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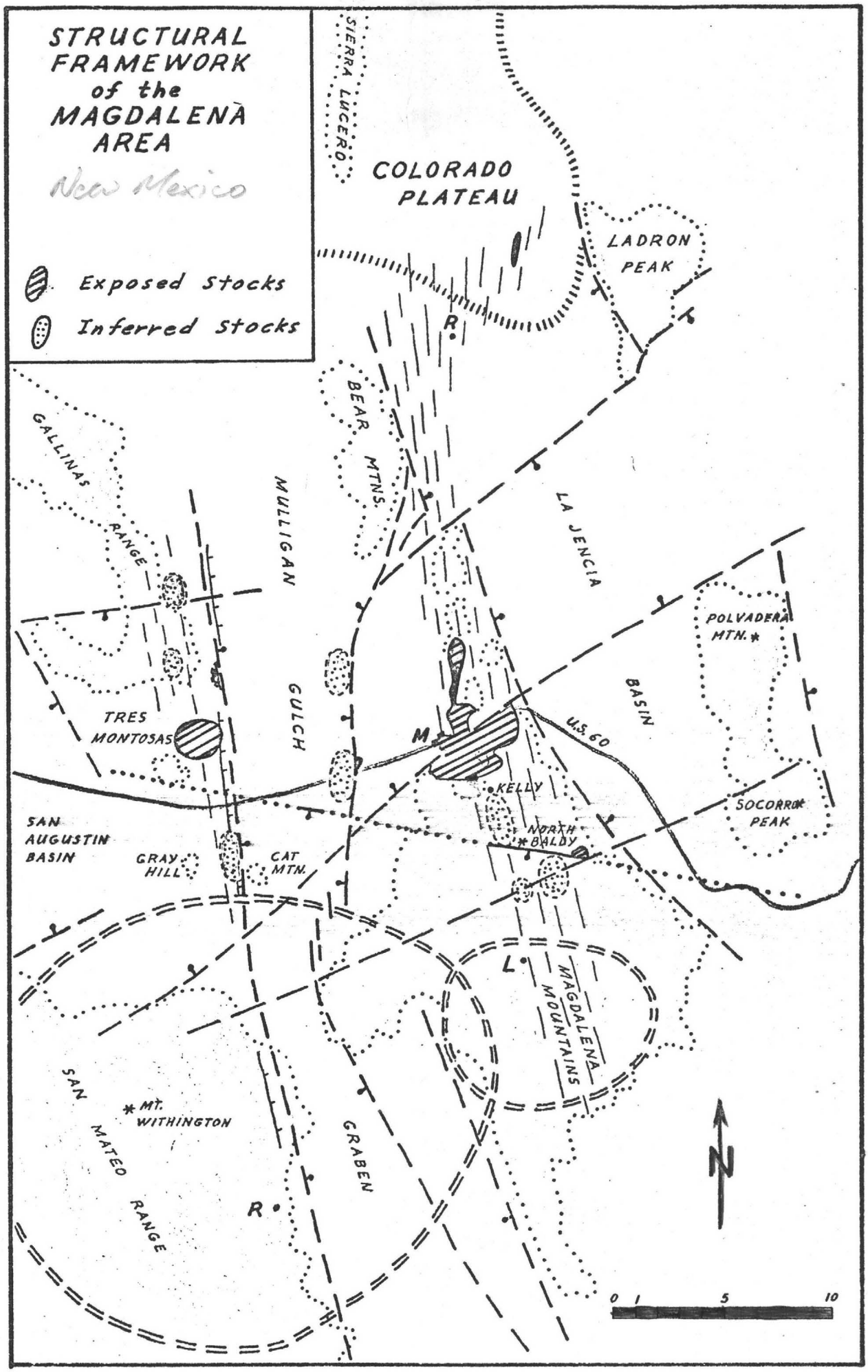
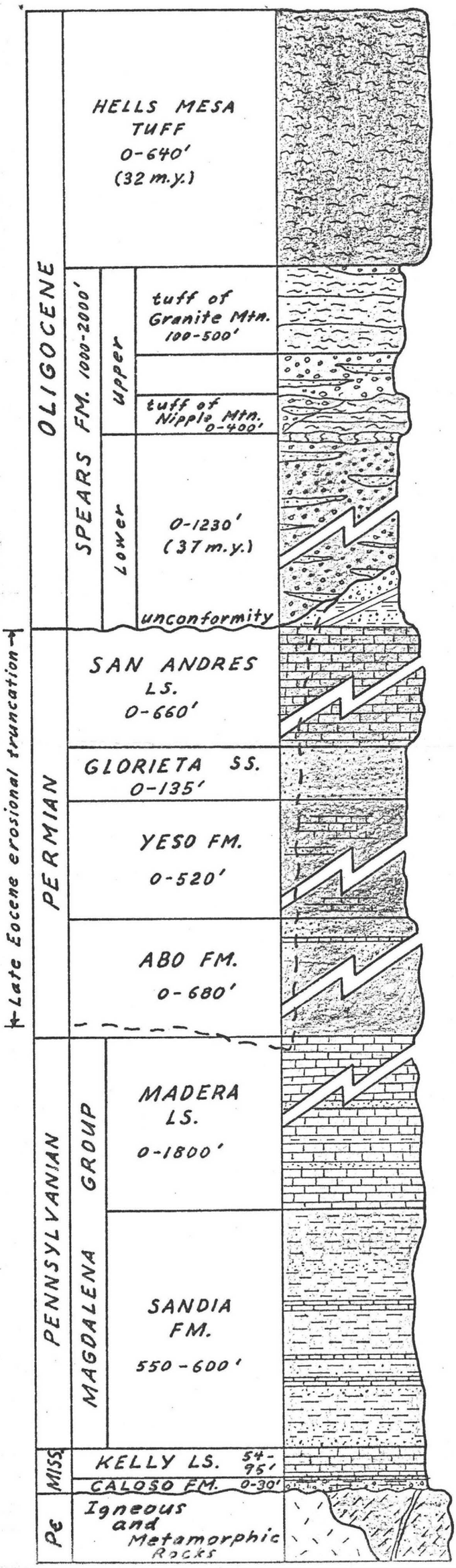

