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Lexicon of stratigraphic names used in southwestern New Mexico

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LEXICON OF STRATIGRAPHIC NAMES USED IN SOUTHWESTERN NEW MEXICO

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This lexicon lists alphabetically under Era headings, and discusses briefly, the stratigraphic names which have been used in southwestern New Mexico and adjacent portions of southeastern Arizona to be visited by the 16th Field Conference. The form used is as follows:

Unit name (formation or group)—system or period. Names printed entirely in capitals are currently accepted by the U.S. Geological Survey. Names printed in caps and lower case are used locally or have been recently proposed. Names preceded by a dagger (†) have either been abandoned by their authors, have been rejected by the U.S. Geological Survey, or have lapsed from use.

1) Areal distribution given in original description.
2) Reference in which unit was first defined or mentioned.
3) Type locality.
4) Short lithologic description and thickness at type locality or in the type area.
5) Age to stage; contacts; emending or redefining descriptions; additional information on areal distribution and thickness, lithology, and character of the beds in the area of the field conference.

PRECAMBRIAN

Granite Gap Granite—Precambrian

1) Extreme SE Ariz. area and extreme SW New Mexico
2) E. Gillerman, 1958, p. 9-12
3) At Granite Gap, where Highway 80 crosses Peloncillo Range
4) Holocrystalline, equigranular, med. gr., light pink to gray, with hypidiomorphic texture; 75% is anhedral qtz. and subhedral orthoclase; 5% albite, 10% microcline, 5-10% microperthite; 1-2% may be small biotite flakes; magnetite and sphene may be present; locally feldspar xtals may be 2 cm. in dia.
5) Overlain nonconf. by Bolsa Qtzite.

Rattlesnake Point Granite—Precambrian

1) SE Arizona
2) F. F. Sabins, Jr., 1957b, p. 1322
3) From vicinity of Emigrant Hills and Little Emigrant Canyon east to Rattlesnake Point, northern Chiricahua Mtns.
4) Coarse-gr. with granitic-porphyritic texture; abund. light-color euhedral feldspar phenocrysts 15 X 25 mm, carlsbad twinng; 20% clear anhedral qtz., 60% perthite, 10% albite, 10% ferromag. mins.
5) Overlain nonconf. by Bolsa Qtzite.

PALEOZOIC

ABO FORMATION—Permian

1) Cent. New Mexico
2) W. T. Lee, 1909, p. 12; redescribed by Needham and Bates, 1943, p. 1654-1657
3) Abo Canyon, S. end of Manzano Mountains, Socorro Co.
4) Dark red, purple, coarse-grained ss., cgl. at base, some sh., 300′ to 800′ thick.
5) Wolfcampian-Leonardian; lies conf. and gradat. on Bursum Fm., or disconf. on upper Madera Ls.; overlain conf. and gradat. by Yeso Fm. Abo is 1,400′ thick in north and thins abruptly to 250′ in the cent. Sacramento Mtns.; farther south is composed of two tongues separated by, and transitional with southward thickening, brackish-marine, Hueco Fm.; basal tongue is the Powwow Cgl. and upper tongue is Deer Mountain red sh. Widespread in New Mexico and in the subsurface of West Texas.

Alamogordo Member—Mississippian
see Lake Valley Formation

Aleman Formation (of Montoya Gp.) Upper Ordovician

1) S. New Mexico
2) V. C. Kelley and C. Silver, 1952, p. 60-62
3) Cable Canyon, Caballo Mtns., NW¼ sec. 10, T. 16. S., R. 4 W.
4) Alternat. chert and dol. in banded outcrop; chert weathers white, brown, black, is in irreg. bands 1″-3″; dol. dense to grained, med. to light gray.
5) Late Maysville to early Richmond; lies prob. disconf. on Upham dol.; overlain prob. disconf. by Cutter Fm.

Andrecito Member—Mississippian
see Lake Valley Formation

ARROYO PENASCO FORMATION—Mississippian

1) N. and Cent. New Mexico
2) A. K. Armstrong, 1955, p. 3, 6
3) SW¼ SE¼ sec. 5, T. 16 N., R. 1 E., Pinos and Penasco Canyons, Nacimiento Mtns.
4) Base 18′-20′ clean, calc. ss., interb. sh. and ls.; 31′ fine to coarse gr., gry. to br. ls.; 70′ lithog. to oolite, gry. med.-bedded ls. upper 10′ wh. chert (140′ max.)
5) Meramecian; unconf. on Precam., overlain disconf. by Log Springs Fm. or Sandia Fm. (Penn); farthest S. expos. in S. Sandia Mtns.

Bat Cave Formation—Lower Ordovician

1) S. New Mexico
2) V. C. Kelley and C. Silver, 1952, p. 45-52
3) N. side of Cable Canyon, Caballo Mtns; sec. 10, T. 16 S., R. 4 W.
4) Lower unit predom. biostromes and bioherms with blue-gray to buff ls. cgls., interbedded with thin to med. bedd. calcilutites; upper unit med. to thick-bedd. drk. to light gray ls.; dolo ls. and dol., predom. calcilutites with some calcarenite and calcirudite; brown chert occasionally in bands or nodules; local collapse breccia; 200′-300′ thick.
5) Middle to Upper Canadian; lies conf. on Sierrite Ls.; overlain unconf. by Cable Canyon Ss.

†Bella shale—Upper Devonian

1) SW New Mexico (Grant County)
2) C. R. Keyes, 1908, p. 7-21
3) Not designated
4) Green shales, no fossils; 60′ thick.
5) Lies on Silver shs. and underlies Berenda ls.; appears to be upper part of Percha shale (Wilmarth, 1938, p. 151).

Black Prince Formation—Up. Mississippian or Lower Pennsylvanian

1) SE Arizona
2) J. Gilluly, J. R. Cooper & J. S. Williams, 1954, p. 14-16
3) West slope of Gunnison Peak, NE¼ SW¼ sec. 4, T. 16 S., R. 23 E.
4) Med. bedd., fine-gr. sparsely fossilif. lss., with a 10′-20′ zone of red.-orange interb. lss. and sh. at base in Dragoon Mtns. and Gunnison Hills (may repre. in pt. a reworked residual soil and hiatus which vanishes to the SE); 100′-175′ thick.
5) Meramecian; lies unconf. on Escabrosa Gp. or conf. on Hachita Fm.; overlain unconf. by Cret. rocks. Unit is difficult to disting. from Hachita Fm., and may only be a western facies of the Meramec pt. of the Hachita Fm. Armstrong (1962) thinks best consid. a memb. of Hachita Fm.

BLISS SANDSTONE (FORMATION)—Upper Cambrian and Lower Ordovician

1) S. New Mexico
2) G. B. Richardson, 1904, p. 27
3) S. end of Franklin Mtns., El Paso, Texas
4) Massive to thin bedd. local cgls. and cross-bed. coarse ss., top glauconitic, cross-bedd., coarse-gr. ss.; dark brown, buff, gray and white; average 200′-300′ thick.
5) Croixian (Franconian & Trempealeauan stages) and basal Gasconadian; Lithology, espec. of upper half, extremely variable laterally and vertically, glauconite, ferrug. ss., oolitic hematite, shales, dolomitic ss. and brown dolomites and limestones all interbed. in sss.; local qtzites. thruout;—depositional hiati common; lies nonconf. on Precamb.; overlain conf. and gradat, or disconf. by basal El Paso beds; contact drawn arbitrarily on predom. of light colored dolomites. Flower, 1959, p. 58, proposes "to restrict the Bliss to the Early Canadian beds."

BOLSA QUARTZITE—Middle Cambrian

1) SE Arizona & extreme SW New Mexico
2) R. L. Ransome, 1904, p. 28-30
3) Bolsa Canyon, on SW side of Escabrosa Ridge, Bisbee Quad., Ariz.
4) Thin basal cgls., overlain by pebbly, x-bedded grits, grading up into med.-thin-bedd., fine to medium grained, sorted qtz. sands and qtzites, without feldspars: 400-600+′ thick.
5) Late Mid. Cambrian; lies with major unconf. on Precambrian; overlain conf. by Abrigo Ls.; a basal transg. sand, continues eastward into the Bliss Ss.

Box Member—late Upper Devonian
see Percha Shale

BURSUM FORMATION—Permian

1) Cent. New Mexico
2) R. H. Wilpolt, and others, 1946
3) SE¼ sec. 1, T. 6 S., R. 4 S., Socorro Co., (E.

R. Lloyd, 1949, designated a new type section in sec. 14, T. 2 N., R. 4 E).
4) Dark purple-red and green sh. interbed. with arkose, arkosic cgl. and gray ls.; locally a reworked rubbly nodular ls. at the base; 28′ to 234′ thick.
5) Late Virgilian and Early Wolfcampian; lies gradat. and transit. on arkosic mbr. of Madera Ls.; overlain grada. and transit. by Abo; local disconf. at base of clastic lenses of intertonguing terresterial to brackish-water red beds and of marine ls. with fusulinid fauna (*Triticites* and *Schwagerina*) of both Pennsylvanian and Permian aspect.

Caballero Formation—Mississippian

1) S. Cent. New Mexico
2) L. R. Laudon and A. L. Bowsher, 1941, p. 2116-2125
3) Upper end Deadman Canyon, Sacramento Mtns. in SC sec. 3, T. 17 S., R. 10 E.
4) Gray silty lss., ls. beds nodular, interbed. with soft gray shs. curving around nodules; upper part much more shly. than lower, ledge-forming ls. beds; little chert; 0-80′ thick.
5) Kinderhookian; lies unconf. on shs. of Dev. age; overlain unconf. by Lake Valley Fm.

