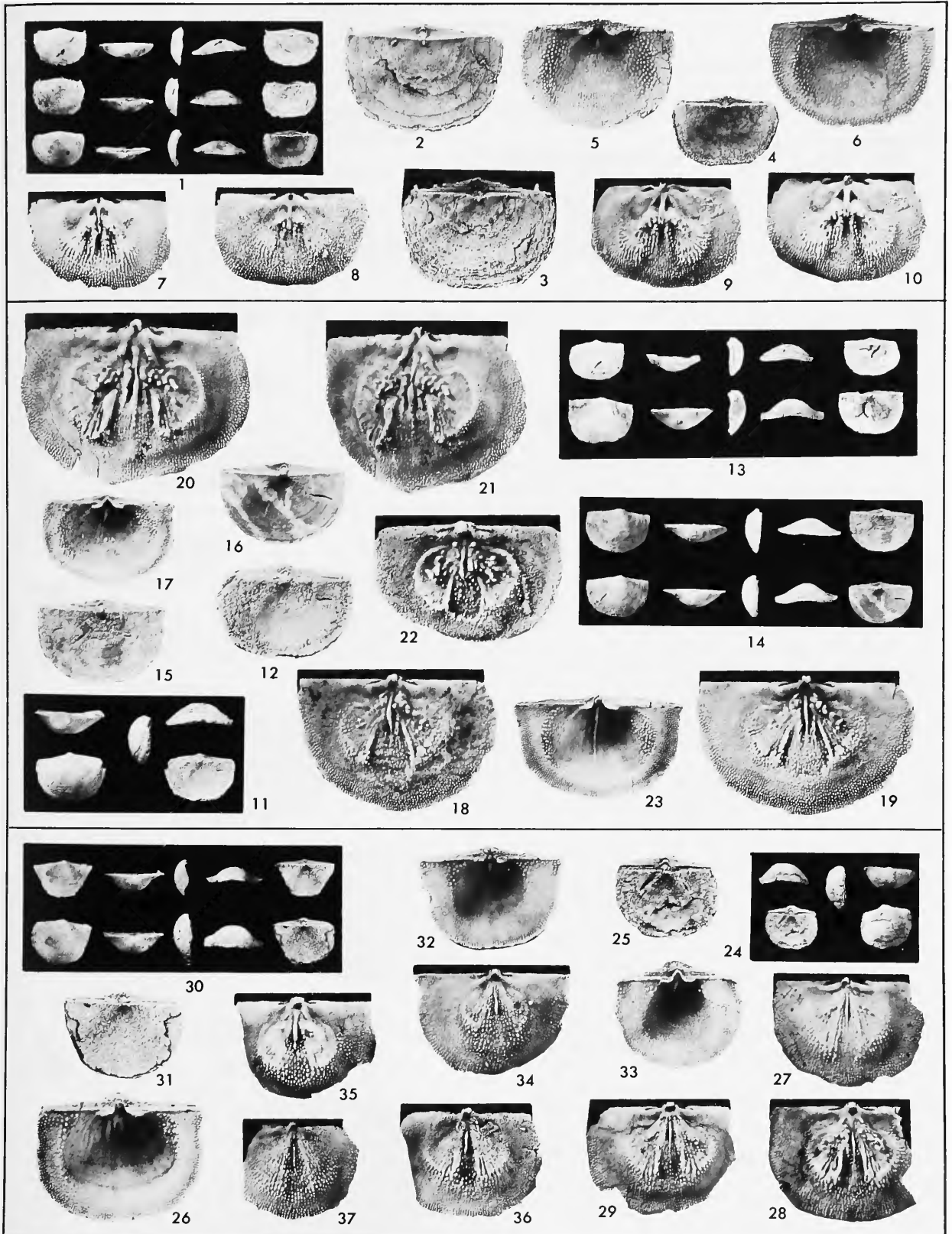


PLATE 494

Leurosina

Leurosina delicata, new species: 1, Ventral, posterior, side, anterior, and dorsal views of two complete specimens, × 1, paratype USNM 152132f (top) and holotype USNM 152132e (below); 2–6, ventral, posterior, anterior, side, and interior views of a pedicle valve, × 1, paratype USNM 152132b; 7–11, anterior, ventral, side, posterior, and interior views, × 1, of another pedicle valve, paratype USNM 152132a; 12, interior of a brachial valve, × 2, paratype USNM 152132h; 13, interior of another brachial valve, × 2, showing anderia, paratype USNM 152132g; 14, posterior of preceding paratype, showing cardinal process, × 4. [Cherry Canyon Formation (Getaway Member), USNM 728 = AMNH 512.]

Leurosina lata, new species: 15–19, Ventral, posterior, side, anterior, and dorsal views, × 1, paratype USNM 152136a; 20, interior of an obese brachial valve, × 3, showing anderia and thickened septum, paratype USNM 152136b; 21, interior of another thickened brachial valve, × 3, showing anderia and endospines, paratype USNM 152136c. [Word Formation (lens between Willis Ranch and Appel Ranch members), USNM 706b.]

22–26, Dorsal, anterior, side, posterior, and ventral views of a large specimen, × 1, holotype USNM 152138a; 27, interior of a pedicle valve, × 2, paratype USNM 152138e; 28, interior of a brachial valve, × 2, showing inner thickening, paratype USNM 152138f; 44, posterior view, × 4, showing cardinal process of the preceding specimen. [Word Formation (China Tank Member), USNM 706c.]

29–33, Dorsal, anterior, side, ventral, and posterior views of a complete specimen, × 1, paratype USNM 153728c. [Word Formation (China Tank Member), USNM 726r.]

34–38, Dorsal, side, anterior, ventral, and posterior views of a complete specimen, × 1, paratype USNM 152140a; 39, 40, interior of two pedicle valves, showing stages in internal thickening, × 2, paratypes USNM 152140h, i; 41, interior of a slightly thickened brachial valve, × 2, paratype USNM 152140j; 42, 43, interior and laterally tilted views of a much thickened brachial valve, × 2, showing septum and anderia, paratype USNM 152140k. [Word Formation (Willis Ranch Member), USNM 706e.]

Leurosina sinesulca (Stehli): 45–49, Ventral, side, posterior, anterior, and dorsal views, of a complete individual, × 1, hypotype USNM 153729a; 50–54, posterior, side, anterior, ventral, and dorsal views of another complete specimen, × 1, hypotype USNM 153729b; 55, interior of the pedicle valve, × 2, showing median septum and endospines, hypotype USNM 153729c; 56, 57, laterally tilted and interior views of a brachial valve, × 2, showing fine endospines and low, anteriorly serrate median septum, hypotype USNM 153729d; 58, posterior of the preceding paratype, × 4, showing the cardinal process and chilidium; 59, 60, interior and laterally tilted views of another brachial valve, × 2, hypotype USNM 153729e. [Bone Spring Formation, USNM 728e.]

61–65, Ventral, anterior, dorsal, side, and posterior views of a complete specimen, × 1, hypotype USNM 152156a. [Bone Spring Formation, AMNH 625.]