STRUCTURAL FRAMEWORK of the MAGDALENA AREA
New Mexico
Exposed Stocks
Inferred Stocks
SIERRA LUCERO
COLORADO PLATEAU
LADRON PEAK
R
BEAR MTNS.
GALLINAS RANGE
MULLIGAN GULCH
LA JENCIA BASIN
POLVADERA MTN.
TRES MONTOSAS
M
U.S. 60
KELLY
SOCORRO PEAK
NORTH BALDY
SAN AUGUSTIN BASIN
GRAY HILL
CAT MTN.
L
MAGDALENA MOUNTAINS
SAN MATEO RANGE
MT. WITHINGTON
GRABEN
R
N
0 1 5 10

COMPOSITE STRATIGRAPHIC COLUMN
of the MAGDALENA AREA



ASH-FLOW TUFFS: qtz. latite (chem. rhyolite), multiple-flow, simple cooling unit of densely welded, crystal-rich, qtz.-rich, massive tuffs; pk. to rd.-brn. when fresh, gry. when propylitically altered; forms cliffs and talus-covered slopes; weathers to blky. bldrs. rather than to grus; abrupt change from latite to qtz. latite 10-25 ft. above base; basal tuffs strongly resemble underlying tuffs in Spears Fm.; formation boundary placed at abrupt increase in qtz. when cgl. is absent; mapped as rhyolite porphyry sill by Loughlin and Koschmann.

ASH-FLOW TUFFS: latite (chem. qtz. latite), multiple-flow, simple cooling unit of densely welded, crystal-rich, lithic-rich, massive tuffs; rd.-brn. when fresh, dk. grn. gry. when propylitically altered; mapped as upper latite tuff by Loughlin and Koschmann; overlain by distinctive hem.-stnd. cgl. N. of Magdalena; grades into mud-flow breccias at base.

VOLCANICLASTIC and VOLCANIC ROCKS: latitic to andesitic conglomerates, sandstones, mud-flow breccias, and lava flows.

ASH-FLOW TUFFS: latite, multiple-flow, compound cooling unit of moderately to densely welded, crystal-poor, pumiceous tuff; pk. when fresh, buff to wht. when altered; distinctive "turkey track" andesite at base; interbedded andesite flow near Tres Montosas; mapped as white felsite tuff by Loughlin and Koschmann.

CONGLOMERATES and SANDSTONES: volcaniclastic apron of early latitic phase of Datil-Mogollon field; fluvial deposits of latitic to andesitic debris; crs. sandstones to pbl. and bldr. conglomerates; purp.-brn. when fresh, grn.-gry. when propylitically altered.

BACA FM (Eocene) } Present in Baca basin north of Magdalena area;
MESOZOIC ROCKS } position of basin margin uncertain due to burial by Tertiary volcanic rocks.

LIMESTONES: blk., fetid, v.-thk.-bdd., homogeneous, sparsely fossil., dolomicrites; weathers to rough, hackly sruface; mapped as Madera Limestone by Loughlin and Koschmann.