Cable Canyon Sandstone—Middle Ordovician

1) S. New Mexico
2) V. C. Kelley & C. Silver, 1952, p. 58-59
3) Cable Canyon, Caballo Mtns., NW¼ sec. 10, T. 16 S., R. 4 W.
4) Coarse-gr., granulated ss. with dol. cement; unsorted small-pebble and granulite cgls. with some well sorted, med.-gr. ss.; 17′-35′ thick at type loc.
5) Trenton; lies unconf. on Bat Cave Fm.; overlain conf. and gradat. by Upham Dol.

Caloso Formation—Mississippian

1) Ladron Mtns., Socorro Co.
2) E. A. Noble, 1950, in V. C. Kelley and Caswell Silver, 1952, p. 86-87
3) Arroyo Caloso, Ladron Mtns.; T. 2 N., R. 2 W.
4) Ls. sim. to Kelly Ls., fossils in br. weather., cherty, gry. ls.; 85′ thick.
5) Earliest Osagian (Fern Glen equiv.); unconf. on Precam., overlain disconf. by Kelly Ls.; cent. N. Mex., correl. with lower pt. of Escabrosa Ls.

CANUTILLO FORMATION—Middle Devonian

1) W. Texas (Franklin and Hueco Mtns.)
2) L. H. Nelson, 1940, p. 157-172
3) Franklin Mtns. opposite Vinton, Texas
4) Light brown, cherty ls., thin beds of fossilif. gray ls., thin bed of dense thick sh. and top 40′ of black fissile sh.; 175′ thick
5) Cassadagan; lies unconf. on Fusselman Ls; overlain disconf. by Mississippian or younger ls.; Stevenson (1942) recog. 88′ in San Andres Canyon; Stevenson (1945) thinks upper 40′ of blk. sh. prob. equiv. of Ready Pay memb. of Percha; lower beds are renamed Onate and Canutillo Fm.; not recognized in New Mexico; Canutillo of Laudon and Bowsher, 1949, is not same lithic unit as describ. by Nelson.

†Chupadera formation—Permian

1) Cent. and E. New Mexico
2) E. H. Wells 1919, p. 10, 11, 17, 18; Darton, N. H., 1922, p. 176-182
3) Not designated
4) Interbed. gyp., lss. ,and shs. with a massive pink to yellow ss. at/or near base locally;—upper part pred. cream buff, blue gray ls. with gyp. beds; 1000′-1200′ thick.
5) Leonardian; lies usually conf. on Abo Ss; unconf. overlain by Triassic. Use of Chupadera fm. has been abandoned and rock units included in it are divided now into Yeso, Glorieta, and San Andres Fms., amenable to more detailed mapping following proposal of Needham and Bates, 1943.

COLINA LIMESTONE—Permian

1) SE Arizona and extreme SW New Mexico (Peloncillo & Big Hatchet Mtns.)
2) J. Gilluly, J. R. Cooper & J. S. Williams, 1954, p. 23-25
3) W. slope of Colina Ridge, Tombstone Hills, 4000′ S. of Horquilla Peak
4) Uniform dark lss., predom. dense to fine gr., no chert, large gastropods abundant, may weather medium to light gray, some thin x-bed. siltsts. in lower part; 633′ thick.
5) Wolfcampian; lies conf. on Earp Fm.; overlain conf. and gradat. by Epitaph Dol.

CONCHA LIMESTONE—Permian

1) SE Arizona and extreme SW New Mexico
2) J. Gilluly, J. R. Cooper and J. S. Williams, 1954, p. 29-30
3) E. end of Concha Ridge, Gunnison Hills, NW¼ sec. 28, T. 15 S., R. 23 E.
4) Lower 50′ of fine-gr., gray, calcar. ss. passing upward into beds of gray, medium-gr. ls., very fossilif. and with many irreg. chrt nodules,

weathering pale brown; large productids common; 130′ in type area to 600′.
5) Late Leonardian to Guadalupian: lies conf. on Scherrer Fm.; overlain unconf. by Lower Cret. beds. Gillerman, 1938, thinks Concha Ls. and Chiricahua Ls. of Stoyanow are same unit and latter name has priority; 1,367′ thick in Big Hatchet Mtns.

Contadero Formation—Upper Devonian

1) Cent. New Mexico (San Andres Mtns. local)
2) F. V. Stevenson, 1945, p. 239-241
3) S ½ sec. 8, T. 13 S., R. 4 E., 2,000′ N. of road thru Rhodes Pass, San Andres Mtns.
4) Carb. shs. and lss., gray, olive-brown and gray-green; top beds weather red; 0-70′ thick.
5) Prob. Chemung; lies appar. conf. on Sly Gap Fm; overlain unconf. by Mississippian lss.; may be a facies equiv. in age to Ready Pay member of Percha Sh. and a tongue in the Sly Gap Fm.; at type loc is now restricted to 45′ of carbon shs; becoming limy at top; upper beds are now Thoroughgood and Rhodes Canyons Fms.

Cooks Formation—Canadian (Lower Ordovician)

1) S. New Mexico
2) R. H. Flower, 1964, p. 148
3) N. end of the Cooks Range, Sierra Co.
4) Limestones of the first Endoceroid zone
5) Middle Canadian; lies on Sierrite Limestone; overlain by Victorio Formation.

Cutter Formation (of Montoya Gp.)—Upper Ordovician

1) S. New Mexico
2) V. C. Kelley and C. Silver, 1952, p. 62-64
3) Cable Canyon, Caballo Mtns., NW¼, sec. 10, T. 16 S., R. 4 W.
4) Light gray-weathering, unfossilif. claystone, ls., calcitic dol. and dol., sublith. with conchoidal fracture; chert in occas. black bands 2-6 inches thick; 50′-100′ thick
5) Late Richmond; lies prob. disconf. on Aleman; overlain disconf. by Fusselman Ls.; is same as the Valmont Dolomite of Pray.

EARP FORMATION—Pennsylvanian & Permian

1) SE Ariz. and extreme SW New Mex (Hidalgo Co.)
2) J. Gilluly, J. R. Cooper, and J. S. Williams, 1954, p. 18-23
3) From saddle S. of Earp Hill up to a conspicu. mottled pink to gray ls; then rest of section about ½ mile E. on the same slope.
4) Thin shaly ls. and interbed. reddish shs. at base; middle pt. a few beds of ls., sh., pebble cgl. and sss.; upper pt. massive lss. with red sh. partings and with a few beds of brilliant red or orange dols., 1′-6′ thick beds; cherty with a few thin sss.; top most of these dolos. forms top of Earp; 600′-1,126′ thick.
5) Virgilian and Wolfcampian; lies conf. on Horquilla Ls; overlain conf. and transit. by Colina Ls.

EL PASO GROUP (LIMESTONE)—Lower Ordovician

1) S. New Mexico
2) G. B. Richardson, 1904, p. 29: restricted to beds of Lower Ordovician, G. B. Richardson, 1908.
3) S. end of Franklin Mtns., El Paso, Texas
4) Gray, massive to thin-bedd. mag. lss., aren. at base; irregular chert bands; 1590′ thick.
5) Canadian (Tremadocian & Arenigian); lies conf. and gradat. on Bliss Ss.; overlain disconf. by Montoya Gp.; local stromatolite biostromes and sponge reefs common; thin bedd. calcilutites; dark gray-black, oolitic limestone, a marker bed in upper pt. Five faunal zones and nine formational units recognized by Flower, 1964, p. 148-9.

EPITAPH DOLOMITE—Permian

1) SE Ariz. and extreme SW New Mex. (Big Hatchet Mtns.)
2) J. Gilluly, J. R. Cooper and J. S. Williams, 1954, p. 25-27
3) E. dip slope of Colina Ridge, W. side of Epitaph Gulch, 1 mi. S. of Horquilla Peak
4) Lower memb., 200′ of medium to light gray dol. with knots of chert and granules of silica on bedding planes, partings of red sh. near top; overlain by sandy lss. or limy ss. with interbed. of maroon sh; some beds of intraformat. breccias; upper memb. intercal. dol., ls., red sh. and thin sandy layers; 783′-1500′ thick.
5) Late Wolfcampian to Leonardian; lies conf. and transit. on Colina Ls; overlain with marked unconf. by Lower Cret. beds in type area, elsewhere overlain conf.? by Scherrer Fm.; base arbitrarily placed at base of first massive dol. above zone of dolomitized ls. at top of Colina Ls.; sparse fauna indicates equiv. to lower Kaibab.

ESCABROSA GROUP (FORMATION)—Mississippian

1) SE Arizona and extreme SW New Mexico
2) F. L. Ransome, 1904, p. 42-44
3) Escabrosa Ridge, Bisbee Quad., Ariz.
4) Thick-bedd., white to light gray, coarse-gr., crinoidal lss., a few beds of fine-gr., drk. gray lss. in lower pt., no sss. or shs.; chert absent in lower part, a few thin, continuous chert bands in middle part, and nodular chert common in upper part; aver. thick. 750′.
5) Osagian and Meramecian; lies appar. conf. on Martin Ls. or Percha Sh.; overlain conf. and transit. by Paradise Fm.; eastward in New Mexico nodular ls. and interbed. ls. and sh. appear in basal part; lower 300′ shows cyclic deposition in Big Hatchet Mtns.

Florida Formation—Canadian (Lower Ordovician)

1) S. New Mexico
2) R. H. Flower 1964, p. 149
3) Florida Mtns., south of Deming, New Mexico
4) Dark calcarenites and some calcilutites with orange-weathering silts, which are absent at type locality.
5) Late Upper Canadian; lies on Scenic Drive Fm; overlain by Montoya Gp.

FUSSELMAN LIMESTONE (DOLOMITE)—Silurian

1) S. New Mexico and W. Texas
2) C. B. Richardson, 1908 p. 476-480
3) S. end of Franklin Mtns., El Paso, Texas
4) Massive-bedd. dense to coarse xtall., buff to drk gray, cherty mag. ls. or dol.; 1000′+ thick; thins to N. and W. due to erosion and non-deposition of lower beds.
5) Alexandrian and Niagaran; lies unconf. on top units of Montoya; overlain disconf. by Devon. thru Perm. beds.

