2000

Pazzaglia Field Notebook: NM State Map '00; Field Camp '00; Ecuador '00; Hudson Valley - CT '00; NM State Map '01

Frank J. Pazzaglia

NM

FRANK J. PAZZAGLIA

Lehigh

- NM STATEMAP '00
- Field Camp '00
- Ecuador '00
- Hudson Valley - CT '00
- NM STATEMAP '01

43 miles VIA RT. 22.

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★ Reward if found & returned ★

INDEX

11/4/99 Cool, breezy, sunny.

High Street Bridge Hellertown w/213 class.

Section of Allentown Fm - attempt to distinguish major facies + cycles.

- rocks dip ~ 10-15° S.

↑ new cycle

SABKA w/shale gutters.

STROMATOLITES

high-energy CALCARENITES

THIN-bedded MICRITES + pelagic.

Thick-bedded calcisiltite - micrite

siliciclastics, COARSENING-UP

SCONNELL

2412 MORROW RD NE

Near Indian School
Road

Lee Woodward in MT.

Maiden, MT -
Box 3633
Lewistown, MT 59547

Gas on 6/6 - Receipt error
NM Visa #18, 12.42 gallons.

Monday, June 5th, 2000

Begin, NM Statemap Fieldwork

warm, bright, pt. cloudy

Bachman - GQ 1268
Upson - old Field maps w/ Kirk Bryan
Stearns pubs - AAPG v. 37, 1953, p. 961
Mike + Elenor Mortaño

Record all day with Sean Connell
- Hagan (Greater Hagan) basin
- I-25 to Budagher's Exit, Ball Ranch access to the north flank of Espinaso Ridge (Arroyo de la Vega de los Tanos)
- Rt. 22 divide
- Arroyo Largo basin and the Tanos fault
- Rt 14 to Puertocito Road

- PUERTECITO TO HAGAN; OUT TO I-25

MAJOR observations

(1) TUERTO GRAVEL is lithologically distinct from SANTA FE (CHAMISA MESA or Cerro Conejo -looking) IN THAT IT CONTAINS much QTZ rock types including hornfels.

(2) TUERTO IS INSET INTO ESPINASO Ridge and upper SANTA FE, all of which are dipping ~30-5° TO THE NE

(3) "SURFACES" above the TUERTO MAY EXIST ON ESPINASO Ridge + THE RT 22 interfluve, but THERE ARE NO gravels IN PLACE.

(4) The higher "SURFACES" all end abruptly TO THE SE, at about

Arroyo del Tuerto - argues for a down to the east structure, but none was mapped.

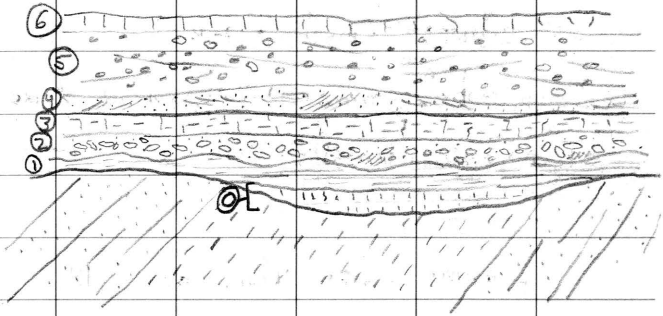
(5) There are several places where we can map / measure sections. We will try to:

- document thickness variations
- document three distinct sources for the Tuerto - Ortiz, Sandias, Sangres
- document the relationship btwn Ancha + Tuerto
- document the relationship btwn Tuerto and Cerros del Rio basalts

Tuesday June 6, 2000 hot, sunny

Will measure a section, then complete the recon.

Section HAGAN SW¼, NW¼, Section 34 R6E, T13N



0- fine-grained, buried soils? stacked overbanks?

1- Thin bedded, coarse red gravel w/ translocated clay; fine white gravel w/ carbonate

2- channel facies of matrix + clast-supported beds; coarse, poorly sorted.

3- marker horizon. red sandy siltstone

4- well stratified, sorted, x-bedded gravelly sandstone

5- ? lenticular bedded gravel + sand, poorly sorted + stratified

6- middle Pleist fan w/ stage III+ caleic horizon.