PLATE 494.—*Leurosina*

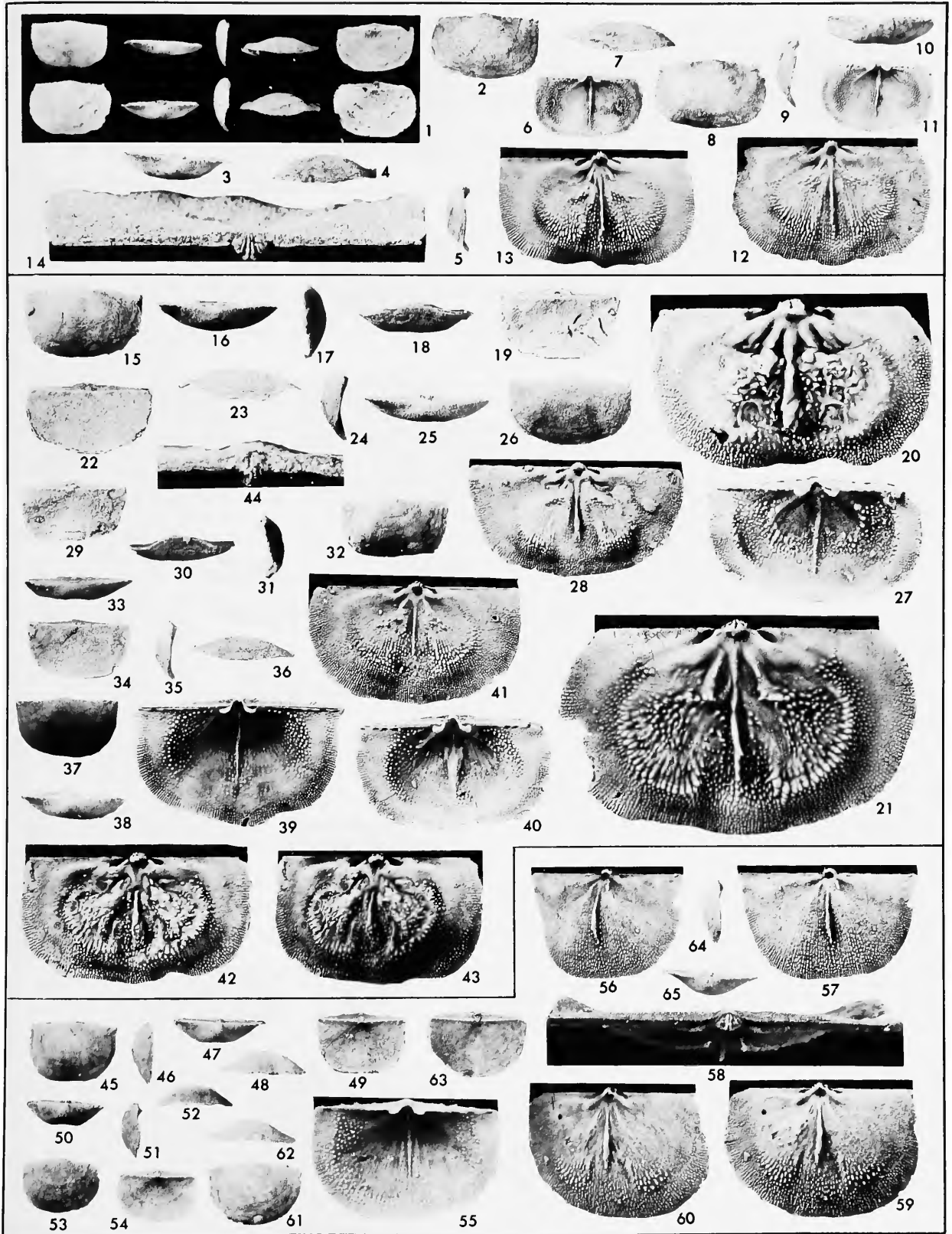


PLATE 495

Leurosina and *Dyoros* (*Tetragonetes*)

Leurosina vulgarica, new species: 1, Ventral, posterior, side, anterior, and dorsal views of two complete specimens, $\times 1$, paratypes USNM 153730a, b. [Bone Spring Formation, USNM 728e.]

2, Ventral, posterior, side, anterior, and dorsal views of two complete paratypes, $\times 1$, USNM 153731a, b; 3, dorsal view of paratype USNM 153731b, $\times 4$; 4, interior of a brachial valve, $\times 3$, paratype USNM 153731c. [Skinner Ranch Formation (base), USNM 705a.]

5, Posterior, ventral, side, anterior, and dorsal views of a complete specimen, $\times 1$, holotype USNM 152159k; 6, dorsal view of the holotype, $\times 2$; 7, interior of the pedicle valve, $\times 3$, paratype USNM 152159-1; 8, interior of a brachial valve, $\times 3$, paratype USNM 152159m. [Bone Spring Formation, AMNH 631.]

Dyoros (*Tetragonetes*) *rectangulatus*, new species: 9, 10, Dorsal view of a complete specimen, $\times 1$, $\times 2$, paratype USNM 153732a; 11, interior of a brachial valve, $\times 1$, paratype USNM 153732b; 12, interior of the median portion of the preceding specimen, $\times 3$, showing anderidia and anteriorly thickened median septum. [Cathedral Mountain Formation, USNM 702a.]

Leurosina marginata, new species: 13-17, Ventral, anterior, posterior, side, and dorsal views of a large, complete specimen, $\times 1$, holotype USNM 152128b; 18-22, anterior, posterior, side, ventral, and dorsal views, $\times 1$, of another complete paratype USNM 152128a; 23-27, side, dorsal, anterior, posterior, and ventral views of a complete specimen, $\times 1$, paratype USNM 152128j; 28, 29, interior of the pedicle valve showing median septum, $\times 1$, $\times 2$, paratype USNM 152128k; 30, 31, interior of a thickened brachial valve, $\times 1$, $\times 2$, showing septum and endospines, paratype USNM 152128m; 32, 33, interior and exterior of a brachial valve, $\times 1$, showing borings, paratype USNM 152128-1; 34, interior of the preceding specimen, $\times 2$, showing well developed anderidia and endospines. [Word Formation (Appel Ranch Member), USNM 715i.]

Leurosina serratoseptata, new species: 35-39, Posterior, anterior, side, ventral, and dorsal views of a complete specimen, $\times 1$, paratype USNM 151999k; 40-44, ventral, side, anterior, posterior, and dorsal views of the holotype, $\times 1$, USNM 151999-1; 45, cardinal process of the holotype, $\times 4$; 46-49, anterior, posterior, side, and dorsal views of a large adult, $\times 1$, paratype USNM 151999m; 50, interior of the pedicle valve, $\times 2$, paratype USNM 151999n; 51, 52, interior of two brachial valves, $\times 3$, showing well developed anderidia and scattered endospines, paratypes USNM 151999o, p; 53, interior of a young brachial valve, $\times 3$, paratype USNM 151999q. [Huocco Formation, USNM 728d.]

PLATE 495.—*Leurosina* and *Dyros* (*Tetragonetes*)

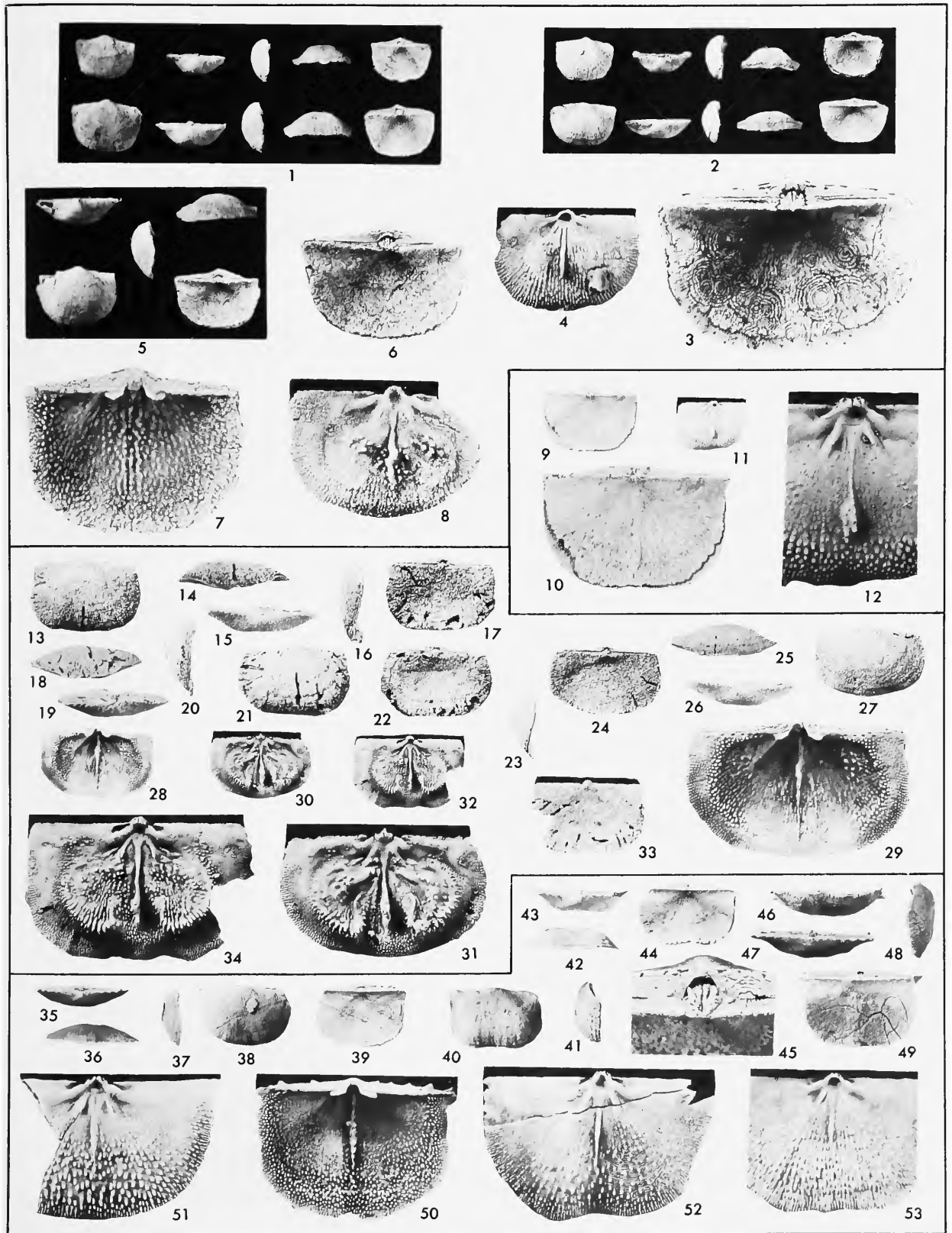


PLATE 496

Mesolobus?, *Rugaria*, and *Neochonetes*

Mesolobus? permianus, new species: 1–5, Posterior, dorsal, side, anterior, and ventral views of a complete specimen, $\times 1$, holotype USNM 152797; 6, 7, dorsal and ventral views of the holotype, $\times 2$. [Road Canyon Formation, USNM 703a.]