GLORIETA SANDSTONE—Permian

1) Cent. N. New Mexico
2) C. R. Keyes, 1915, p. 257, 262
3) South-central part of T. 15 N., R. 12 E., on Glorieta Mesa, 1 mile W. of Rowe, San Miguel Co. as designated by Needham and Bates (1943).
4) White-gray, medium-coarse-gr., qtzitic. ss., beds 2′-6′ thick, cliff-former; at the base is a 20-foot thick buff-white, thin-bedd. ss.; 12′ to 300′ thick.
5) Leonardian; lies conf. on the Yeso Fm.; overlain conf. by San Andres Fm. Occurs in central and southeastern New Mexico, the subsurface of West Texas; is stratigraphic equiv. of Hondo Ss. Mbr.

†Gym limestone—Permian

1) SW New Mexico
2) N. H. Darton, 1916, p. 19, 35
3) Gym Peak, Florida Mtns., where all exposures are of the Fusselman Fm. (Sil.)
4) Light gray, predom. massive-bedd. ls, with many brecciated beds; lower pt. local. much darker, upper pt. light color; 700′-1000′ thick.
5) Manzano, i.e. lower Permian; lies unconf. on Magdalena, Lake Valley and older fms; unconf. overlain by Lobo Fm. or Tert. agglom. Later field work in this region has failed to recognize a Permian ls. unit as defined by Darton; the name is rarely used and should be discarded.

Hachita Formation—Mississippian

1) SW New Mexico and extreme SE Arizona
2) A. K. Armstrong, 1962, p. 10-13
3) S. end of Blue Mtn., Chiricahua Mtns., Ariz.; SW¼ sec. 20, T. 26 S., R. 30 E.
4) Massive-bedd. cliff-forming encrinites; lower ⅔ light gray, unbedd., upper ⅓ darker, massive bedd., largely encrinites but also brachiopod and bryozoan debris; 250′-350′ thick
5) Upper Osagian thru Meramecian: lies conf. or with slight disconf. on Keating Fm.; overlain conf. and transit. by Paradise Fm.

HELMS FORMATION—Mississippian

1) W. Texas (Hueco Mtns)
2) J. W. Beede, 1918, p. 30, 36
3) 1 mi. S. of Helms Peak, Hueco Mtns., Texas
4) Green shs., shaly ss. and impure lss. containing Chester fossils as restricted by Laudon & Bowsher, 1949, p. 19; 98′ aver. thick.
5) Chesterian; lies unconf. on Rancheria Fm; overlain unconf. by Pennsyl. fms.; orig. Helms Gp. included all beds between Sil. and Penn. as defined by Beede.

HORQUILLA LIMESTONE—Pennsylvanian

1) SE Ariz. and extreme SW New Mex. (Hidalgo Co.)
2) J. Gilluly, J. R. Cooper & J. S. Williams, 1954, p. 16-18
3) Eastern spur of Horquilla Peak, about 1 mi. SE of Ajax Hill, in Tombstone Hills, Ariz.
4) Basal zone of ss. or thin-bedd. ls.; overlain by thin to med.-bedd. blue-gray lss. with a few red-weathering shaly lss. in upper pt.; most ls. is dense and pinkish-gray; thicker beds are crinoid-

al debris; abundant small fusulinids; black and pink chert nodules; 1200′-1350′ thick.
5) Morrowan, Derryan, Desmoinesian, and basal Virgilian; lies disconf. on Paradise Fm. or Escabrosa Gp; overlain conf. and transit. by Earp Fm. (see Ross & Sabins, 1965, p. 177).

HUECO FORMATION (LIMESTONE)—Permian
1) W. Texas and S. New Mexico
2) G. B. Richardson, 1904, p. 32-38
3) West facing scarp of Hueco Mtns., El Paso Co., Texas
4) Thick to medium bedd., light gray fossilif. lss. grading laterally northward into two red-bed tongues of the Abo; lower, Powwow cgl. near base, and an upper, Deer Mtns. red sh. memb. near top. 750′-2000′ thick.
5) Wolfcampian; lies unconf. on Penn. beds; overlain unconf. by Bone Spring Ls.

José Formation—Canadian (Lower Ordovician)
1) S. New Mexico
2) R. H. Flower, 1964, p. 148
3) N. end of the Cooks Range, Sierra Co.
4) Drk. gray to black oolitic limestone.
5) Middle Canadian; lies on Victorio Fm; overlain by Mud Springs Mountain Fm.

KAIBAB LIMESTONE—Permian
1) N. Arizona
2) N. H. Darton, 1910, p. 21, 28, 32
3) Kaibab Gulch, 8 mi. SW of Paria, Utah
4) Dense, gry., cherty ls.; 820′ thick
5) Leonardian; lies conf. and gradat. on Toroweap.; unconf. overlain by Moenkopi; S. Utah and SE Nev.; prob. equiv. of part of San Andres Ls.

Keating Formation—Mississippian
1) SW New Mexico and extreme SE Arizona
2) A. K. Armstrong, 1962, p. 6-10
3) SE side of Blue Mtn., Chiricahua Mtns., Ariz.; SW¼ sec. 20, T. 26 S., R. 30 E.
4) Interbedd. calcilutites and encrinites; lower memb. of basal 50′ of sandy, clayey encrinites overlain by medium to thick bedd. encrinites, oolites and calcilutites intercalat. lateral. and vertical., with a massive, dark gray ls. near top carrying corals and brachiopods silicif. to brown chert; upper memb. thin-bedd. calcilutites and encrinities with 20%-40% consist. of long, lenticular chert bodies; 350′-600′ thick.
5) Lower to Middle Osagian; lies unconf. on Upper Dev. beds; overlain conf. or with slight disconf. by Hachita Fm.

KELLY LIMESTONE—Mississippian
1) Magdalena Mtns.
2) C. L. Herrick, 1904, p. 310 (*Graphic-Kelly ls.)
3) Kelly mining dist., Magdalena Mtns., Socorro Co.
4) Lt. blu.-gry., med.-coarse xtall., crinoid., thick-bedd. lss. with 5′ dense arg. ls. near middle, called "Silver Pipe" because of close assoc. with ore shoots; 125′ thick.
5) Late Osagian (Keokuk equiv.); disconf. on Caloso Fm., overlain unconf. by Magdalena Gp.; Armstrong, 1958, restricted unit at type locality to upper 70.1′ of lss., including "Silver Pipe" near base; lower 34.9′ is Caloso Fm.; 130′ on Bear Mtn., W. of Silver City, 51′ in Lemitar Mtns., 35′ near Rio Salado, S. Ladron Mtns., beveled to zero at 3 mi. N. of Rio Salado.

LAKE VALLEY FORMATION (LIMESTONE)—Mississippian
1) Lake Valley mining dist. Sierra Co.
2) E. D. Cope, 1882, p. 214
3) No type sect. for fm.; Laudon and Bowsher, 1941, 1949, give type locality and sections for each member.
4) Coarse-xtall., blu. gry., crinoidal ls., blu. sh. in lower pt., cherty near top; 200′ thick.
5) Osagian; disconf. on Percha Sh. (Devonian) or Caballero Fm. (Kinderhookian); overlain conf. by Kelly Ls., or unconf. by Magdalena Gp. or younger units; Laudon and Bowsher, 1949, recog, six membs. ascend.—Andrecito Memb., thin-bedd., gry., fossil. ls. grading up into thin bedd., drk.-gry., cherty ls.; Alamogordo Memb., mass. blk. cherty, cliff-forming ls.; Nunn Memb., soft, blue-gry. marls and nodul. crinoid. ls.; Tierra Blanca Memb., med. to thin-bedd., gry. to br. coquina, cherty; Arcente Memb., soft sltsts., slope-form.; Dona Ana Memb., cliff form., chty., crinoid. ls.; (two upper membs. restricted to San Andres and Sacramento Mtns.); S. cent. and SW New Mexico.

McKelligon Formation—Canadian (Lower Ordovician)
1) S. New Mexico
2) R. H. Flower, 1964, p. 148
3) McKelligon Canyon, S. end of Franklin Mtns. at the northeast edge of El Paso, Texas

4) Massive stromatol. biostromes, bioherms and thick-to thin-bedd. lss. of the second piloceroid zone.
5) Middle to early Upper Canadian; lies on Snake Hills Fm.; overlain by Scenic Drive Fm.; a lower sandstone overlain by a massive stromatolitic biostrome (the reef with *Mcqueenoceras*) is named the Pistol Range Member.

†Magdalena Group—Pennsylvanian

1) Cent. New Mexico
2) C. H. Gordon, 1907b, p. 806
3) Magdalena Mtns.—no type section designated
4) Divided into two fms; upper is Madera Ls., 300′ to 700′ thick, composed of dark-blue ls.; lower is Sandia Fm., 500′ to 700′ thick., of blue and black clay sh., dense earthy ls., and cgl. ss. or qtzite. The Magdalena has a max. thick. of 1,400′.

†Mimbres limestone—Silurian and Ordovician

1) SW New Mexico
2) C. H. Gordon, 1907, p. 91-92
3) Not designated
4) Greater pt. of ls. contains Richmond faunas, but upper 100′ have yielded Sil. faunas; 900′-1200′ thick.
5) Lies unconf. on Shandon qtzite. (Bliss Ss.); unconf. overlain by Dev. Percha Shale; this unit now separated into Fusselman Ls., Montoya Ls., and El Paso Ls., and name abandoned (Wilmarth, 1938, p. 1378).

MONTOYA GROUP (LIMESTONE)—Upper Ordovician

1) S. New Mexico and W. Texas
2) G. B. Richardson, 1908, p. 476-479
3) S. end of Franklin Mtns., above Scenic Drive, El Paso, Texas
4) Lower pt. massive, dark-colored lss. with little or no chert; upper pt. gray dolomitic ls. with bands of chert; 250′ thick
5) Trenton thru Richmond; lies unconf. on El Paso Gp.; overlain unconf. by Fusselman Ls.; divid. by Entwistle (1944) into 3 members and by Kelley & Silver (1952) into 4 members.