Clast counts, meter stick laid out along a bed, sampled any clast > 2cm at 5cm intervals

Red SS - Pa	red PMh	white S.S.	lt. green S.S. PMh	gray l.s. Pm
White SS - Tg	buff S.S.	green PMh	pC qtzite	Andesite
Kgh	dark l.s. Pm	light andesite Porphyry	Red SS - Pa	green PMh
dark andesite Porphyry	felsic Volc.	gray l.s.	buff S.S.	green PMh
White SS - Tg	light andesite Porphyry	felsic volc.	basalt	buff SS
Red SS - Pa	white SS. Pa?	chloritized diorite?	limonitic S.S.	andesite
dark l.s. Pm	dark l.s. Pm	felsic volc.	green S.S.	felsic volc.

☆ GRANITE + GNEISS < 1%, but present

micaceous quartzite	andesite	white S.S. Pa	gray andesite porphyry	white S.S.
white S.S.	l.s. - Plm	dark andesite porphyry	dark gray S.S - Ps?	felsic volc.
white S.S. - Tg	bull QTZ	Rhyolite Porphyry	white S.S.	gray S.S.
dark L.S.	green PMh	bull QTZ	green PMh	white S.S. Pa
dark Sparite	felsic volc.	gray sparite	QTZite	white S.S. Pa
buff S.S.	green S.S.	felsic Volcanic	gray chert	green andesite porphyry
Quartzite	Thin-bedded l.s.	white S.S.	limonitic S.S.	felsic volc
dark micrite	gray l.s.	gray sparite	gray l.s.	dark PMh
white S.S.	gray l.s.	laminated l.s.	gray micrite	red S.S.
green micrite	banded PMh	banded PMh	brown siltstone	white SS. Pa
gray andesite porphyry	gray chert	brown S.S.	white S.S.	gray andesite porphyry
green banded PMh	gray andesite porphyry	green PMh	gray andesite porphyry	white S.S.
gray andesite porphyry	white S.S.	dark l.s.	gray andesite porphyry	black mudstone

10 largest clasts, UNIT 1 (cm) b-axis

11	7	6	10
9	7	12	19
20	8	11	

	(b-axis)				
10	longest clasts -		UNIT 2	(cm)	
5	9	8	11		
12	12	17			
20	20	8			
CLAST COUNT -		deposit	trend - likely the		
middle Pleist.		FAN.			
white SS	white S.S.	basalt	gray PMh	white SS	felsic volc
gray Andesite	white SS Pa	dark PMh	andesite	green SS	felsic volc.
gray PMh	white SS Pa	basalt.	green PMh	felsic volc.	green banded PMh
gr Andesite porphyry	gr. PMh	felsic volc.	calcareous siltstone	green PMh	white S.S. Pa
gr Andesite porphyry	felsic volc.	felsic volc	l.s.	l.s.	basalt
gray chert	gray l.s.	gray andesite porphyry	white S.S.	green PMh	green banded PMh
green PMh	felsic volc.	Quartzite	felsic volc.	white SS	l.s.
Amphibolite	white S.S.	green PMh	felsic volc.	felsic volc.	QTZite
white S.S.	felsic volc.	banded green PMh	Andesite	bull QTZ	gray PMh

felsic volc.	Andesite	black Pmh	green SS.	white qtzite	gray qtzite
brn. S.S	felsic volc.	gray chert	green siltst	basalt	gray qtzite
chert	gray Pmh	white S.S.	felsic volc	gray andesite porphyry	brn. qtzite
brn siltstone	gray SS	red SS - Pa	white qtzite	white S.S. Pa	white S.S.
andesite	green Pmh	black l.s.	felsic volc.	travertine	gray andesite porphyry
gray siltstone	gray siltst.	white SS	felsic volc	l.s.	felsic volc.
felsic volc	white S.S.	white SS-Pa	felsic volc.	felsic volc.	andesite
gray qtzite	felsic volc	gray qtzite	andesite.		

Granite/gneiss present <1%

but... granite (Sangres, pink) is com at the base of the QF - QTc contact.

Wednesday, June 7th, 2000

hot, sunny, maybe AFT T-storm.