Rugaria crassa, new species: 8, Anterior, posterior, ventral, dorsal, and side views of a complete specimen, $\times 1$, holotype USNM 152099j; 9, dorsal view of the holotype, $\times 2$; 10, dorsal valve exterior, $\times 1$, paratype USNM 152100e; 11, plasticine replica of mold of the exterior, $\times 1$, paratype USNM 152100b; 12, exterior of an exfoliated pedicle valve, $\times 1$, paratypes USNM 152100c; 13, 14, ventral and side views of another exfoliated pedicle valve, $\times 1$, paratype USNM 152100a. [Skinner Ranch Formation (Decie Ranch Member), USNM 707a.]

15, Exterior of an imperfect pedicle valve, $\times 1$, paratype USNM 153734. [Skinner Ranch Formation (Decie Ranch Member), USNM 729i.]

16, 17, Exterior of another pedicle valve, $\times 1$, $\times 2$, paratype USNM 153733. [Sullivan Peak Member), USNM 722–1.]

Rugaria hessensis (R. E. King): 18, Ventral and dorsal views of three immature specimens, $\times 1$, hypotypes (from top) USNM 152098j, m, n; 19, ventral, posterior, side, anterior, and dorsal views of three grown specimens, $\times 1$, hypotypes USNM 152098b (top), f, a; 20, dorsal view, $\times 2$, of hypotype USNM 152098f; 21, dorsal view, $\times 2$, of hypotype USNM 152098b; 23, interior of the pedicle valve, $\times 4$, paratype USNM 152097a; 24, 25, interior of two brachial valves, $\times 4$, paratypes USNM 152097b, c. [Hess Formation (Taylor Ranch Member), USNM 702e.]

22, Ventral view of a pedicle valve, $\times 1$, hypotype USNM 152096a. [Hess Formation (Taylor Ranch Member), USNM 702d.]

Neochonetes liratus, new species: 26–29, Dorsal, ventral, posterior, side, anterior, and posterior views of a paratype, $\times 1$, USNM 152103; 52, dorsal view of the preceding paratype, $\times 4$; 30–34, side, dorsal, ventral, anterior, and posterior views of a large specimen, $\times 1$, holotype USNM 152104a; 35–39, anterior, dorsal, posterior, side, and ventral views of another complete specimen, $\times 1$, paratype USNM 152104e; 40–44, ventral, anterior, dorsal, side, and posterior views of a complete individual, $\times 1$, paratype USNM 152104d; 45, exterior of the pedicle valve of the preceding specimen, $\times 4$; 46, 47, side and dorsal views of a small, complete specimen, $\times 1$, paratype USNM 152104h; 48, ventral view of an incomplete specimen, showing strong antheridia and a median septum, $\times 4$, paratype USNM 153735a; 49, interior of the pedicle valve, $\times 2$, paratype USNM 153735b; 50, 51, interior of the brachial valve, $\times 1$, $\times 2$, paratype USNM 153735c. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

Neochonetes parvus, new species: 53–57, Dorsal, anterior, posterior, ventral, and side views of a complete specimen, $\times 1$, holotype USNM 152115a; 58, 59, dorsal and ventral views of the preceding specimen, $\times 2$; 60, dorsal view of an immature individual, $\times 1$, paratype USNM 152115b. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701c.]

61–65, Dorsal, ventral, posterior, side, and anterior views of a complete specimen, $\times 1$, paratype USNM 153737. [Neal Ranch Formation (beds 12–14 of P. B. King), USNM 701k.]

PLATE 496.—*Mesolobus?*, *Rugaria*, and *Neochonetes*

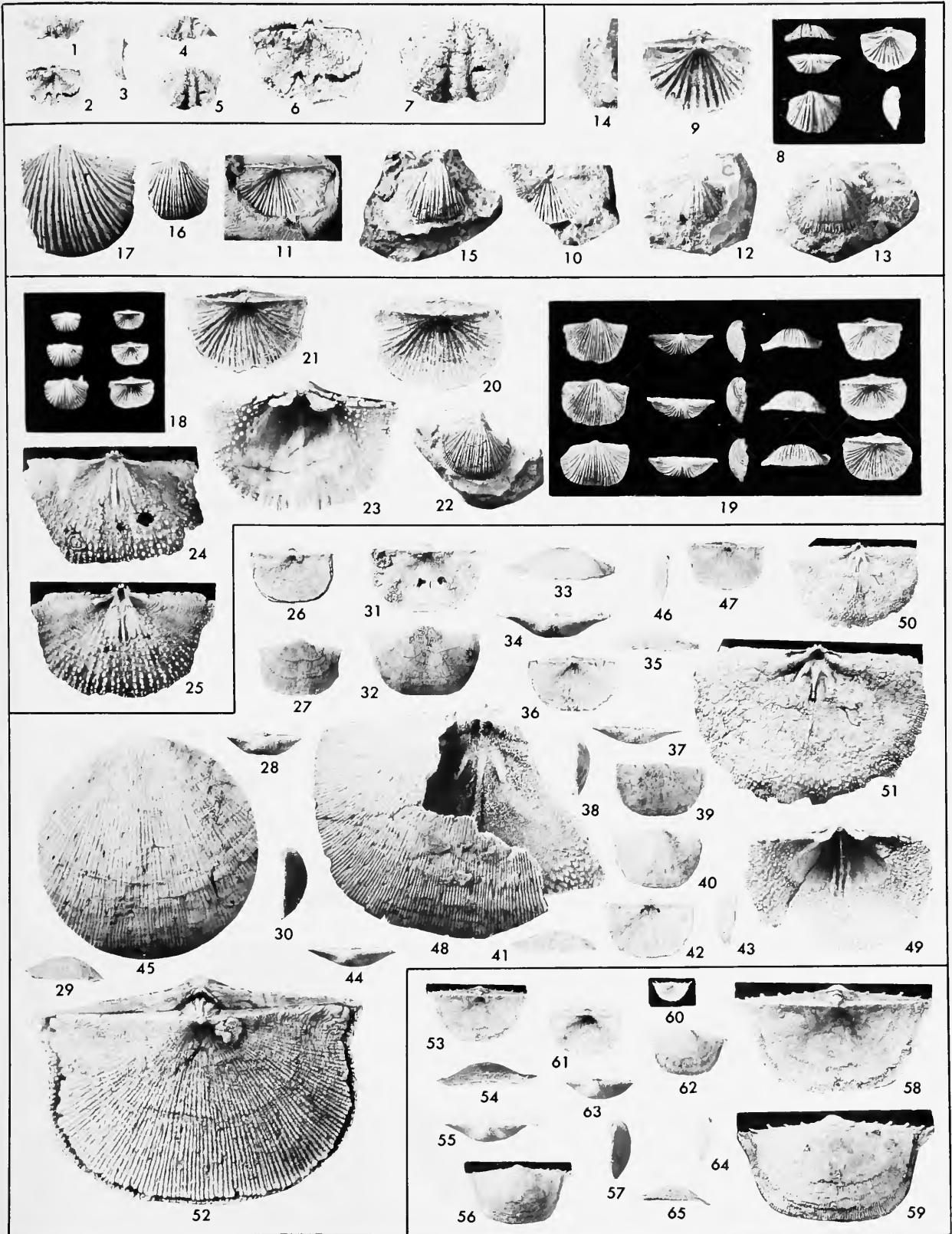


PLATE 497

Neochonetes, *Dyoros* (*Tetragonetes*), and *Lamellosia*

Neochonetes dominus (R. H. King): 1–5, Anterior, dorsal, posterior, side, and ventral views of a complete specimen, $\times 1$, hypotype USNM 153738b; 6–10, anterior, ventral, side, dorsal, and posterior views of another complete specimen, $\times 1$, hypotype USNM 153738a; 11, interior of the pedicle valve of the preceding specimen, $\times 2$; 12, interior of the brachial valve of the preceding specimen, $\times 2$; showing small anderida; 13, posterior of another complete specimen, $\times 4$, showing cardinal process and pseudodeltidium, hypotype USNM 153738c; 14, interior of a thickened pedicle valve, $\times 2$, hypotype USNM 153738d; 15, interior of a young pedicle valve, $\times 2$, showing fine endospines, hypotype USNM 153738e; 16, exterior of a pedicle valve, showing the fine radial costellae, $\times 4$, hypotype USNM 153738f; 17, laterally tilted brachial valve interior, $\times 2$, showing median septum and well formed anderidia, hypotype USNM 153738g; 18, posterior of the preceding specimen, showing the cardinal process, $\times 4$. [Bend Formation (Marble Falls Member), on Texas State Highway 81, 2.7 miles south of San Saba, Texas.]

Neochonetes puebloensis (R. H. King): 19–23, Anterior, ventral, side, posterior, and dorsal views of a large and complete specimen, $\times 1$, hypotype USNM 153739a; 24, exterior of part of the brachial valve of the preceding specimen, $\times 4$, showing the costellae; 25, interior of the brachial valve, $\times 2$, showing anderidia and anteriorly thickened median septum, hypotype USNM 153739b. [Putnam Formation (Coleman Junction Member), USNM 766.]

26, Interior of a pedicle valve, $\times 1.5$, showing muscle scars, hypotype USNM 152124. [Pueblo Formation, one mile south of Camp Colorado, Coleman County, Texas.]

Neochonetes meekanus (Girty): 27, Interior, $\times 1.5$, of the brachial valve, showing well formed anderidia, hypotype USNM 152119a; 28, interior of a somewhat thickened brachial valve, $\times 1.5$, showing anderidia and endospines, hypotype USNM 152119b; 29, posterior view of the preceding specimen, showing the cardinal process, $\times 3$; 30, interior of an obese brachial valve, $\times 1.5$, hypotype USNM 152119c. [Hughes Creek Formation, U. S. Highway 75, five miles south of Dawson, Nebraska.]