Mud Springs Mountain Formation—Canadian (Lower Ordovician)

1) S. New Mexico
2) R. H. Flower, 1964, p. 148
3) Mud Springs Mountains near Hot Springs (now Truth or Consequences), New Mexico
4) Limestones of the *Bridgeites* reef
5) Middle Canadian; lies on José Fm; overlain by Snake Hills Fm.

NACO GROUP (LIMESTONE)—Pennsylvanian-Permian

1) SE Arizona
2) F. L. Ransome, 1904, p. 44-46
3) Naco Hills, Bisbee quad.—no type sect. desig.
4) Thin-to mass.-bedd.; lt. gry., fine-gr., fossil. lss., crinoid., chert common; 1,500′-2,000′ thick
5) Atokan thru Leonardian; appar. conf. on Miss. lss., unconf. overlain by basal Cret.; Gilluly, Cooper, and Williams, 1954, raised to Naco Gp.

Onate Formation—late Middle or earliest Late Devonian

1) S. New Mexico
2) F. V. Stevenson, 1945, p. 222-227
3) N. Slope of San Andres Canyon, sec. 18, T. 18 S., R. 4 E., San Andres Mtns.
4) Gray-brown to buff intergradat. series of shs., siltst., fine sss. and lss. thin bedd., with lateral gradat.; several fossils char. of these shs. and not the overlying Sly Gap; 35′-86′ thick
5) Lies unconf. on Fusselman Fm. or older units; overlain prob. disconf. by Sly Gap; beds with *Sulcoretepora anomalotruncata* occur 3′-4′ from top of Onate.

OSWALDO FORMATION—Pennsylvanian

1) SW New Mexico (Santa Rita district)
2) A. C. Spencer and S. Paige, 1935, p. 22-26
3) Not designated
4) Predom. blue gray, thick-bedd. cherty ls; sh. partings from a few inch. to 10′ to 20′; 40′ of gray-red sh. at base; upper 50′ to 80′ alternat. thin pure ls., crinoidal ls., and silty ls.; top 3′ to 5′ dense cherty pure ls., lenses of coarse ss. local. at 70′-125′ above base; 350′-420′ thick.
5) Exact stage(s) unknown; lies prob. unconf. on Lake Valley Ls; overlain conf. by Syrena Fm.

PARADISE FORMATION—Mississippian

1) SE Arizona and extreme SW New Mexico
2) A. A. Stoyanow, 1926, p. 316-320
3) On E. side of Chiricahua Mtns., a few miles E. of old mining camp of Paradise, Ariz.
4) Black and gray, thick to thin-bedd., olive to buff-weathering, argill. lss. interbed. with shs, ss., oolitic buff lss., xbedd. calcar. ss., and arenac. lss., with ls. cgls. prominent near top; 134′-270′ thick.
5) Latest Meramecian to early Chesterian; lies

conf. and transit. on Escabrosa Ls.; overlain unconf. by Naco Gp.

Par Value Member (of Montoya Limestone)—Upper Ordovician
1) SW New Mexico (Silver City area)
2) L. P. Entwistle, 1944, p. 16-19
3) Par Value Claim, Boston Hill subdist., Silver City dist; Grant Co.
4) Alternat. beds of red chert and gray dol.; 65′ at type locality.
5) Late Maysville? to early Richmond; lies conf? on Second Value memb.; overlain prob. disconf. by Raven member.

PERCHA SHALE (FORMATION)—Upper Devonian
1) S. New Mexico
2) C. H. Gordon, 1907, p. 92; 1907a, p. 60, 62
3) 2½ mi. SE of Hillsboro, Sierra Co., New Mex. near Percha Creek, in SW¼ SW¼ SE¼ sec. 14, T. 16 S., R. 7 W.; designated by Stevenson, 1942
4) Divid. into two pts.; lower unit of blk., carb., fissile sh. without fossils; upper unit of gray and green shs. with lens. and nodules of fossilif. ls.; 160′ to 200′ thick.
5) Upper Famennian (late Up. Dev.); lies unconf. on Fusselman; overlain unconf. by Caballero and/or Lake Valleys Ls. Stevenson (1945) named lower unit the Ready Pay Member and the upper unit the Box Member.

Portal Formation—Upper Devonian
1) SE Arizona
2) F. F. Sabins, Jr., 1957a, p. 475
3) Ridge between Round Valley and Silver Creek, SW¼ sec. 15, T. 17 S., R. 31 E., Cochise Co., Ariz.
4) Comprised of 4 membrs.—basal memb. alternat. thin beds of calcar. olive-gray shs. and shaly, dark olive-gray, dense, nodular lss:; memb. 2, hard, fissile, silice. shs. grade up into memb. 3, very thin-bedd. olive gray shs. & nodular lss. with thin chert lenses; memb. 4, alternat. thick to very thick-bedd. gray lss. with brachiopods & bryozoa and olive-gray shs.; 200-340′ thick.
5) Latest Mid. Dev. to earliest Up. Dev.; lies disconf. on El Paso Gp., overlain disconf. by Escabrosa Gp.; fossils indicate age is Chemung and equiv. of Sly Gap Fm., thus older than Percha Sh.

Rainvalley Formation—Permian
1) SE Arizona
2) D. L. Bryant & N. E. McClymonds, 1961, p. 1330-1333
3) S. side of hill in NE¼ sec. 15, T. 20 S., R. 18 E., Mustang Mtns., Cochise Co., Ariz.
4) Light to med. gray ls. alternat. with blk., fetid, partly dolomitic lss. with rare chert; overlain by gray lss. with 30% large nodules or beds of chert and numerous fossils; upper beds light gray to med. gray-brown, xtalline, partly dolomitic ls., with scatter. chert nodules; 250′± thick.
5) Leonardian?; lies conf. on Concha; overlain unconf. by Cret.? beds; No need to recognize this unit as beds are only a part of the Concha Ls., of which upper surface is eroded in all known exposures (Sabins, this Guidebook, 1965).

Rancheria Formation—Mississippian
1) Cent. S. New Mexico and W. Texas
2) L. R. Laudon and A. L. Bowsher, 1949, p. 17
3) SW side of small S. fork of shallow canyon leaving west slope of Franklin Mtns., almost directly E. of Vinton, Texas.
4) Basal few inches of blk. detrital sandy sh., chert pebbles, fish teeth and phosphatic concret., overlain by blk. qtz. ss. with plant remains; 8′ of soft yellow brown sandy siltst. with *Leiorhynchus*, overlain by massive bitumin. crinoidal ls. and massive-bed., dense, blk. silty lss. with brown-weather. porous chert; soft gray silty sh. on bedding planes; 250′ thick.
5) Meramecian; lies disconf. on Caballero Fm.; overlain unconf. by Helms Fm.

Raven member (of Montoya Gp.)—Upper Ordovician
1) SW New Mexico (Silver City district)
2) L. P. Entwistle, 1944, p. 18
3) Raven claim, Boston Hill subdist., Silver City dist., Grant Co.
4) Thick-bedd. gray dol., some red chert; basal beds a shell ls; upper beds carry a few colonial corals, and are thick bedd. gray cherty dol.; 120′ thick.
5) Late Richmond; lies prob. disconf. on Par Value memb; overlain unconf. by Fusselman Fm.

Ready Pay Member—late Upper Devonian
see Percha Shale

Rhodes Canyon Formation—Upper Devonian
1) S. New Mexico
2) R. H. Flower, 1959, p. 168

3) Not designated; possib. same as Contadero Fm.
4) Soft shale, white marly beds in lower pt; middle silty beds, top of soft thin clay shs.; 75′ thick.
5) Conewangan; lies disconf. on Thoroughgood Fm; overlain unconf. by early Miss. (Kinderhookian) shaly beds.

SAN ANDRES FORMATION—Permian

1) San Andres Mtns. of central New Mexico
2) W. T. Lee, 1909, p. 12; Needham and Bates, 1943, p. 1664-1666; Kottlowski, et. al., 1956, p. 60-62
3) Rhodes Canyon, San Andres Mtns., in sec. 29, T. 12 S., R. 2 E.
4) Lt. to drk. gray, massive-bedd., often cherty, poorly fossilif. ls.; about 600′ thick.
5) Leonardian; lies conf. on Glorieta Ss.; overlain disconf. by Bernal Fm. or its stratigraphic equiv.; lower 350′ of ls., a few beds of dolo. with interbeds of qtz. ss. (15-30 feet thick) and siltsts.; upper 400′ of interbedd. dark petrolif. ls., dolo., and gyp.; widely distributed in southeastern, central, and north-central New Mexico.

SANDIA FORMATION (of Magdalena Group)—Pennsylvanian

1) Cent. New Mexico
2) C. L. Herrick, 1900, p. 115
3) S. end of Sandia Mtns.—no type section
4) Ss., cgl., and sh. with occasional sdy. ls.; about 150′ thick.
5) Morrowan-Desmoinesian; lies unconf. on Mississippian ls. or Precambrian rocks, overlain conf. and gradat. by Madera Ls.; Sandia Fm. now used as defined by C. H. Gordon, 1907; widespread in New Mexico.

Scenic Drive Formation—Canadian (Lower Ordovician)

1) S. New Mexico
2) R. H. Flower, 1964, p. 149
3) Scenic Drive, S. end of Franklin Mtns., El Paso, Texas
4) A basal sandy dolomite, overlain by sand-free dolomite and 200′ of thin-bedded limestones
5) Late Upper Canadian; lies on McKelligon Fm; overlain by Florida Fm.