SANDSTONES: lt. to med.-gry., v. thk. bdd., med.-gnd. v. well srt. calc., qtz. arenites and minor limestones; mapped as upper quartzite member of Sandia by Loughlin and Koschmann.

LIMESTONES, SANDSTONES, and SHALES: faulted, incomplete, poorly exposed section near Magdalena; dk.-gry., unfossil., dol. micrites only exposed lithology; mapped as upper limestone member of Sandia Fm. by Loughlin and Koschmann.

SANDSTONES, SILTSTONES, and SHALES: rd.-brn., fn.-gnd., thn.-bdd., qtz. arenites and siltstones; abun. thn. lam. and ripple xlam.; bleached to lt.-rd.-brn. and grn.-gry. near Magdalena and Tres Montosas plutons; mapped as Sandia shales by Loughlin and Koschmann (1942).

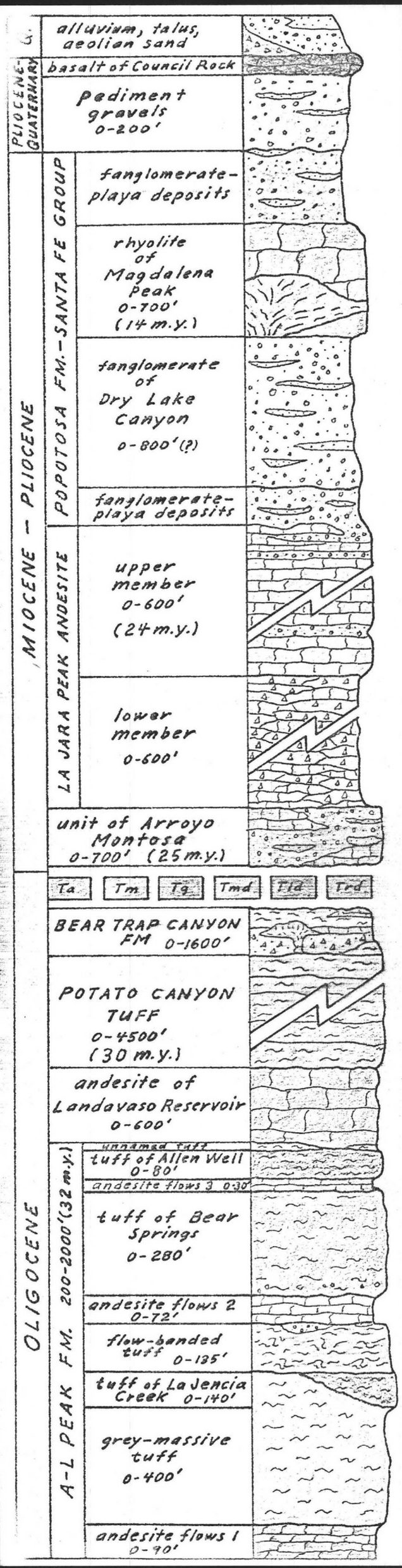
LIMESTONES: Thick, homogeneous sequence of lime muds (micrites) with a few thn. bds. of grn.-gry. to gry., med. to crs.-gnd. quartzite; upper 200-300 ft. consists of rd., grn., and gry. micrites grading upward into arkosic strata of Abo Fm.; nodular micrites common throughout; micrites generally gry. to blk. with strata becoming darker and more fossilferous towards base.

SHALES, QUARTZITES, and LIMESTONES: gry. to blk., sdy., carb., shales and siltstones with thn. bds. of gry., med.-gnd., crinoidal limestones and grn.-gry. to brn., med.-crs.-gnd. quartzites. Loughlin and Koschmann (1942) divided the Sandia into six members but lenticular bedding and rapid facies changes make this subdivision of limited value.

LIMESTONES: lt. gry., med.-crs. gnd., thk.-bdd., crinoidal sparrites; thn. bd. of dol. micrite near middle (Silver Pipe).

LIMESTONES and CONGLOMERATES: gry., pbly., sdy., mas., qtz. micrites and basal ark. cgls.

ARGILLITES, QUARTZITES, and GRANITES: thick sequence of metasedimentary rocks intruded by granites, gabbros, felsites, and diabase dikes.



ALLUVIUM, TALUS, and AEOLIAN SAND: sand extensive N. of Hwy. 60 and N. of La Jencia Creek.

BASALT FLOWS and DIKES: thin flows of dk. gry., dense to vesicular basalt; dikes near Council Rock apparent source; widely scattered remnants west of Magdalena.