Northern part of Diamond Tail property - Access road btwn Coyote + Hagan, north to the region around the Union Carbide Prospects.

Arroyo Coyote 1 - a 3-fingered mesa north of Arroyo Coyote, NW¼, Section 22, T13N, R6E

The Tuerto here appears thicker than our measured section at Hagan. But both major lithofacies, a lower cemented and upper unconsolidated with a red siltstone in between are present

* Channel facies - fluvial dominate *

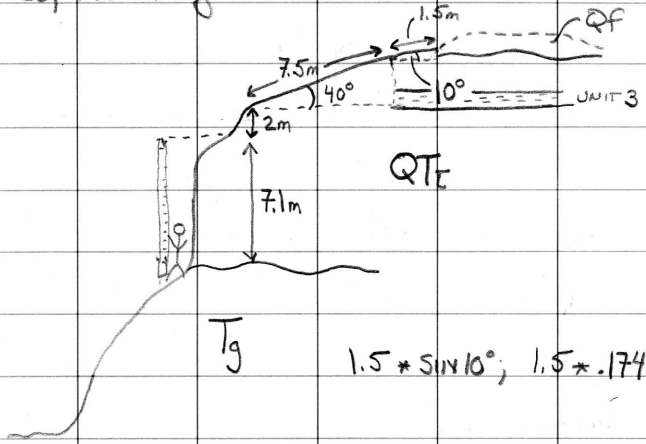
The Tuerto and Otay pediment clearly (in my mind) dip to the east ~ 5°. Overlying Qf do NOT. In fact, the fans thicken to the east, filling in the accomodation space produced by the Tuerto dip. We hypothesize that there is a N-S structure with down to the W movement. I'll pencil it in and call it the Coyote Fault.

Photos 16, 17, 18

I can't get reliable Buntoon dips (<5°) Sean feels it is ~ 2.5° east.

The Tuerto thins rapidly to the north

when it encounters Te. Apparently, Te is better cemented, etc and was a valley wall or interfluve in Tuerto time. QTc is clearly inset into Espinaso Ridge.



1.5 * SIN 10°; 1.5 * .174

7.5m * SIN 40°; 0.643

7.5	1.5
3215	870
4501 0	1740
4.8225m	2.610

.174

7.1
2.0
4.8
2.6
16.5m = TOTAL THICKNESS.

Clast count in upper facies - middle finger mesa.

basalt/perd.	Augite (AA) Andesite	AA	gray Siltstone	Augite monzonite	banded green hornfel
gray banded PMh	green siltstone	Siltstone	AA	green hornfel	green hornfel S.S.
green banded PMh	green PMh	green PMh	green PMh	AA	green hornfel.
felsic vole.	AA	gray PMh	felsic vole	green hornfel.	white S.S.
red SS Fa	(GAP) gray and. Porphry.	gray PMh	green horn.	GAP	gray S.S.
red SS Fa	green PMh	red S.S. Fa	green banded hornfel.	AA	white qrgite Fg
green PMh	green S.S. PMh	l.s.	GAP	AA	green hornfel.
felsic vole.	green S.S. PMh	gray S.S.	red SS Fa	white S.S.	green hornfel
Augite Andesite	GAP	white S.S.	AA	gray hornfel	AA
Augite Andesite	AA	white quartzite	AA	AA	AA
green S.S. PMh	Quartzite Fg	green banded PMh	K calc-siltite	GAP	AA
felsic vole.	augite monzonite	AA	K calcarenite	red silt stone.	red S.S.
green SS. PMh	basalt	AA	felsic vole	l.s.	green SS. hornfel
augite andesite	white S.S.	AA	K calcarenite	basalt	AA
white S.S.	white S.S.	AA	AA	felsic vole.	AA

l.s	Green PMh	basalt	black horn	AA	white SS
2	15	1	1	1	1

gray siltstone		Red SS Pa	white QTZITE	BRN SS
1		2	2	2

Granite/gneiss present < 1%

STOP Cuchillo 1

079 76°S

- really neat, complicated little region. There is a pretty sizable down to the N, E-W striking fault following Arroyo Tuerto. There are many small cross faults striking ~ N-S, down to both the east + west.