Dyoros (*Tetragonetes*) *giganteus*, new species: 31, 32, Interior and exterior of a large brachial valve, $\times 1$, paratype USNM 153736a; 33, posterior view of the preceding brachial valve, $\times 4$, showing strongly developed anderidia; 34, 35, exterior and interior of the pedicle valve, $\times 1$, paratype USNM 153736b. [Cathedral Mountain Formation, USNM 726u.]

Lamellosia lamellosa, new species: 36, Posterior, dorsal, side, anterior, and ventral views of a complete specimen, $\times 1$, holotype USNM 153740a; 37, dorsal view of the preceding specimen, $\times 2$, showing lamellose exterior; 38, 39, exterior, $\times 1$, and interior, $\times 2$, of a pedicle valve showing lamellose exterior, paratype USNM 153740b; 40, exterior of another pedicle valve, $\times 2$, showing crowded, concentric lamellate, paratype USNM 153740c; 41, 42, exterior of a pedicle valve with strong lamellae, $\times 1$, $\times 2$, paratype USNM 153740d; 43, hinge region of the preceding specimen, $\times 2$. [Bell Canyon Formation (Hegler Member), USNM 732a.]

PLATE 497.—*Neochonetes*, *Dyoros* (*Tetragonetes*), and *Lamellosia*

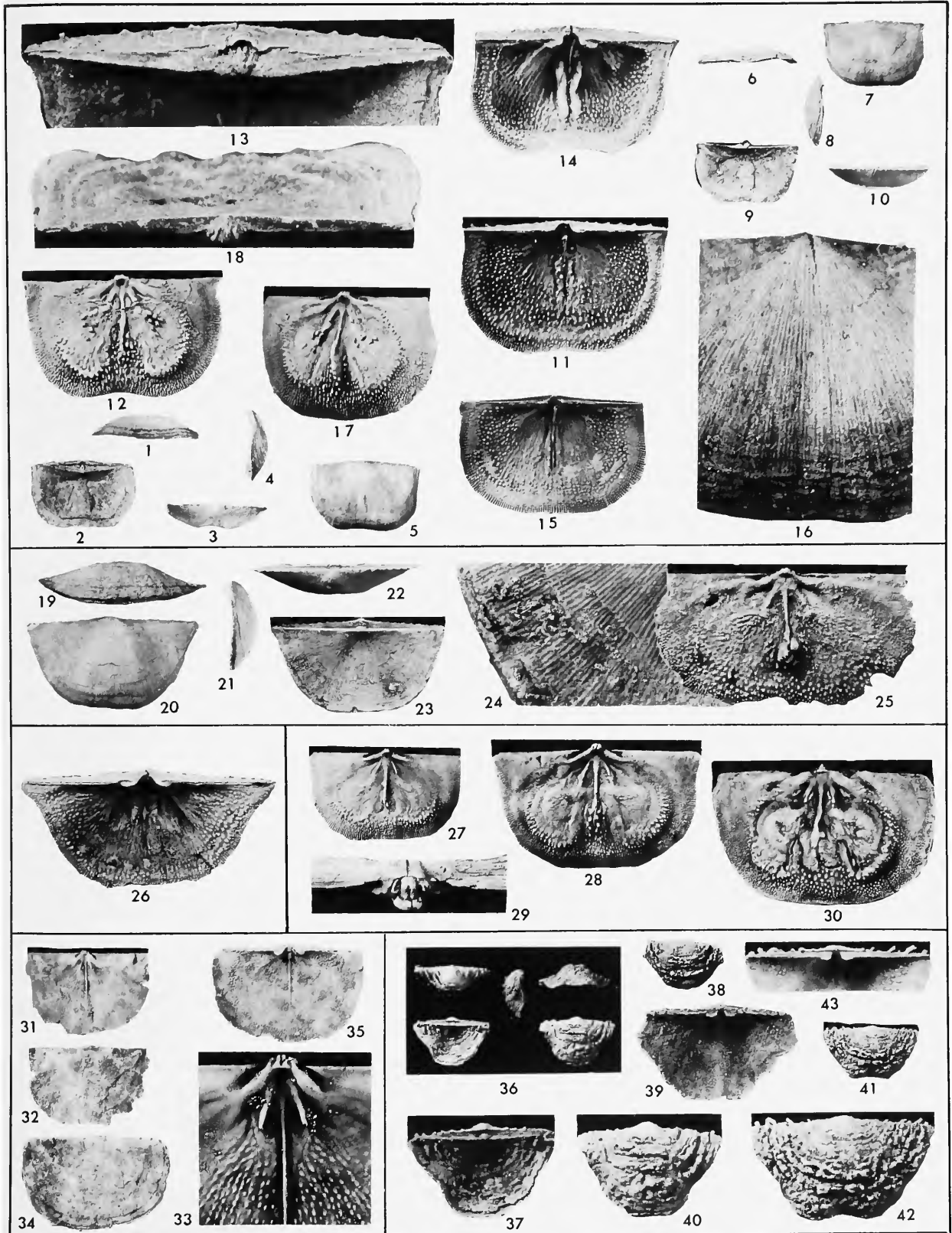


PLATE 498

Rugaria, *Leurosina*, *Dyoros* (*Tetragonetes*), "*Chonetes*," and *Dyoros* (*Dyoros*)

Rugaria hessensis (R. E. King): 1–5, Posterior, ventral, side, dorsal, and anterior views of a complete specimen, × 3, paratype YPM 10820b; 6, dorsal view of an imperfect specimen, × 3, paratype T10589; 7, dorsal view of a complete specimen, × 1, lectotype YPM 10820a; 8–12, ventral, anterior, side, posterior, and dorsal views, × 3, of the preceding lectotype. [Hess Formation (Taylor Ranch Member), R. E. King locality 107.]

Leurosina sinesulca (Stehli): 13–17, Posterior, ventral, side, anterior, and interior views of a large pedicle valve, × 1, hypotype USNM 153741a; 18, interior of the preceding specimen, × 2; 19–23, interior, anterior, side, posterior, and ventral views of another pedicle valve, × 1, hypotype USNM 153741b; 24, 25, ventral and interior views of a pedicle valve, × 1, hypotype USNM 153741c; 26, posterior of the interarea of the preceding specimen, × 4, showing teeth and pseudodeltidium; 27, exterior of a brachial valve, × 1, hypotype USNM 153741d; 28, 29, laterally tilted and interior views of the preceding specimen, × 2, showing median septum and anderidia; 30, exterior of another brachial valve, × 1, hypotype USNM 153741f; 31, 32, laterally tilted and interior views of a brachial valve showing well developed anteridia, × 2, hypotype USNM 153741e. [Bone Spring Formation, USNM 728e.]

44, Interior of the brachial valve, × 2, showing a modestly developed median septum and strong anderidia, hypotype USNM 153742a; 45, 46, interior of another brachial valve, × 1, × 2, showing a strongly developed median septum, hypotype USNM 153742b; 47, exterior of the pedicle valve, × 1, hypotype USNM 153742c; 48, interarea of the preceding specimen, × 2. [Bone Spring Formation, AMNH 631.]

Dyoros (*Tetragonetes*) *subquadratus*, new species: 33–37, Dorsal, anterior, side, posterior, and ventral views of a small individual, × 1, paratype USNM 151988d. [Cherry Canyon Formation (Getaway Member), USNM 728 = AMNH 512.]

"*Chonetes*" *verneuilianus* R. E. King (not Norwood and Pratten) = *Dyoros?* species: 38, dorsal view of a complete specimen, × 1, figured specimen YPM 10792; 39–43, dorsal, posterior, anterior, ventral, and side views of the preceding specimen, × 2, (see *Chonetinella* for discussion). [Lenox Hills Formation, R. E. King locality 75.]

Dyoros (*Dyoros*) *hillanus* (Girty): 49–53, Posterior, anterior, dorsal, ventral, and side views of a complete specimen, × 1, hypotype USNM 153743a; 54, dorsal view of the preceding specimen, × 2; 55, interior of a pedicle valve, × 1, hypotype USNM 153743b; 56, 57, dorsal and side views of a small specimen, × 1, hypotype USNM 153743c. [Bell Canyon Formation (Lamar Member), USNM 728p.]

Dyoros (*Dyoros*) *intrepidus*, new species: 58, Exterior of an alate pedicle valve, × 1, paratype USNM 153744a; 59, interior of the preceding specimen, × 2; 60, exterior of a brachial valve, × 1, paratype USNM 153744b; 61, interior of the preceding brachial valve, × 2, showing anderidia and median septum; 62, interarea of a nearly complete specimen, × 3, showing the pseudodeltidium and chilidium, paratype USNM 153744c. [Bell Canyon Formation (Rader Member), USNM 740a.]