SCHERRER FORMATION—Permian

1) SE Arizona and extreme SW New Mexico
2) J. Gilluly, J. R. Cooper and J. S. Williams, 1954, p. 27-29, 42
3) Scherrer Ridge and Concha Ridge, Gunnison Hills, NW of Walnut Gap, Dragoon Quad., Ariz.
4) At base bright-red siltst. memb. 65′ thick overlain by 30′ of fine-gr. gray ls., 270′ of white to rusty-brown-weather. sss., some beds xbedd. and ripple-marked; 165′ of fine-gr., thin-bedd., gray lss. with nodules of white to rusty-brown chert; and 150′ of sss. at top; 687′ thick.
5) Leonardian: lies disconf. on Colina Ls.; overlain conf. and transit. by Concha Ls. (Chiricahua Ls.); thins markedly N. and E.; only 5′-20′ in Big Hatchet Mtns. and is a med. to fine-gr. qtz. ss. with a limy matrix; in this area it lies with sharp unconf. on Epitaph Dol. but upper contact with Concha Ls. is transit.

Second Value Member (of Montoya Limestone)—Middle Ordovician

1) SW New Mexico (Silver City district)
2) L. P. Entwistle, 1944, p. 16-19
3) Second Value claim, Boston Hill subdist., Silver City dist., Grant Co.
4) Purplish-gray, sandy dol., ls. and thin xbedded ss., with red and black chert frags.; sand most common near base; 90′ at type locality.
5) Trenton; lies unconf. on El Paso Gp. lss.; overlain conf:? by Par Value memb.; is lenticular locally.

†Shandon Quartzite—Upper Cambrian and Lower Ordovician

1) SW New Mexico
2) C. H. Gordon, 1907, p. 92
3) Not designated
4) Qtzites, ss. and shs. with occasional ls. beds; 50′ to 1,100′ thick.
5) Upper Cambrian and Lower Ordovician; lies nonconf. on Precamb.; overlain conf. by El Paso Group; Gordon, 1907, "Shandon is Bliss equiv." Flower, 1959, p. 158-159—"In the Caballo Mountains, Mud Spring Mountain, and Tonuco Mountain the so-called Bliss consists of two portions. **** It seems appropriate to employ here the term Shandon formation if the whole is to be treated as a formation and mappable unit."

Sierrite Limestone—Lower Ordovician

1) S. New Mexico
2) V. C. Kelley and C. Silver, 1952, p. 42-45
3) N. side of Cable Canyon, Caballo Mtns., sec. 10, T. 16 S., R. 4 W., Sierra Co.
4) Medium-gray, thin-bedd. lss. with thin crenu-

lated chert laminae; predom. calcilutites, chert gray to white; 127′-167′ thick.
5) Lower to Middle Canadian; lies conf. and gradat. on Bliss Ss. and overlain conf. by Bat Cave fm.; at type loc. predom. calcitic but elsewhere may become dolomitic; restricted by Flower, 1964, p. 148, to thin-bedd. Lower Canadian limestones.

†Silver shales—Upper Devonian
1) SW New Mexico (Grant County)
2) C. R. Keyes, 1908, p. 7-21
3) Silver City, Grant Co.
4) Black argill. shs., non fossilif.; 100′ thick.
5) Lies unconf. on Santa Rita ls. (Sil.) and underlies Bella sh.; appears to correspond to lower part of Percha Sh.

Sly Gap Formation—Upper Devonian
1) S. Cent. New Mexico
2) F. V. Stevenson 1945, p. 227-239
3) S. side of Sheep Mtn., in Sly Gap, San Andres Mtns.; sec. 25, T. 11 S., R. 5 E.
4) Alternat. beds of red-brown-weathering shs. and siltsts. with a few buff lss.; shs. are black, fissile and carb. or light tan and buff.
5) Cheming; lies unconf. on Fusselman Ls. or Canutillo Fm; overlain disconf. by Percha Shale; contains *Manticoceras*.

Snake Hills Formation—Canadian (Lower Ordovician)
1) S. New Mexico
2) R. H. Flower, 1964, p. 148
3) Snake Hills southwest of Deming, New Mexico
4) Largely barren, thin-bedded limestones.
5) Middle Canadian, lies on Mud Springs Mountain Fm; overlain by McKelligon Fm.

SYRENA FORMATION—Pennsylvanian
1) SW New Mexico (Santa Rita district)
2) A. C. Spencer and S. Paige, 1935, p. 22-26
3) Not designated
4) At base, 40′ of blocky to fissile black fetid silty ls. with 3′-5′ lenses of fossilif. gray ls. or ls. cgls; overlain by 30′ of nodular gray ls. in a dense drk.-gry. silty ls.; overlain by alternat. gray pure ls. (crinoidal ls.), silty ls. and brown yellow, red shs.; 170′-390′ thick.
5) Exact stage(s) unknown; lies conf. on Oswaldo Fm; overlain conf. by Abo red beds.

Thoroughgood Formation—Upper Devonian
1) S. New Mexico
2) R. H. Flower, 1959, p. 168
3) Not designated; possib. same as Contaderos Fm.
4) Yellow ss., and silts. with shaly interbeds.; comprising the fish zone and *Spirifer* zone of Stevenson; 12′ thick.
5) Cassadagan; lies disconf. on Contadero Fm. overlain disconf. by Rhodes Canyon Fm; fauna of *Cyrtospirifer*, *Loxonema*, *Leiorhynchus*, allied to Three Forks Sh. of Montana.

Tonuco Formation—Upper Cambrian
1) S. New Mexico
2) R. H. Flower, 1958 p. 62
3) Not designated
4) Fine to coarse, gray to buff sandstone and pebble cgls., hematitic and glauconite sandstone; of Upper Cambrian age; 60′-123′ thick.
5) Croixian (Franconian and Trempealeauan); lies nonconf. on Precamb.; overlain disconf. by Bliss Fm.

Upham Dolomite—Middle Ordovician
1) S. New Mexico
2) V. C. Kelley & C. Silver 1952, p. 59-60
3) Cable Canyon, Caballo Mtns., NW¼ sec. 10, T. 16 S., R. 4 W.
4) Massive-bedd., coarse to fine gr., med. gray to drk. brown-gray dol.; basal beds sandy; scattered irreg. chert nodules up to 12 inches; fossils scarce; 20′-30′ thick.
5) Trenton: lies conf. on Cable Canyon Ss.; overlain disconf. by Aleman Fm.

Valmont Dolomite—Upper Ordovician
1) S. New Mexico
2) L. C. Pray, 1953, p. 1906-1911
3) NE side of Alamo Canyon, SE¼ SW¼ SW¼ sec. 6, T. 17 S., R. 11 E., Sacramento Mtns.
4) Light gray-weathering, thin to medium-bedd., sublith. dolomite; can be divid. into an upper and a lower memb. by several feet of non-resistant argill. dolomite, 40′-70′ above base; 150′-225′ thick.
5) Late Richmond; lies prob. disconf. on Aleman; overlain disconf. by Fusselman Ls.; is same as Cutter Fm. of Kelley and Silver.

Victorio Formation; Canadian (Lower Ordovician)
1) S. New Mexico
2) R. H. Flower, 1964, p. 148
3) N. end of the Cooks Range, Sierra County
4) Limestones of the first piloceroid zone

5) Middle Canadian; lies on Cooks Fm; overlain by José Fm.

YESO FORMATION—Permian

1) Cent. New Mexico
2) W. T. Lee, 1909, p. 12; Needham and Bates 1943, p. 1657-1661
3) 11.2 miles N. 46° E. of Socorro, at point where E. edge of Socorro quad. intersects the 34°10′ parallel; from this point NE in sec. 4 and 5, T. 2 S., R. 2 E., and in sec. 33, T. 1 S., R. 2 E., Socorro Co.
4) Variegated ss., soft, coarse-gr., friable to hard, fine-gr., pink-yellow, often gypsif. sh., earthy ls., massive white beds of gyp.; 1,000′ to over 2,000′ thick.
5) Leonardian; rests conf. and gradat. on Abo Fm., conf. and gradat. or disconf. overlain by Glorieta Ss.

MESOZOIC

BEARTOOTH QUARTZITE—Upper Cretaceous?

1) SW New Mexico
2) S. Paige, 1916, p. 5
3) Beartooth Creek, near Fort Bayard, New Mex.
4) Qtzite. with little interbedd. sh., thin cgl. at base; no fossils; 90′-125′ thick.
5) Early Washitan?; lies unconf. on Precambrian to Perm. rks.; overlain disconf. by Colorado Sh.; exact age unknown.

BISBEE GROUP—Lower Cretaceous

1) SE Arizona
2) E. T. Dumble, 1902, p. 696-715
3) Near Bisbee, Arizona
4) Consists of, ascend:—1) interbed. sss. and clays with cgls. at base; 2) fossilif. ls. and clays; 3) interbed. lss., clays and sss. with oysters at base, rudistids and other fossils at top; 4) interbed. sand and clay; 1000′-3000′ thick.
5) Trinitian; lies unconf. on Permian beds; overlain unconf. by Tertiary volcanics; F. L. Ransome, 1904, p. 56, raised unit to a group and recognized fms., ascend:—Glance Cgl., Morita Fm., Mural Ls., Cintura Fm. separated by disconformities. Lasky, 1947, p. 13, p. 16-26; recognized seven fms. in Bisbee Gp. of Little Hatchet Mtns., New Mex. with total thick. 15,000′-21,000′ ascend:—1) Broken Jug Ls.; interbed, pure ls., shly. and sdy. ls.; sss. and ls. cgls.; local massive reef ls.; 3,400′-5,000′; 2) Ringbone Sh.; local basal cgl., blk. and green fissile shs.; little ss. and black ls.; fresh water beds; includes basalt flow and andesite breccia; 0′-650′; 3) Hidalgo Volc.; basaltic and andesitic flows, some pyroclastics; upper part local. includes ls., sh., and gritty or cgl. layers, with assoc. flow streaked andesite; 0′-5000′; 4) Howells Ridge Fm.; at base interbed. and gradat. red beds of sh., ss., ls., and cgl.; overlain local by andesite flows and purple volcanic breccias; overlain at top by thick to thin blk. lss. and massive, xtalline, cream-white ls., locally a massive fossilif. reef structure; 1000′-5000′; 5) Corbett Ss.; marine sss., qtzitic. massive with few thin sandy shs. and fossilif. ls.; 1,500′-4,000′; 6) Playas Peak Fm.; basal cgl., light-color ss., green to brown shs.; fresh water seds. with massive fossilif. marine reef ls. at top; 800′-3,000′; 7) Skunk Ranch Cgl.; red and maroon cgl. with red ss. and sh. matrix, boulders in lower part are Lower Cret; in upper pt. Paleozoic boulders appear; 3,400′. Gillerman, E., 1958, p. 45-53; recogn. four fms. in Bisbee Gp. of Peloncillo Mtns., ascend:—McGhee Peak Fm., Carbonate Hill Fm., Still Ridge Fm., Johnny Bull Ss.