PEDIMENT GRAVELS: coarse, heterogeneous gravels and thin sands grading laterally into alluvial fans; caliche deposits and aeolian sand at top; dissected as deep as 200 ft. by arroyos.

FANGLOMERATE - PLAYA DEPOSITS: similar to below but with increasing amounts of detritus from units lower in section; overlain with angular unconf. by buff, poorly indur., deposits of upper Santa Fe Group containing abun. detritus from Paleoz. & Precambrian rocks and by pediment gravels.

RHYOLITE FLOWS and DOMES: pk., dense slightly porphyritic flow-banded rhyolite; vitrophyric and perlitic zones present locally; thin interbedded tuffs; Magdalena Peak dome main eruptive center.

FANGLOMERATES: buff to gry., well-indurated andesitic cgls., thin ss., and mud-flow deposits derived from erosion of La Jara Peak Andesite; other detritus absent to sparse; forms clastic wedge along west side of Bear Mtns.; locally interbedded with uppermost La Jara Peak Andesite; unique facies of Popotosa Fm.

FANGLOMERATE - PLAYA DEPOSITS: rd.-brn. to gry., well-indurated, volc. cgls., thin ss., and mud-flow deposits derived from erosion of volcanic pile during block faulting; A-L Peak, Potato Canyon, and La Jara Peak detritus especially abun.; fangls. grade laterally into rd., poorly indur., siltstones and mudstones of playas.

ANDESITE FLOWS: gry., locally rd., dense, basaltic andesite characterized by abun. small, rd. hematized pyroxene and/or olivine phenocrysts and lack of plagioclase phenocrysts; lower member mostly thin autobrecciated flows that weather to slopes and rounded hills; upper member consists of cliff-forming vesicular flows with fresh pyroxene phenocrysts; amygdules of silica and/or calcite abun. in lower member; upper member interbedded with Popotosa Fm.

DACITE FLOWS and FANGLOMERATES: dk. gry. to rd. flows with unusual phenocryst assemblage of plag. (up to 4 cm), qtz. (up to 1 cm), and sanidine; interbedded cgls. are highly indurated and rd.-brn. like Popotosa but lack La Jara Peak detritus.

STOCKS, PLUGS, and DIKES: major period of intrusive activity at 28-30 m.y.; andesitic, monzonitic and granitic stocks; mafic, latite, and rhyolite dike swarms.

TUFFS, DOMES, FLOWS, and VOLCANICLASTIC ROCKS: Complex sequence of rhyolite pyroclastic rocks, domes, flows, breccias, and sedimentary rocks filling moat of Mt. Withington cauldron (Deal and Rhodes, in press).

ASH-FLOW TUFFS: rhyolite, multiple-flow sequence of slightly to densely welded, moderately crystal-rich to crystal-poor, rd.-brn. to pk. or lt. gry. tuffs; crystal content intermediate between that of crystal-rich and crystal-poor tuffs; perthitic "moonstone" potash feldspar.

ANDESITE: thin flows of rd. to gry. porphyritic andesite with phenocrysts of plagioclase, pyroxene, and biotite; flows highly variable but generally platy with abun. hematite stained bands.

ASH-FLOW TUFFS and ANDESITE FLOWS: Composite sheet of rhyolite crystal-poor tuffs with interbedded quartz latite (chem. rhyolite) crystal-rich tuffs and andesite flows. Relatively homogeneous 2000-foot-thick "puddle" of crystal-poor tuffs in Mt. Withington cauldron (Deal and Rhodes, in press) grades laterally into complex unit shown at left. Crystal poor, rhyolite tuffs are gry., pk., and rd.-brn., moderately to densely welded, platy tuffs that weather to grus of small platy fragments. The flow-banded member is very platy and shows abundant laminar flow structures, such as lineated pumice, flow folds etc. All crystal-poor tuffs are characterized by 6-8% small, euhedral sanidine phenocrysts and 1-2% small, rounded qtz. grains. Crystal-rich, qtz.-rich, qtz. latite tuffs strongly resemble the Hells Mesa tuffs except that they contain more glassy matrix and more biotite. Andesite flows 2 and 3 are thn., dk. gry. to rd.-brn., fn.-gnd. flows similar to the La Jara Peak Andesite in lack of feldspar phenocrysts and abundance of small red, hematized pyroxene and/or olivine phenocrysts. Andesite flows 1 are thn., bl.-gry., porphyritic, vesicular flows with abun. plagioclase phenocrysts. Distribution of the tuff of La Jencia Creek was controlled by NE-trending paleo-valleys. Small channels containing tuffaceous sedimentary rocks are common above flow-banded member.