PLATE 498.—*Rugaria*, *Leurosina*, *Dyoros* (*Tetragonetes*), "*Chonetes*,"
and *Dyoros* (*Dyoros*)

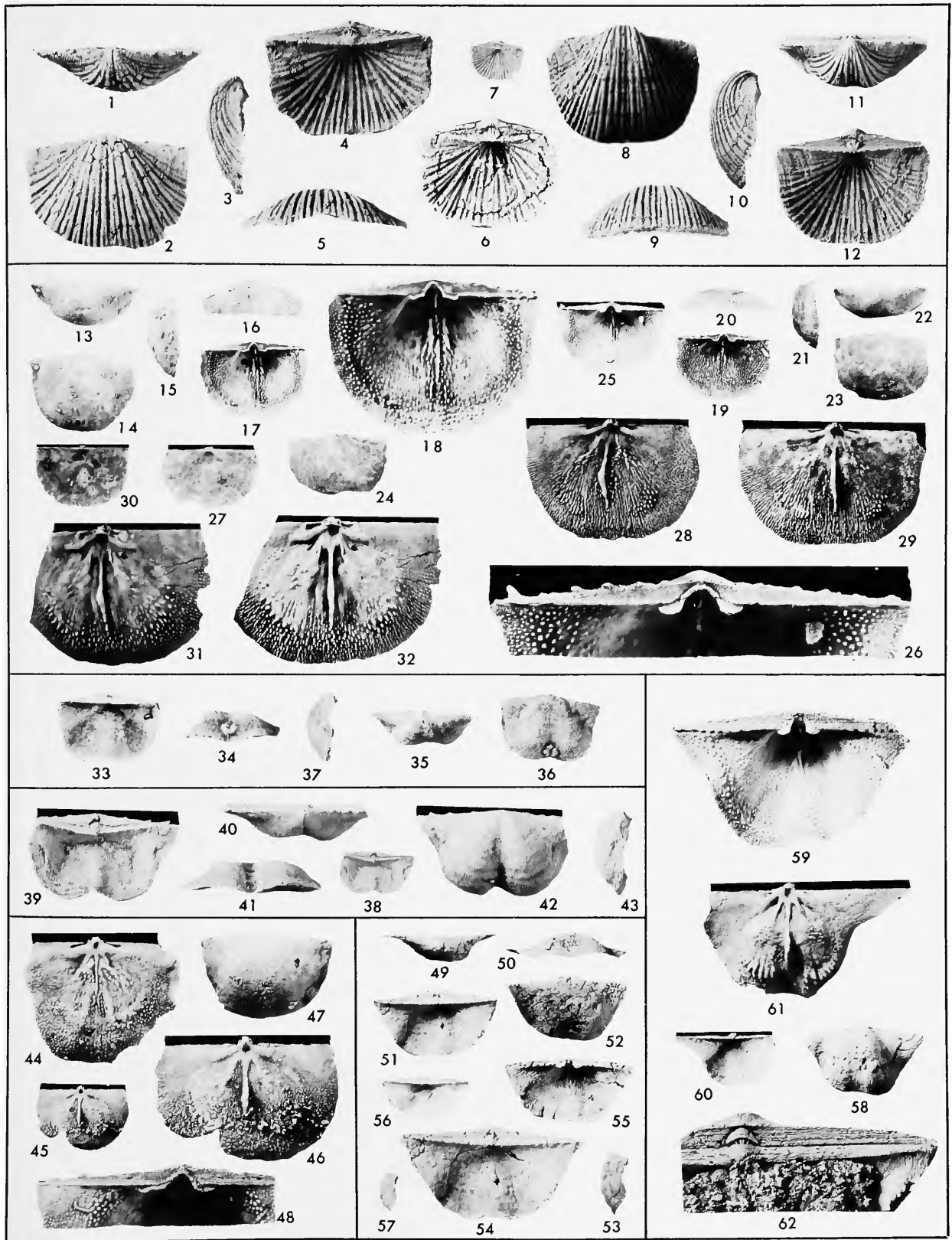


PLATE 499

Dyoros (Tetragonetes) and Rugaria

Dyoros (Tetragonetes) complanatus, new species: 1–5, Dorsal, posterior, anterior, side, and ventral views of a complete specimen, × 1, paratype USNM 152017b; 6, dorsal view of two immature specimens, × 1, paratypes USNM 152017i, f; 7–11, dorsal, anterior, posterior, side, and ventral views of a paratype, × 1, USNM 152017a; 12, dorsal view of another paratype, × 1, USNM 152017d; 13, interior of the pedicle valve, × 2, paratype USNM 152017k; 14, interior of brachial valve, × 2, showing anderia, paratype USNM 152017–1; 15, 16, laterally tilted and interior views of another brachial valve, × 2, paratype USNM 152017m; 17, posterior view of the cardinal process, × 4, of the preceding specimen. [Cherry Canyon Formation (Getaway Member), USNM 732.]

Dyoros (Tetragonetes) giganteus, new species: 18–22, Dorsal, anterior, posterior, side, and ventral views of the holotype, × 1, USNM 152032a; 23, 24, ventral and interior views of a pedicle valve, × 1, paratype USNM 152032b; 25, ventral view of a small specimen, × 1, paratype USNM 152032c. [Cathedral Mountain Formation, USNM 708u.]

26–28, Interior, side, and ventral view of a large pedicle valve, × 1, paratype USNM 153745. [Cathedral Mountain Formation, USNM 735c.]

29, Ventral view of another pedicle valve, × 1, paratype USNM 152031a; 30, interior of the preceding specimen, × 1.5. [Cathedral Mountain Formation, USNM 702b.]

31, Interior of the brachial valve, × 2, showing anderia and thin median septum, paratype USNM 153746. [Cathedral Mountain Formation, USNM 721u.]

32, Ventral view of a small pedicle valve, × 1, paratype USNM 152029. [Cathedral Mountain Formation, USNM 702.]

Dyoros (Tetragonetes) lateralis, new species: 33–37, Ventral, anterior, posterior, side, and dorsal views, × 1, of the holotype USNM 152798a. [Cathedral Mountain Formation, USNM 711q.]

Dyoros (Tetragonetes) planus, new species: 38–42, Dorsal, side, anterior, posterior, and ventral views of a complete specimen, × 1, paratype USNM 152008c; 43, dorsal view of two immature specimens, × 1, paratypes USNM 152008i, h; 44–48, dorsal, posterior, side, anterior, and ventral views of the paratype, × 1, USNM 152008a; 49, posterior view of the interarea of the preceding paratype, × 4, showing the cardinal process and pseudodeltidium; 49–53, ventral, posterior, anterior, side, and dorsal views, × 1, of a paratype USNM 152008e; 54–58, ventral, side, anterior, posterior, and dorsal views, × 1, of the holotype USNM 152008b; 59, dorsal view of another paratype, × 2, USNM 152008j; 60, interarea of the preceding specimen, × 3, showing the cardinal process and pseudodeltidium; 61, interior of the pedicle valve, × 2, paratype USNM 152008–1; 62, interior of the brachial valve, × 2, showing delicate endospines and septum, paratype USNM 152008m; 63, posterior view of the preceding paratype × 4, showing the cardinal process; 64, interior of another brachial valve, × 2, showing anderia, paratype USNM 152008n. [Cathedral Mountain Formation, USNM 711q.]

Dyoros (Tetragonetes) tetragonus, new name (for *Chonetes quadratus* R. E. King): 66, 68, Ventral and side views of the holotype, YPM 10830; 67, ventral view of the holotype, × 2. [Kaibab Formation, Bass Ranch, Grand Canyon, Arizona.]

Dyoros (Tetragonetes) cf. D. (T.) tetragonus, new name: 69, Ventral view of a small specimen, × 1, figured specimen YPM 10833 (R. E. King, plate 9: figure 10). [Word Formation (Appel Ranch Member), R. E. King locality 247.]

Rugaria hessensis (R. E. King): 70, 71, Exterior and interior of a brachial valve, × 2, hypotype USNM 153747. [Cathedral Mountain Formation, USNM 721u.]