Broken Jug limestone—Lower Cretaceous
See Bisbee Group

Carbonate Hill Formation (of Bisbee Gp.)—Lower Cretaceous

1) Extreme SE Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 47-50.
3) In vicinity of Carbonate Hill (McGhee) mine, on east side of the Peloncillo Range, sec. 34, T. 24 S., R. 21 W.
4) Thin-bedd., coarse to medium-gr., drk. gray, sandy calcarenite, brown-gray-weathering, thin ls. and chert peb. cgl. beds in lower pt.; 8′-10′ thick shell beds, of pelecypods, characteristic of fm., shell beds freq. underlain by a fine, clean, well-sort. sand; 113′-200′ thick.
5) Trinitian (Upper Aptian); lies conf. on McGhee Peak Fm.; overlain conf. by Still Ridge Fm.; abund. fossilif.; age equiv. of Quajote memb. of Lowell Fm. of Bisbee Gp.

COLORADO GROUP (SHALE OR FORMATION)—Upper Cretaceous

1) NE and SW New Mexico
2) F. V. Hayden, 1876, p. 45
3) Exposed along E. base of Front or Colorado Range, Colo.
4) Dark gray to blk. calcar. silty shs. with interbeds of thin, buff ss., brown sandy siltst., drk.

gray, brown-weathering silty fossilif. lss.; 300′ thick (description in field conference area)
5) Lower Benton (Woodbine); lies disconf. on Sarten Ss.; overlain unconf. by Tertiary sediments or volcanics in Silver City area; Paige gave max. thick. of 2,000′; in vicinity of El Paso, Texas, called Eagle Ford sh., and at Love Ranch, southern Sacramento Mtns. referred to as Mancos-Eagle Ford shs.

Corbett Sandstone
see Bisbee Group

DAKOTA SANDSTONE—Upper Cretaceous
1) Nebraska and Kansas
2) F. B. Meek and F. V. Hayden, 1862, p. 419-420.
3) Hills back of the town of Dakota, Dakota Co., Nebraska
4) Yellow, red and white ss. interbedded with variegated clays and lignite; about 400′ thick.
5) Overlies unconf. the Triassic (Chinle or Dockum); overlain conf. by the Mancos Sh.; elsewhere some units of the Dakota contain fossils and are now known to be of Early Cretaceous age.

EAGLE FORD SHALE—Upper Cretaceous
see Colorado shale

Glance Conglomerate—Lower Cretaceous
1) SE Arizona
2) F. L. Ransome 1904, p. 56, 57
3) Near Glance Mine, Bisbee quad.
4) Well bedd., red-brown bould. cgls., basal unit of Bisbee Gp.; 50′-75′ thick.
5) Trinitian; lies unconf. on Precambrian schists in type area; elsewhere on Late Paleozoic fms.; overlain conf. by Morita Fm.; thickness up to 200′.

Hidalgo Volcanics—Lower Cretaceous
see Bisbee Group

Howells Ridge Formation—Lower Cretaceous
see Bisbee Group

Johnny Bull Sandstone (of Bisbee Gp.)—Lower Cretaceous
1) Extreme SE Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 52-53
3) S. side of hill just N. of road to Silver Hill mine, in SE¼ sec. 4, T. 25 S., R. 21 W.
4) Thick to thin bedd., white to gray, med.-fine-gr., well-sort. orthoquartzite, and gray-brown to pink subgraywacke, poorly sort., with fine-gr., ang. to subang. qtz. grs. in an illite matrix, 10% metamorph. rock frags.; two types of sss. alternat. with subgraywacke common in upper pt.; few thin-bedd. brown shs., qtz. and chert pebb. cgls. in lower 25′ of fm.; 1,000′+ thick
5) Trinitian; lies conf. on Still Ridge Fm.; upper contact unknown; no fossils.

LOBO FORMATION—Triassic?, Early Cret.?
1) SW New Mexico
2) N. H. Darton, 1916, p. 19, 39
3) Lobo Draw, on NE slope of Florida Mtns.
4) Pink-gray to purple-gray shs., gray and pink silty ls. or nodular ls., with cgls. at base, with pebbles to boulders of most Paleozoic fms. and Precamb. rocks; lies on an irreg. erosion surface of local conspicuous relief, cut in older Paleozoics; no fossils; thickness highly variable, 0-350′ thick.
5) Lies unconf. on Hueco & older fms.; overlain conf.? by Early Cret. beds; extremely variable in lithology but marked by reddish-pink and purple coloration; appears to be reworked debris of deeply weathered Paleozoic land surface (Kottlowski, 1963).

McGhee Peak Formation (of Bisbee Group)—Lower Cretaceous
1) Extreme SE Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 45-47
3) McGhee Peak, between Granite Gap and Steins on main ridge of Peloncillo Mtns.
4) Basal cgls. of poor-sort. bould. and pebb., well cemented qtz. sand matrix with Paleozoic ls. pebb.; coarse, med. gr. to fine gr., white to red, gray sss. with calcar. cement, white silic. siltst; thin shales and black to gray, thin-bedd., nodular or pebb. ls. near top; highly variable vertically and laterally; 370′-600′ thick.
5) Trinitian; lies unconf. on Permian lss.; overlain conf. by Carbonate Hill Fm.; lower contact shows local relief of 25′ and local old soil layer; prob. equiv. of Glance Cgl.

McRae Formation—Upper Cretaceous to Early Tertiary
1) Caballo Mtns.
2) V. C. Kelley and C. Silver, 1952, p. 115-120
3) Eastern shore of Elephant Butte Reservoir for several miles north of dam.
4) At base pebble to boulder cgls. interbedd. with sh. and siltst., some breccia, overlain by inter-

bedd. sh. and ss., cgl. thin and rare, sh. red-brown to purple, ss. gray-green or pink, arkose common; *Triceratops* in lower beds.; 3,000′+ thick.
5) Latest Upper Cretaceous to Eocene; lies conf. and gradat. to unconf. on the Mesaverde Gp.; overlain by younger Tertiary sediments and volcanics.

MANCOS SHALE—Upper Cretaceous
1) W. Colorado
2) C. W. Cross, 1899, p. 4
3) Mancos Valley near town of Mancos, in SW Colorado
4) Dark-gray sdy. sh. with ss. lenses and fossilif. calcar. sh. and thin ls. lenses; 2,000′ thick.
5) Montanan and Coloradoan; lies conf. or disconf. on Dakota Ss.; overlain conf. and gradat. by Mesaverde Gp. or unconf. by Tertiary sediments.

MESAVERDE GROUP—Upper Cretaceous
1) W. Colorado and NW New Mexico
2) W. H. Holmes, 1877, p. 245, 248
3) Mesa Verde, Montezuma Co., Colo.
4) Divided descend.—upper ss., 190′ mass. ss.; mid. coal group of 800′-900′ of ss., sh., marl and lignite; lower ss., 120′ mass. ss.; 1,200′-1,500′ thick.
5) Carlile to Pierre; conf. on Dakota Ss. or Mancos Sh., conf. overlain by Lewis Sh.; Collier, 1919, named the divisions descend:—Cliff House Ss., Menefee fm., Point Lookout Ss.; thick. range-type loc. 1,000′, NE 422′, to SW 3, 100′+; NE Ariz., E. Utah, S. and Cent. and N. Wyo. (?), N. Mex. (widespread).

Morita Formation—Lower Cretaceous
see Bisbee Group

Noria Limestone—Lower Cretaceous
1) East Potrillo Mtns.
2) Bowers, W. E., 1960; named in unpub. thesis.

Playas Peak Formation—Lower Cretaceous
see Bisbee Group

Ringbone Shale—Lower Cretaceous
see Bisbee Group

SARTEN SANDSTONE—Lower Cretaceous
1) SW New Mexico
2) N. H. Darton, 1916, p. 19, 43
3) Sarten Ridge, southern Cooks Range
4) Massive bedd. light gray sss.; largely qtzitic; few beds slabby with lime cement; thin basal cgl.; even bedd. at type loc., xbedd. appears to N. & NW; 300′ thick.
5) Early Washitan; lies unconf. on Precambrian or Late Paleozoic rks., overlain disconf. by Colorado Shale.

Still Ridge Formation (of Bisbee Gp.)—Lower Cretaceous
1) Extreme SE Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 50-52
3) Still Ridge, just N. of Carbonate Hill mine, Peloncillo Mtns.
4) Predom. silty and sandy blk. cgl. lss. and ls.; cgls. medium to thick bedd.; with sss. and calcar. sss. common in upper and lower pts.; some thin beds of sh.; in upper pt. beds of a cgl. of ls. pebb. in a coarse qtz. sand matrix; no fossils except frags. of silicif. wood; 575′-650′ thick.
5) Trinitian: lies conf. on Carbonate Hill Fm., overlain conf. by Johnny Bull Ss.; top is upper limit of carbonat. sedimentat.; possib. equiv. of lower Cintura Fm.