QTc is thicker on the south, and thickens markedly to the east, especially downstream of the Cuchillo-Tuerto confluence.

18.6 m of QTc + Qf on south side of Tuerto Arroyo just upstream of Cuchillo confluence.

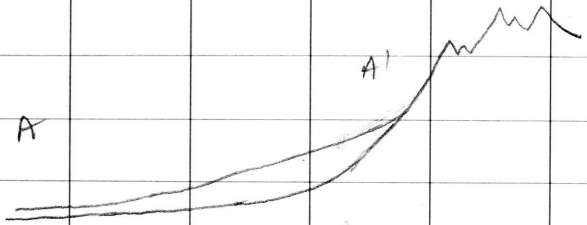
Cross fault on N side of Arroyo Tuerto 195° 75° W dip-slip slicks.

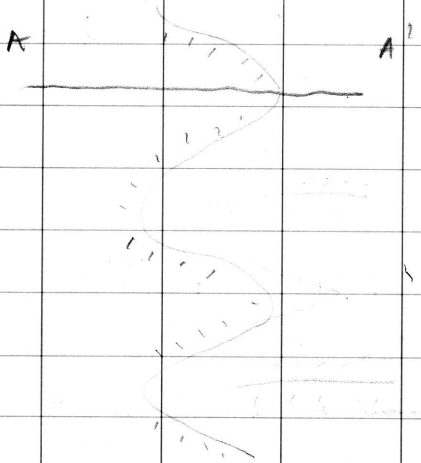
Tuerto Fm is faulted down to the E' → ~5m against horst of TRc channel sands - in the N-S oriented fault zone.

Photo 19 ↑

Photo 20 Numerous small N-S faults offsetting Je + Jt; large down to west placing K against Je

JUNE 8, 2000 hot, sunny, aft T storm





MUSINGS ON GENESIS

SECTION AT Cuchillo 2

3 * 5.6m , 1 * 3.5m ← TOP OF QTc

UNIT 1 ~ 5.6m ; UNIT 4 IS THE REST,
NO UNIT 3.

16.8m + 3.5m = 20.1m TOTAL QTc

Qf = 4.0m

SECTION AT Cuchillo 3 - UPSTREAM ON
Arroyo Tuerto, Golden Quad.
SECTION NOW STARTS TO THIN A BIT
and become deeply channelized.
There are several meters of local

relief of ~10–30 m wide channels cut into Chinle Grp bedrock.

Clast count - done in basal channel facies. All clasts within a 0.5×0.5 m grid were (>2cm) counted

White S.S.	White Qtzite Pg	Qtzite	Red S.S. Pe/Pc	Brn SS	Gray SS/ Calcarenite
II	IIII		IIII IIII	I	IIII I

siltstone	l.s.	AA	GAP	gr. Pmh	gray Pmh
III	I	IIII IIII I	IIII IIII IIII	IIII IIII IIII II	I

Augite Marg.	gray banded Pmh	basalt	black Pmh	felsic vole.	green S.S.
II	IIII III	II	IIII IIII IIII I	IIII	I

Unit 4 is 14.1 m thick w/ 4.5 m of Qf on top.
Unit 1 (cemented) is 3.8 m

The Cuchilla 3 section is summarized as a coarse, poorly to well stratified, fining-up channel facies w/ pebble imbrication, 0.2-0.3 m high trough x-beds. This facies is well cemented + pinkish-white in color. Above it is ~6 m of a brown sandy poorly consolidated gravel. Above this is a white/gray gravel. There is no intervening Facies 3 siltstone/soil of the Hagan section.

There are 3 v. distinct Q terraces inset into the QTc at this locality

Qt3 is either v. late Pleist or Holocene

There are several pit pits in Qt2 - shows sol characteristics consistent w/ a 1. Pleist. age - Red silty edian argillic, calcic horizons...

Cucillo 4

upsection ↓

5.3 m poorly stratified indurated unit 1.

4.6 m brn pebbly partially indurated sand

1.7 m coarse sandy gravel, well indurated and stratified.