PLATE 499.—*Dyoros* (*Tetragonetes*) and *Rugaria*

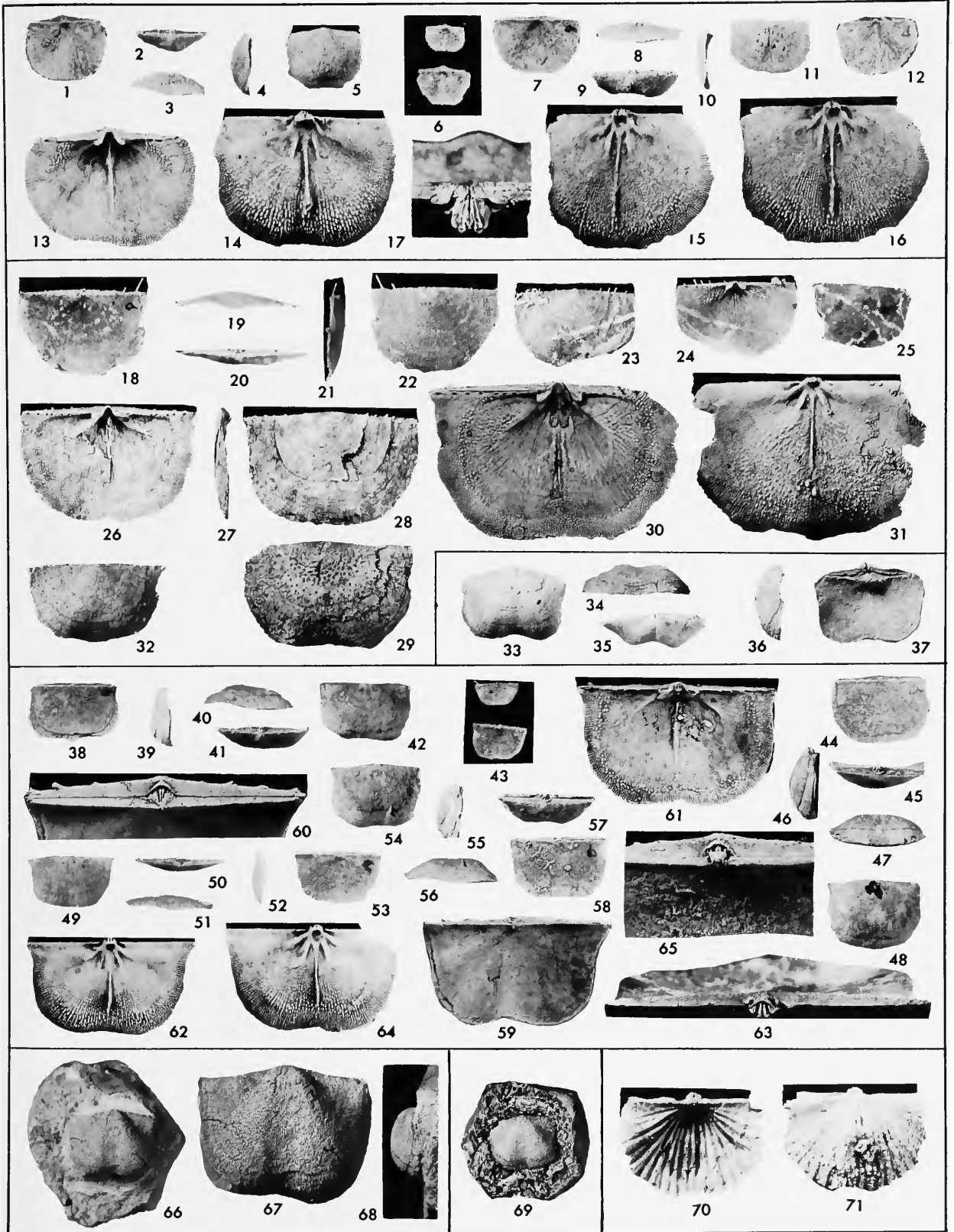


PLATE 500

Chonetinella, *Dyoros* (*Dyoros*), and *Leurosina*

Chonetinella crassiparva, new species: 1, Dorsal views of two specimens, $\times 1$, holotype (top) and paratype USNM 151883b, a; 2, dorsal view of two more paratypes, $\times 1$, USNM 151883e, d; 3, ventral, anterior, side, posterior, and dorsal views, $\times 2$, holotype (top) and paratype USNM 151883a; 4, dorsal, posterior, side, anterior, and ventral views, $\times 2$, paratypes USNM 151883e (top) and 5, 6, dorsal and side views, $\times 4$, of paratype USNM 151883a; 7, 8, dorsal and side views, $\times 4$, of the holotype; 9, interior of the pedicle valve, $\times 2$, paratype USNM 151882a; 10, interior of the brachial valve, $\times 4$, paratype USNM 151882b. [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

Chonetinella species 2: 11, 12, Exterior of two pedicle valves, $\times 3$, figured specimens USNM 152790a, b (for additional views, see plate 480: figure 36). [Neal Ranch Formation (top 15 feet of bed 2 of P. B. King), USNM 701.]

Chonetinella victoriana (Girty): 13, 14, Interior and posterior views of a brachial valve, $\times 3$, hypotype USNM 153683-l; 15, 16, posterior and interior views of another brachial valve, $\times 3$, showing anderidia, paratype USNM 153683f; 17-19, laterally tilted, posterior, and interior views of a third brachial valve, $\times 3$, showing anderidia and short median septum, paratype USNM 153683k. [Bone Spring Formation, USNM 728f.]

Dyoros (*Dyoros*) *extensiformis*, new species: 20-24, Ventral, posterior, dorsal, side, and anterior views, $\times 1$, of the holotype, USNM 151972a; 25-29, posterior, ventral, dorsal, side and anterior views, $\times 1$, of a small paratype USNM 151972b; 30, dorsal view of the posterior of the preceding paratype, $\times 3$, showing the cardinal process; 31, interior of the brachial valve, $\times 2$, paratype USNM 151972d; 32, interior of the pedicle valve, $\times 2$, paratype USNM 151972e. [Road Canyon Formation, USNM 702c.]

Leurosina sinesulca (Stehli): 33, Exterior of a pedicle valve, $\times 1$, hypotype USNM 153751a; 34, interior of the preceding specimen, $\times 2$; 35, 36, exterior, $\times 1$, and interior, $\times 2$, of another pedicle valve, hypotype USNM 153751b; 37, 38, interior and laterally tilted views of a brachial valve, $\times 2$, showing serrate median septum and anderidia, hypotype USNM 153751c; 39, posterior of the preceding specimen, $\times 4$, showing the cardinal process; 40, exterior of the preceding specimen, $\times 1$. [Bone Spring Formation, USNM 728e.]

Chonetinella ciboloensis, new species: 41, Ventral, posterior, side, anterior, and dorsal views, $\times 1$, of the paratype USNM 153752a (top) and holotype USNM 153752b; 42-45, ventral, side, anterior, and dorsal views of the paratype, $\times 2$; 46-49, anterior, side, dorsal and ventral views of the holotype, $\times 2$. [Cibolo Formation (Breccia Zone of Udden), AMNH 703.]

PLATE 500.—*Chonetinella*, *Dyoros* (*Dyoros*), and *Leurosina*

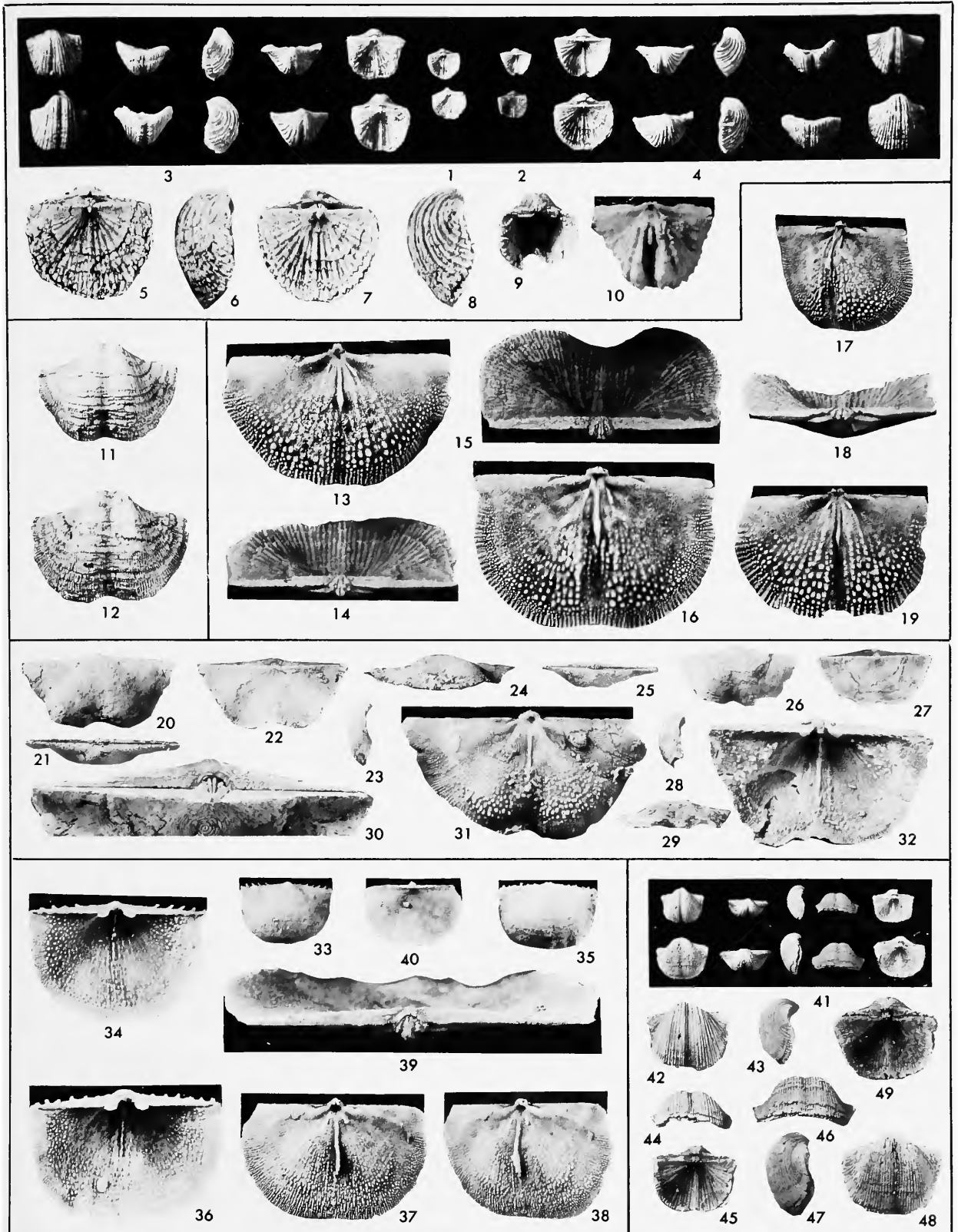


PLATE 501

Dyoros (Dyoros), Chonetinella, and Micraphelia

Dyoros (Dyoros), transversus, new species: 1, Dorsal view of a complete specimen, $\times 1$, paratype USNM 153705a; 2, interior of the pedicle valve, $\times 1.5$, showing lateral thickenings, paratype USNM 153705b; 3, 4, interior of the brachial valve, $\times 1$, $\times 1.5$, showing anteriorly thickened median septum and small anderidia, paratype USNM 153705c. [Road Canyon Formation, USNM 732j.]