Skunk Ranch Conglomerate—Lower Cretaceous
see Bisbee Group

Virden Formation—Upper Cretaceous
1) SW New Mexico
2) W. E. Elston, 1960
3) In sec. 16, T. 18 S., R. 20 W., Virden Quad.
4) Fangls., fluvial cgls., tuffac. sss. and gray shs.; boulds. of Cret. rks.; contains plant fossils; 4,000′ thick.
5) Lies unconf. on Up. Cret. andesite flows, tuffs and breccias; intruded by early? Tert. igneous rks., or overlain unconf. by Datil Fm.

CENOZOIC

Bear Springs Basalt—Tertiary
1) SW New Mexico
2) H. L. Jicha, Jr., 1954, p. 48-49
3) ¼ mi. NE of intersect. of secs. 17, 18, 19 and 20, T. 19 S., R. 8 W., ½ mi. ENE from Bear Springs Canyon, Lake Valley Quad.
4) Porphyritic, slightly scoriaceous and amygdal. fine gr., reddish-purple basalt, holoxtalline ground mass, phenocrysts of feldspar.
5) Lies disconf. on Razorback Rhyolites: overlain unconf. by Swartz Rhyolite.

Bell Top Formation—Tertiary

1) S. New Mexico
2) F. E. Kottlowski, 1953, p. 145
3) On Bell Top Mtn., Sierra de las Uvas, Dona Ana Co.
4) Pumice, soft pink rhyolite tuffs, vitrophyre flows and dikes, banded rhyolite flows and domes interbedd. with light-color. pumiceous and tuffaceous sss. and a few lens. of stream gravels; 800′ thick.
5) Early Tert.? lies unconf. on andesites and latites; overlain local. by Uvas Basalts; Bell Top Fm. intertongues to NE with Thurman Fm.

Box Canyon Rhyolite Tuff—Tertiary

1) SW New Mexico
2) W. E. Elston, 1957, p. 29-30
3) On upper 4 miles of Box Canyon, Dwyer Quad., New Mexico
4) Massive, cream, gray and pink porphyritic rhyolite ignimbrite, forming a plate 40′-75′ thick; 0-75′ thick.
5) Lies conf. on Mimbres Peak Rhyolite or Kneeling Nun Rhyolite; overlain conf.? by Rustler Canyon Basalt.

Caballo Blanco Rhyolite—Tertiary

1) SW New Mexico
2) W. E. Elston, 1957, p. 30-31
3) Mtn. in secs. 25, 36, T. 18 S., R. 9 W., Dwyer Quad. New Mex.
4) Pumiceous, porphyritic, rhyolitic ignimbrite; white, cream, light-gray, partly pumiceous matrix; columnar jointing well develop.; 0′-300′ thick.
5) Lies disconf. on Rustler Canyon basalt or older units; overlain unconf. by Razorback Fm.

Cienega Peak Granite—Late Cretaceous? or Tertiary?

1) Extreme SE Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 12-13
3) Cienega Peak, on west side of Peloncillo Mtns.
4) Holocrystalline, equigranular, fine-gr., light-pink granite; hypidiomorphic texture; 20-30% anhedral qtz., 60-70% subhedral and anhedral orthoclase, 10% or less anhedral oligoclase; less than 1% biotite; called alaskite; occurs as a nearly vertical sill or laccolith.
5) Intrudes McGhee Peak Fm. and older rks; is intruded by a qtz. monzonite porphyry dike of ? Late Cret. or ? early Tertiary age.

Cub Mountain Formation—Early Tertiary

1) Cent. New Mexico
2) Used without definition by M. W. Bodine, Jr., 1956, p. 8-11; defined by R. H. Weber, 1964, p. 105
3) Sanders Canyon, from SW¼ SW¼ sec. 16 to SW¼ SW¼ sec. 24, T. 9 S., R. 10 E.
4) White to gray, yellow, buff brown, massive to thin bedd., fine- to coarse-gr., poor. sort. arkosic ss.; contains cross-laminations and channels.; interbedd. with variegat. montmor. clayst., mudst., siltst., and fine ss., thin cgl. lenses in lower part; upper part contains coarse-gr. graywacke ss.; 2,400′ thick.
5) Latest Upper Cretaceous? to Eocene?; appar. lies conf. to disconf. on the Mesaverde Gp.; overlain unconf. by the Sierra Blanca Volcanics; upper contact sharp; thought to be lithol. and stratig. equiv. of Baca Fm.; upper memb. possib. equiv. to Spears memb. of the Datil Fm.

Cueva Rhyolite—Tertiary

1) S. New Mexico
2) K. C. Dunham, 1935, p. 55-56
3) La Cueva, W. of mouth of Fillmore Canyon, Organ Mtns.
4) Massive white rhyolitic ignimbrite; cryptoxtalline ground mass; bands of pale brown glass, large patches of calcite, white mica abund; ground mass purplish with occas. flow banding; spherulitic; tuffs and mud flows common in base; 120′-250′ thick.
5) Early Tert.?; lies disconf. on Orejon Andesite; overlain conf. by Soledad Rhyolite.

DATIL FORMATION—Tertiary

1) Cent. New Mexico
2) D. E. Winchester, 1920, p. 9-10
3) N. end of Bear Mtns., Socorro Co.
4) Wh., red, purple, ylw.-gry. interb. tuffs, rhy., cgl., sss., and mudst.; 1,824′ thick.
5) Unconf. on Baca Fm. or Cret.; disconf., or unconf. overlain by Santa Fe Fm.; Wilpolt and others, 1946, remove lower 684′ into Baca Fm.; Tonking, 1957, adds 150′ of weld. rhy. tuff and min. of 1,200′ of basalt and bas. andesite flows to top of section (2,500′); char. volcanic material, thickness is variable.

Faywood Rhyolite—Tertiary

1) SW New Mexico
2) W. E. Elston, 1958, p. 37
3) Plug located near Faywood Hot Springs, in secs. 15, 16, 21, 22, T. 20 S., R. 11 W.
4) Cream-color., fine gr., flow-layered rhyolite in dome-like plugs; flow lines tend to be vertical;

horizontal rhyolite body may be related flow.
5) Intrudes Rubio Peak flows and Sugarlump tuffs; petrogr. and struct. resembles Mimbres Peak Fm.

GILA CONGLOMERATE—Tertiary-Quaternary
1) Arizona and SW New Mexico
2) G. K. Gilbert, 1875, p. 540-541
3) Gorge of upper Gila River and tributaries of Bonita, Prieto, Gilita, and San Francisco Crs.
4) Interb. lent. cgls., sss., siltst., caliche cement, wh., buff to ylw., br.; with basalt flows; 1,000′-1,500′ thick.
5) Pliocene and Pleistocene; disconf. to unconf. on Datil and older fms.; disconf. overlain by Recent gravels; western equiv. of Santa Fe Group; fang.

Kneeling Nun Rhyolite Tuff*—Tertiary
1) SW New Mexico
2) W. E. Elston, 1957, p. 25
3) The Kneeling Nun at Santa Rita, Grant Co.
4) Grayish-purple, cliff-forming rhyolite ignimbrite; irregular cavities in sheeted zone at base, overlain by columnar jointing; inclusions of foreign rks. and angular xtal frags. abund thruout; 0-500′ thick.
5) Lies conf. and gradat. on Sugarlump Fm; overlain disconf. by Mimbres Peak Fm.

Love Ranch Formation—Tertiary
1) S. New Mexico
2) F. E. Kottlowski, R. H. Flower, et. al., 1956, p. 69-71
3) Exposure NW of Love Ranch, sec. 30, T. 20 S., R. 4 E., San Andres Mtns.
4) Coarse cgls., 50-90% cobbles, with matrix of green-gray calcar. sss., xbedd. to horizontal bedd. and calcar, reddish-brown, blocky siltsts. intercal. with beds of limy, gray-reddish-green, poor. sort., coarse, xbedd. sss.; thickness variab; 2, 100′ at type loc.
5) Early Tertiary; lies unconf. on Mancos-Eagle Ford beds; overlain unconf. by Orejon Andesite.

Macho Pyroxene Andesite—Tertiary
1) SW New Mexico
2) H. L. Jicha, Jr., 1954, p. 39-40
3) Macho mining dist. in W½ sec. 20, T. 19 S., R. 7 W.
4) Purple, fine-gr., porphyritic pyroxene andesite flows, phenocrysts of white labradorite (2 mm), augite and hypersthene; purple brown breccias, of frags. of pyroxene andesite flow rks.; and varicolored tuffs interbedd. with white to gray-green magnetite sss. and lens. of red cgls.; tuffs predom. in lower pt.; 1000′+ thick.
5) Early? Tert.; lies with major unconf. on late Cret. fms.; overlain unconf. by Rubio Peak Fm.

†Mimbres Conglomerate—Tertiary
1) SW New Mexico
2) R. M. Hernon, W. R. Jones & S. L. Moore 1953, p. 170
3) Not designated
4) Consolidat. and deformed sand, gravel, silt and clay with interbedd. basalt flows; 1000′± thick.
5) Miocene?, Pliocene; lies unconf. on Mio.? basalt flows; overlain unconf. by Recent alluvium; equiv. to Gila Cgl.

Mimbres Peak Formation—Tertiary
1) SW New Mexico
2) W. E. Elston, 1957, p. 27-29
3) Hill in sec. 8, T. 19 S., R. 10 W., Dwyer Quad. New Mex.
4) Rhyolite flows, abund. pumiceous tuffs and local tuffac. sss., cgls., sandy tuffs and perlite flows; show alternat. gray and pink bands, 1-8 mm wide; 0-2,500′+ thick.
5) Lies disconf. on Kneeling Nun Rhyolite; overlain conf. by Mimbres Peak Fm.