2.4 m of upper brn sandy gravel (unit 4) unconsolidated

5.2 m of Qf

14.0 m

Cucillo 5

Opposite (N-side) of Cucillo 4

4.6m of Tuerto Fm- upper unconsolidated pebbly sand - brown

2.4m of Qf

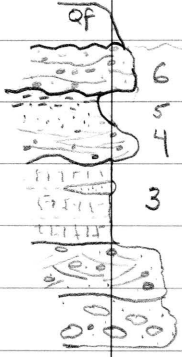
The QT story here is incredible! Needs someone to work it in detail

There are at ~~least~~ 3 strands, maybe more in the downstream direction

At stop Cucillo 5, the base of the QTt lies on bedrock ~ 1m above QT1.

Cucillo 6 downstream of confluence of Tuerto Arroyo and Arroyo Val Verde, South side of Cucillo Drainage.

QTg lies unconformably on Km. This is like of an ancestral San Pedro Creek deposit



	Facies	5m
6	4	1m
5	3/2	3m
4	2	3.7m
3	3	4m
2	2	3m
1	1	1.2m
		15.9m QTz

will sample for burial cosmogenics

3 bags →

bull qtz, white ss + qtzite; sandy matrix

Pebble count, Unit 1 Outcrop Grid Method

White SS.	Quartzite	White Qtzite P_g	Red SS P_a/P_c	Brn S.S.	Gray SS
11	1	𝍸	𝍸 𝍸 𝍸 𝍸	11	
l.s.	chert	Bull Qtz	Granite/ metamorph	Black Pmh	Green Pmh
𝍸 𝍸 𝍸		𝍸 11	1111	𝍸 11	𝍸
Green banded Pmh	AA	GAP	felsic volcanic	basalt	siltstone
𝍸 1	𝍸 1111 11	𝍸 𝍸 𝍸	𝍸 1	11	11
K calcisiltite /calcarenite	Augite monz				
	111				

Qf deposit here is very rich ~30-40% in 1.5. -by clasts ~20-30 cm Very distinctive from QTc

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Some general tidy-up notes

CLAST COUNTS. The counts done on 6/8 reflect a consolidation of known rock types. For display purposes, the following categories can be assigned

Sedimentary: Pa/Tkc, Pg/Pawhite, BRN SS GRAY SS, siltstone, K calcsilite/ calcarenite

Igneous / Ortiz : Augite Andesite (AA), Gray Andesite Porphyry (GAP), Augite Monzonite, basalt / gabbro / lamprophyre, felsic volcanic

hornfels : green hornfel, green banded hornfel, black hornfel, gray hornfel

Precambrian : Pink / red granites, red gneiss, quartzite, Sandia granite, bull quartz, Amphibolite

Limestones : Pm limestone, chert

Right now, the working hypothesis has the Tuerto Fm as a series of coarse piedmont alluvial deposits of three sources -

Ortiz,	Sandias	Sangre de Cristo
Arroyo Tuerto	San Pedro	Galisteo
Ortiz Prov.	L.S. Prov.	Granite Prov.

From W to East we see →

San Felipe Casino	Hagan	RT 14	
No QT	QT 12-15m	QT 16-20m	QT
1(?) midde?	Thick. 4 facies.	Thick. 3 facies	Thickness unknown.
Pleist. strath on Tsf, several	Broad, indistinct channels, No basal relief (<2m)	well defined channels, 10's of meters wide	confined to canyons, none on Br interfl.
Thick (10m) middle + late fill Terraces.	3-4 QT - primarily strath	Basal relief (2-6m)	?QT
		3-4 QT - all strath	

Major facies

4 brown pebbly sandstone, unconsolidated
3 Red siltstone w/ paleosols
2 sandy gravel, x-bedded, subrounded
1 basal sandy gravel, Arg, fluvial + hypercone., matrix + clast-supported

June 9th 2000 morning clouds/showers
Friday

La Bajada Today - Waldo Road
- Trying to resolve the Cerrodel Rio basalt - Tuerto Fm relationship.