Chonetinella gerontica, new species: 5–9, Dorsal, ventral, posterior, anterior, and side views of a complete specimen, $\times 1$, holotype USNM 153753a; 10–14, posterior, anterior, ventral, side, and dorsal views of a damaged specimen, $\times 1$, paratype USNM 153753b; 15, dorsal view of the preceding, $\times 2$; 16–18, side, ventral, and dorsal views of a small specimen, $\times 1$, paratype USNM 153753c; 19–21, anterior, posterior, and ventral views of a well formed pedicle valve, $\times 1$, paratype USNM 153753d; 22, ventral view of the preceding specimen, $\times 2$; 23, 24, interior of two brachial valves, $\times 2$, showing anderidia and only a trace of a median septum, paratypes USNM 153753e, f. [Road Canyon Formation, USNM 732j.]

Micraphelia subalata, new species: 25, Posterior, ventral, side, anterior, and dorsal views of two complete specimens, $\times 1$, holotype USNM 151890b (top) and paratype USNM 151890k; 26–28, side, dorsal, and anterior views of the holotype, $\times 2$; 29–31, side, dorsal, and anterior views of the paratype, $\times 2$. [Bell Canyon Formation (Rader Member), AMNH 410.]

Dyoros (Dyoros) convexus, new species: 32–36, Ventral, posterior, side, dorsal, and anterior views of a strongly alate specimen, $\times 1$, paratype USNM 153754d; 37–41, ventral, side, posterior, anterior, and dorsal views of an obese adult, $\times 1$, paratype USNM 153754a; 42–46, posterior, anterior, dorsal, ventral, and side views of a paratype, $\times 1$, USNM 153754b; 51, interarea of the preceding specimen, $\times 4$, showing the chilidium and pseudodeltidium; 47, 48, dorsal view of another alate specimen, $\times 1$, $\times 2$, paratype USNM 153754c; 49, 50, dorsal view of two small adults, $\times 1$, paratypes USNM 153754f, e; 52, 53, interior of two pedicle valves, $\times 1$, paratypes USNM 153754g, h; 54, interior of a brachial valve, $\times 1$, paratype USNM 153754i; 55–57, posteriorly tilted, interior, and laterally tilted views of the preceding paratype, $\times 2$, showing septum, strong endospines, and weak anderidia; 58, interior of another brachial valve, $\times 1$, paratype USNM 153754j; 59–61, laterally tilted, posteriorly tilted, and interior views of the preceding specimen, $\times 2$. [Word Formation (lens between that of 706b and the Appel Ranch Member), USNM 732c.]

PLATE 501.—*Dyoros (Dyoros)*, *Chonetinella*, and *Micraphelia*

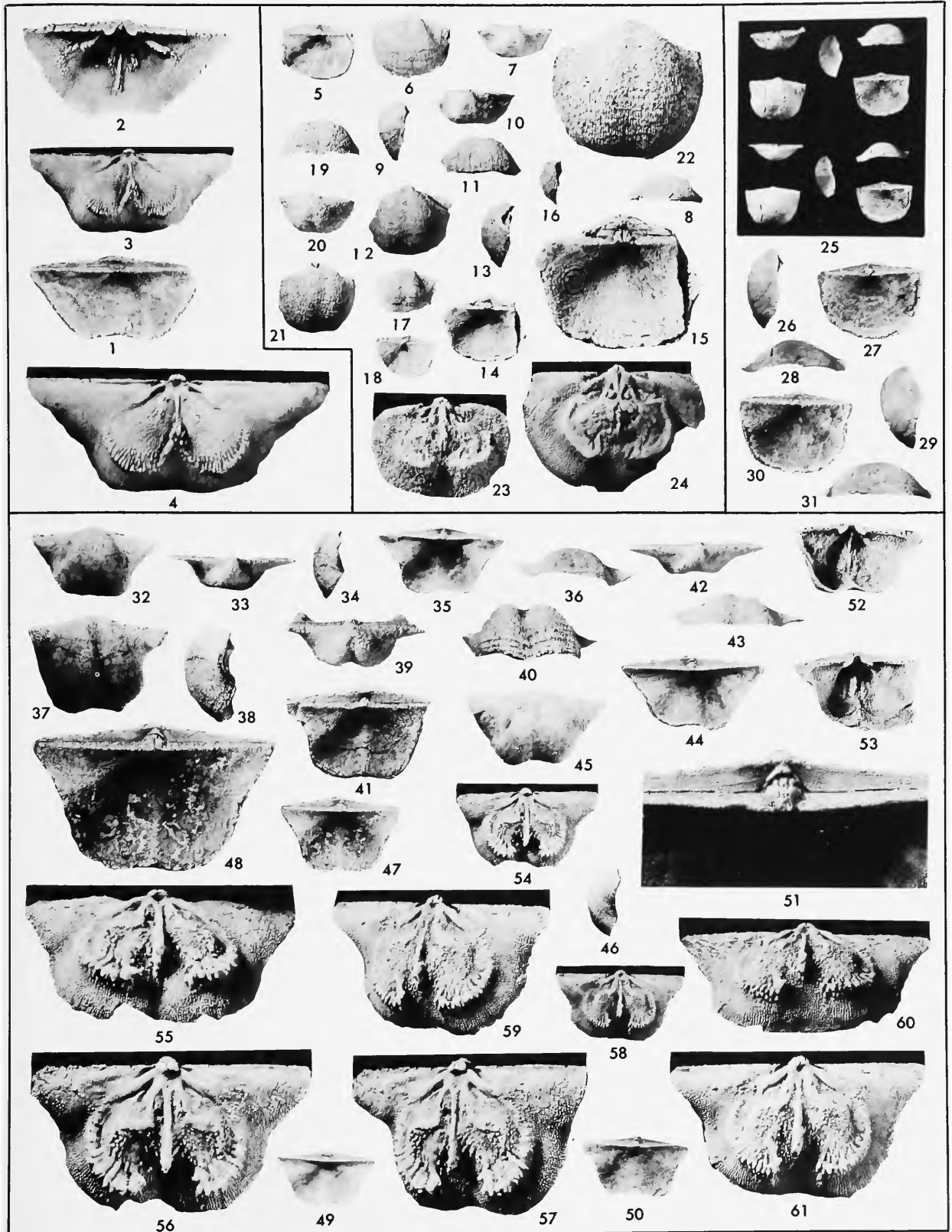


PLATE 502

Quadrochonetes, *Undulella*, *Dyoros* (*Lissosia*), *Dyoros* (*Dyoros*), and *Chonetinetes*

Quadrochonetes praecursor, new species: 1, Ventral, posterior, side, anterior, and dorsal views of four specimens, $\times 1$, paratypes (from top) USNM 152088d, c, b, and holotype USNM 152088a (bottom); 2, dorsal view of the holotype, $\times 3$; 3-5, dorsal views, $\times 3$, of paratypes USNM 152088b-d; 6-8, interior of three pedicle valves, $\times 3$, paratypes USNM 152088e-g; 9, interior of a brachial valve, $\times 3$, paratype USNM 152088h; 10, 11, interior and posterior views of another brachial valve, $\times 3$, paratype USNM 152088i; 12, 13, interior and posterior views of a third brachial valve, $\times 3$, paratype USNM 152088k. [Bone Spring Formation, AMNH 631.]

Quadrochonetes girtyi Stehli: 14, Dorsal view of six specimens of small size, $\times 1$, hypotypes (from top left) USNM 152091i, h, g, f, c, b; 15, ventral view of three specimens preserving some of their spines, $\times 1$, hypotypes USNM 153748a-c; 16, 17, exterior of a brachial valve, $\times 1$, $\times 2$, hypotype USNM 153721f; 18, 19, exterior of another brachial valve, $\times 1$, $\times 2$, hypotype USNM 153721d; 20-24, dorsal, posterior, ventral, side, and anterior views of a complete specimen preserving some of its spines, $\times 2$, hypotype USNM 152091c; 25-29, posterior, anterior, side, dorsal, and ventral views of a large specimen, $\times 2$, hypotype USNM 152091b; 30, 31, ventral view, $\times 1$, of two hypotypes USNM 153721h and 152091d; 32, ventral view of a large specimen, $\times 2$, hypotype USNM 153721c; 33, ventral view, $\times 2$, of another hypotype USNM 152091k (for additional views of this species, see plate 491). [Bone Spring Formation, USNM 728f.]