Nipper Formation—Late Cretaceous? or early Tertiary?
1) SE Arizona
2) F. F. Sabins, Jr., 1957b, p. 1325
3) On the Nippers and assoc. hills S. of Blue Mtn., in SW corner of Vanar Quad., Ariz.
4) Lower thick cgl. of dark green to purple mafic volc. rks., poor. sort., well-round. boulds. up to 12′, of alter. andesite and poss. basalt, tightly cement. in a graywacke ss. matrix; upper pt. of cgls. with dark augite flows interbed. with graywacke sss., overlain by light andesite flows.
5) Lies unconf. on late Paleozoic rks. and Lower Cret. seds.; overlain conf? or disconf. by Faraway Ranch Fm.

OGALLALA FORMATION—Upper Miocene and Pliocene
1) Kans. and Colo. into Nebr.
2) N. H. Darton, 1899, p. 741-742
3) Feldt Ranch, in the vicinity of Ogallala, Keith Co., Nebr., designated by C. J. Hesse, 1935.
4) Calcar. grit or soft ls., sdy. clay ss., with local basal cgl. 150′ to 300′ thick in the type area;

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Elias, 1931, restricted the Ogallala to the interbedd. buff to pink, unsorted ss. and gravel with fine clay and siltst. that underlie the "plains marls" and other Pleistocene units.
5) Unconf. on late Paleoz. to Up. Cret. fms.; overlain unconf. by Quaternary seds. or volcs.

Orejon Andesite—Tertiary
1) S. New Mexico
2) K. C. Dunham, 1935, p. 54-55
3) In Orejon Mine, Organ Mtns.
4) Brown-gray or greenish, coarse to med.-gr., andesite flows, not over 75′ thick individually; 600′ thick.
5) Late Cret? or early Tert?; lies conf. on basal tuff; overlain disconf. by Cueva Rhyolite.

Palm Park Formation—Tertiary
1) S. Cent. New Mexico
2) V. C. Kelley and C. Silver, 1952, p. 120-121
3) In valley called Palm Park, along SE edge of Caballo Mtns.
4) Reddish-brown, predom. coarse bould. cgls., large andesite boulds. up to 12′; upper pt. with much red, gray and purple-brown latite to andesite breccia and tuff, with intercal. red-brown tuffac. clay and silt; 1,000′ thick.
5) Oligo? to early Mio?; lies unconf. on late Paleozoic rks.; overlain conf. by Thurman Fm.

Quarry Peak Rhyolite—Tertiary
1) Extreme SE Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 65-68
3) On peak W. of Steins and N. of S. Pacific RR and State Highway 14, N. side of Steins Pass, Peloncillo Mtns.
4) Rhyolitic flows, breccias and tuffs, many well-bedd.; holocrystalline, equigranular, aphanitic, white to gray rhyolite with a few phenocrysts of qtz. and feldspar; less than 1% biotite; felsitic matrix a mixture of kaolinized feldspar and qtz.; 1000′+ thick.
5) Lies unconf. on older andesites; overlain conf. or unconf. by a black basalt and Steins Mtn. Qtz. Latite Porphy.

Razorback Formation—Tertiary
1) SW New Mexico
2) W. E. Elston, 1957, p. 32-34
3) Mtn. in sec. 36, T. 18 S., R. 11 W., Dwyer Quad. New Mex.
4) Black, drk.-gray, fine-gr., lower andesite memb. of alternat. flows and breccia; an upper rhyolite memb. with some green fine-gr. tuffs.
5) Lies disconf. on units of Lower Volcanic series; overlain disconf. by Bear Spring Basalt or younger rks.

Rubio Peak Formation*—Tertiary
1) SW New Mexico
2) W. E. Elston, 1957, p. 18-23
3) Butte in secs. 9, 10, 15 and 16, T. 9 S., R. 10 W.
4) Andesite and latite flows, agglo., tuffs, breccias, tuffaceous sss. and cgls., dark gray, brown, purple and black, some tuffs cream to green; all flows and tuff beds limit. lateral extent; andesite tends to grade up into latites; red sandy shale locally at base; individual flows and breccia lenses up to 50′ thick; up to 5,000′ thick.
5) Lies unconf. on erosion surface cutting Sil. to Cret. beds; overlain unconf. by Sugarlump tuffs.

Rustler Canyon Basalt—Tertiary
1) SW New Mexico
2) W. E. Elston, 1957, p. 30
3) On W. side of Box Canyon, Dwyer Quad.
4) Black, vesicular, fine-gr. basalt in amygdal. flows; flow breccias, and few sandy tuffs; 0′-50′ thick.
5) Lies disconf. on Box Canyon Rhyolite Tuff; overlain disconf. by Caballo Blanco Rhyolite Tuff.

SANTA FE GROUP—Tertiary-Quaternary
1) New Mexico and S. Cent. Colo.
2) F. V. Hayden, 1869, p. 66, 90
3) Valley of Rio Grande at Santa Fe, New Mex.
4) Interb. lent. sss., siltst., and cgls., wh., buff to ylw., br.; 1,200′-1,500′ thick.
5) Latest Miocene-Pleistocene; conf. and gradat. (?) on La Jara Peak memb. of Datil fm.; unconf. overlain by Recent gravels; interb. with young basalt flows and caliche beds; thick. range 500′-8,000′; gravels deriv. from Datil and older fms.; fang. orig; drainage area of Rio Grande.

Soledad Rhyolite—Tertiary
1) S. New Mexico
2) K. C. Dunham, 1935, p. 56-60
3) In Mtns. adjacent to Soledad Canyon, Dona Ana County
4) Gray to purple-gray, porphyritic rhyolite flows with columnar jointing in steep cliffs; 2,500′ thick.
5) Early Tert.; lies conf. on Cueva Rhyolite; no overlying rks.

* The history of this name is summarized on the Geologic Map of the Santa Rita Quadrangle (in pocket).

Steins Mountain Quartz Latite Porphyry—Tertiary

1) SW New Mexico
2) E. Gillerman, 1958, p. 69
3) Upper part of Steins Mtn. and hill to E., Peloncillo Mtns.
4) Columnar jointed flows and devitrif. tuffs; holocrystalline, porphyrit., aphanitic, pinkish-gray qtz. latite; phenocrysts 25-30% of rk., of embay. and corrod. euhedral qtz. xtals. Kaoliniz. euhedral orthoclase and plagioclase xtals. in matrix of clay, chlorite, some ghosts of glass shreds and shards.
5) Lies unconf. on Quarry Peak Rhyolite; no overlying rocks.

Sugarlump Formation*—Tertiary

1) SW New Mexico
2) W. E. Elston, 1957 p. 23-25
3) Hill in NE¼ sec. 5, T. 19 S., R. 10 W.
4) Massive and bedd. latite and rhyolite tuff, maybe xbedd. with small ripple marks, one memb. with varvelike graded bedding; tuff often sandy or conglomeratic; several beds of massive vitric xtal. tuffs (ignimbrites); white, green, pink to brown; 50′-1,300′ thick.
5) Lies conf. or unconf. on Rubio Peak Fm.; overlain conf. by Kneeling Nun Rhyolite Tuff.

Swartz Rhyolite—Tertiary

1) SW New Mexico
2) W. E. Elston, 1958, p. 36
3) Secs. 26, 27, 34, 35, 36, T. 18 S., R. 10 W.
4) Interbedd. rhyolite flows, pumiceous tuffs, light-color. glass and rhyolite breccia; of alterna. brown and gray bands, 3 mm wide, xtals of sanidine, qtz. and plagioclase; 0-75′ thick.
5) Lies unconf. on and intruded into Bear Springs Basalt; overlain unconf. by Santa Fe Cgls.

Thurman Formation—Tertiary

1) S. Cent. New Mexico
2) V. C. Kelley and C. Silver, 1952, p. 120-121
3) Along road to Palm Park barite mine in secs. 35, 36, T. 18 S., R. 3 W.
4) Basal pt. a dense, cream-tan color., resistant rhyolite tuff-breccia; overlain by altern. and intercal. thin beds of pink sandy clay and thicker evenly-bedd., water-laid tuff and tuffac. sss., white, fine- to med-xtal. tuff of predom. kaoliniz. feldspar; scatt. pebbs. of brown basaltic scoria in sss. and local. thin dark amygdal. basalt flows; about 2,100′ thick.
5) Oligo? to early Mio.? lies conf. on Palm Park Fm.; overlain unconf. by Santa Fe Fm.; is similar to Datil, Espinaso and Abiquiu Fms.

Uvas Basalt—Tertiary

1) S. New Mexico
2) F. E. Kottlowski, 1953, p. 144
3) On Bell Top Mtn., Sierra de las Uvas, Dona Ana Co.
4) Basalt and basaltic andesite with interbed. scoria and basaltic tuff; 145′ thick.
5) Early Tert.?; lies on ark., pumice., and tuffac. sss., interbedd. with rhyolitic welded tuff; overlain by Santa Fe Cgls.

Weatherby Canyon Ignimbrite—Tertiary

1) Extreme SW Arizona and SW New Mexico
2) E. Gillerman, 1958, p. 70-75
3) On 1117 Peak, south of Weatherby Canyon, Peloncillo Mtns.
4) Rhyolite and some trachyte ignimbrite, with interbeds of non-welded tuff; light gray to red, hard, compact, aphanitic, porphyritic rhyolite, phenocrysts of qtz., sanidine and orthoclase in devitrif. matrix of glass shards; numer. lenticular cavities; 3,000′+ thick.
5) Late Tertiary; prob. youngest igneous rk. in area; prob. correl. with Rhyolite Canyon Fm. of Chiricahua Mtns.

†Wimsattville Formation—Tertiary

1) SW New Mexico
2) R. H. Hernon, W. R. Jones & S. L. Moore, 1953, p. 120
3) Not designated
4) Basin filling gravel and ss.; 1000′ thick.
5) Lower Tert; lies unconf. on Up. Cret. or Lower Tert? andesite breccias; overlain unconf. by Rubio Peak Fm.

* The history of this name is summarized on the Geologic Map of the Santa Rita Quadrangle (in pocket).

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