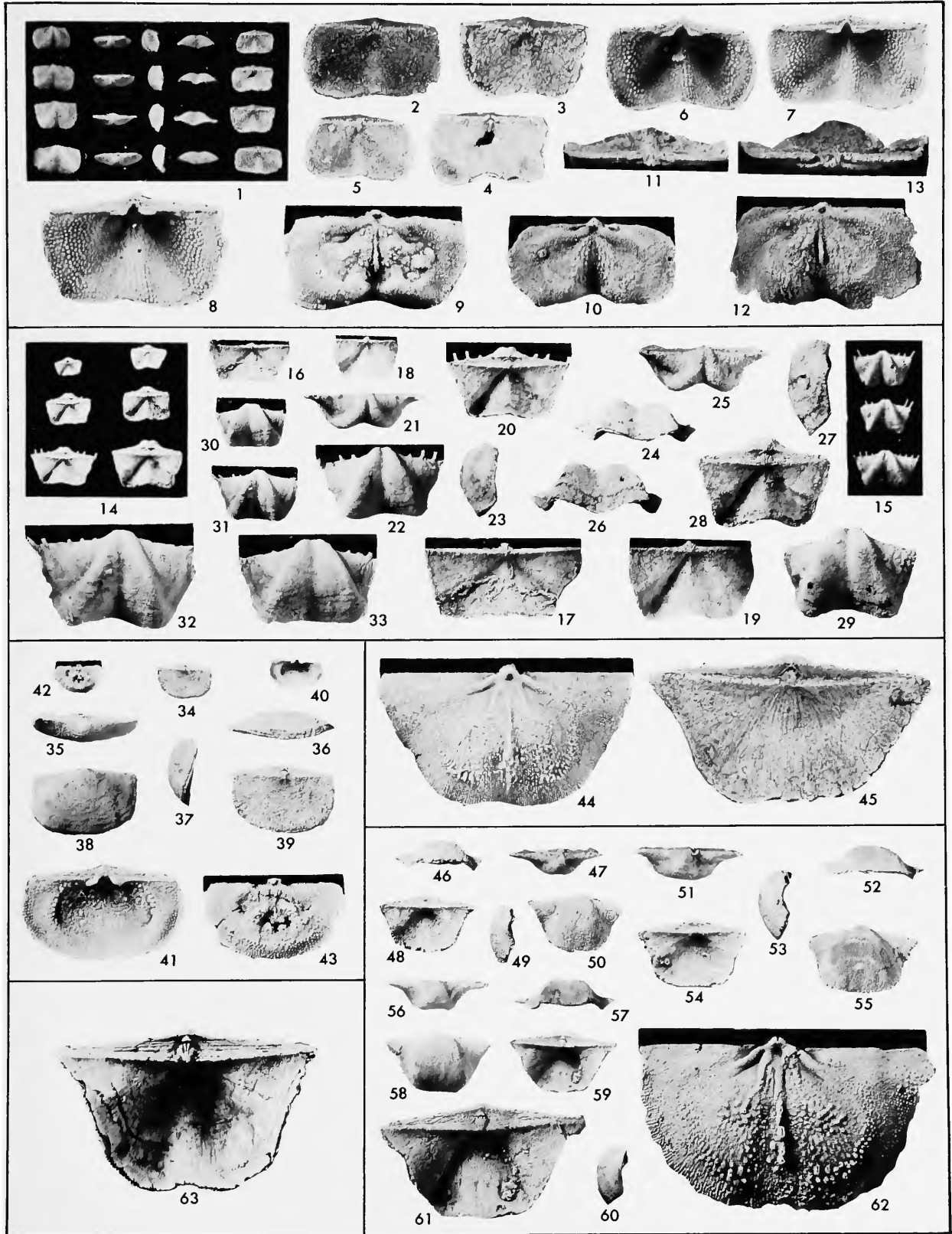
Undulella matutina, new species: 34, Dorsal view of a complete specimen, $\times 1$, holotype USNM 153749a; 35-39, posterior, anterior, side, ventral, and dorsal views of the holotype, $\times 2$; 40, 41, interior of the pedicle valve, $\times 1$, $\times 3$, paratype USNM 153749b; 42, 43, interior of the brachial valve, $\times 1$, $\times 2$, paratype USNM 153749c. [Road Canyon Formation, USNM 732j.]

Dyoros (*Lissosia*) *concauus*, new species: 44, Interior of the brachial valve, $\times 2$, paratype USNM 153707a; 45, dorsal view of a complete specimen, $\times 2$, showing radial ornament, holotype USNM 152144a (for additional views of the holotype, see plate 488: figures 1-5). [Word Formation (Willis Ranch Member-lower), USNM 706.]

Dyoros (*Dyoros*) *vulgaris*, new species: 46-50, Anterior, posterior, ventral, side, and dorsal views of an alate specimen, $\times 1$, holotype USNM 153750a; 51-55, posterior, anterior, side, ventral, and dorsal views of another complete specimen, $\times 1$, paratype USNM 153750b; 56-60, posterior, anterior, ventral, dorsal, and side views of a third complete, alate individual, $\times 1$, paratype USNM 153750c; 61, dorsal view of the preceding specimen, $\times 2$; 62, interior of the brachial valve, $\times 3$, showing sparse endospines and median septum, paratype USNM 153750d (for pedicle valve interior, see plate 42: figure 16). [Road Canyon Formation, USNM 732j.]

Chonetinetes varians, new species: 63, Dorsal view of a complete specimen, $\times 4$, holotype USNM 153677a (for additional views see plate 477: figures 49-53). [Bell Canyon Formation (Hegler Member), USNM 732a.]

PLATE 502.—*Quadrochonetes*, *Undulella*, *Dyoros (Lissosia)*, *Dyoros (Dyoros)*,
and *Chonetinetes*



Publication in *Smithsonian Contributions to Paleobiology*

Manuscripts for serial publications are accepted by the Smithsonian Institution Press, subject to substantive review, only through departments of the various Smithsonian museums. Non-Smithsonian authors should address inquiries to the appropriate department. If submission is invited, the following format requirements of the Press will govern the preparation of copy.

Copy must be typewritten, double-spaced, on one side of standard white bond paper, with 1½" top and left margin, submitted in ribbon copy with a carbon or duplicate, and accompanied by the original artwork. Duplicate copies of all material, including illustrations, should be retained by the author. There may be several paragraphs to a page, but each page should begin with a new paragraph. Number consecutively all pages, including title page, abstract, text, literature cited, legends, and tables. The minimum length is 30 pages, including typescript and illustrations.

The *title* should be complete and clear for easy indexing by abstracting services. Taxonomic titles will carry a final line indicating the higher categories to which the taxon is referable: "(Ammonoidea: Goniatitidae)." Include an *abstract* as an introductory part of the text. Identify the *author* on the first page of text with an unnumbered footnote that includes his professional mailing address. A *table of contents* is optional. An *index*, if required, may be supplied by the author when he returns page proof.

Two *headings* are used: (1) text heads (boldface in print) for major sections and chapters and (2) paragraph sideheads (caps and small caps in print) for subdivisions. Further headings may be worked out with the editor.

In *taxonomic keys*, number only the first item of each couplet; if there is only one couplet, omit the number. For easy reference, number also the taxa and their corresponding headings throughout the text; do not incorporate page references in the key.

In *synonymy*, use the short form (taxon, author, date:page) with a full reference at the end of the paper under "Literature Cited." Begin each taxon at the left margin with subsequent lines indented about three spaces. Within an entry, use a period-dash (.—) to separate each reference. Enclose with square brackets any annotation in, or at the end of, the entry. For *references within the text*, use the author-date system: "(Jones, 1910)" and "Jones (1910)." If the reference is expanded, abbreviate the data: "Jones (1910:122, pl. 20: fig. 1)."

Simple *tabulations* in the text (e.g., columns of data) may carry headings or not, but they should not contain rules. Formal *tables* must be submitted as pages separate from the text, and each table, no matter how large, should be pasted up as a single sheet of copy.

Use the *metric system* instead of, or in addition to, the English system.

Illustrations (line drawings, maps, photographs, shaded drawings) can be intermixed throughout the printed text. They will be termed *Figures* and should be numbered consecutively; however, if a group of figures is treated as a single figure, the components should be indicated by lowercase italic letters on the illustration, in the legend, and in text references: "Figure 9*b*." If illustrations (usually tone photographs) are printed separately from the text as full pages on a different stock of paper, they will be termed *Plates*, and individual components should be lettered (Plate 9*b*) but may be numbered (Plate 9: figure 2). Never combine the numbering system of text illustrations with that of plate illustrations. Submit all legends on pages separate from the text and not attached to the artwork. An instruction booklet for the preparation of illustrations is available from the Press on request.

In the *bibliography* (usually called "Literature Cited"), spell out book, journal, and article titles, using initial caps with all words except minor terms such as "and, of, the." For capitalization of titles in foreign languages, follow the national practice of each language. Underscore (for italics) book and journal titles. Use the colon-parentheses system for volume, number, and page citations: "10(2):5-9." Spell out such words as "figures," "plates," "pages."

For *free copies* of his own paper, a Smithsonian author should indicate his requirements on "Form 36" (submitted to the Press with the manuscript). A non-Smithsonian author will receive 50 free copies; order forms for quantities above this amount with instructions for payment will be supplied when page proof is forwarded.