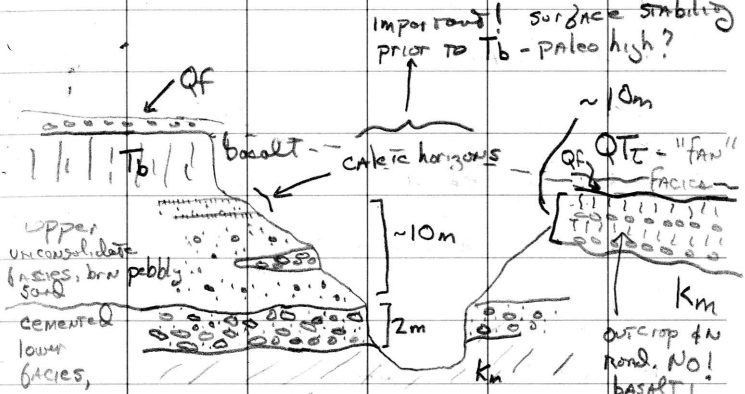
Paydirt! Unequivocal evidence that the basalt overlies the QTc

Quick clast count:
- ~1-2% I.S.
- ~1% PMh
- all volcanic / intrusive - weathered monzonite, Andesites, Latites.
- No Pink granite
- some Tree-looky Qtzite.

Stop La Bajada 1
- The base of QTc lies ~12-15m below Tb (carnotite horizon). There are no clasts of basalt in QTc

and I are directly below the deposit!

... but there are younger Q deposits overlying both the basalt and QT_t. This younger Q deposit is STEARN's QT_t .... and BACHMAN's QT_p.



Qf are distinctly different sedimentologically from QT_t. - Classic Q-type aeolian

deposits/soils (rubified) interbedded with gravel. many buried calcic horizons throughout.

Photo 1 (roll 2)

Qf is QTp of Bachman.

Galisteo 1 - nose of QTa + QTc immediately west of County Rd 55, Cerrillos, NM.

Cemented base of the deposit is all granite; granite sand + pebbles. I will do a quick count of the really big clasts. ~ 5cm diameter clasts.

→ This lower cemented base has steeply dipping ~ 25° x-sets ~ 0.5m thick. Trough-shape

paleoflow is subparallel to Rio Galisteo

Pink Granite	Sandstone	volcanic/ ORTI z.	PMh green	Gneiss/ Amphibolite	black PMh
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||	𝍸	𝍸 𝍸 𝍸 𝍸 𝍸 ||	𝍸	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||	||

l. s.	basalt/ lamprophere	bull QTZ
		𝍸 ||||

Float above last occurrence of Pink Granite

→ composition: <1% PreЄ; mainly gneiss + mica qtzite

~1% gray, fine-grained qtzite

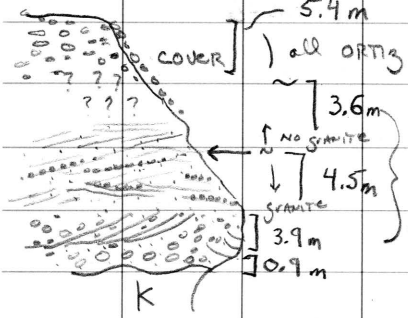
~2% IRONSTONE

~2% basalt / mafic rock.

remainder are intermediate volcanics, mostly GAP + a hornblende bearing GAP; no AA; red latite.

l.s. is present, but in amounts <<1%

The TRANSITION from granite bearing to NO granite bearing occurs rapidly in a fine-grained pebbly indurated SANDSTONE that sits atop the coarse basal facies.



Property of Barbara Harnack
98B Goldmine Rd
Cerrillos, NM 87010

GALISTEO 2 ATSF Shortline + RT 285

ON Private Road immediately W of 285

QTa - rather undulatory basal contact w/ bedrock. at least 2-5 m of relief.

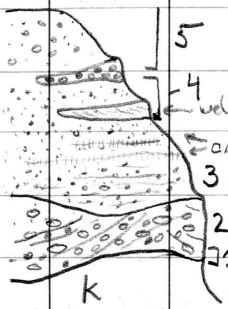
Again, a lower, well indurated, coarse-grained unit. Angular clasts, but a crude stratification at the decimeter scale.

Clast count: in face of outcrop, large ~5cm clasts.

Pink granite	meta/Amphibolite	l.s.	QTZITE (pC)	S.S.	Siltstone
49	18	27	2	6	1

Volc.	GAP	Hornblende, Augite monzonite	Monzonite (lt. colored granite)	Ball QTZ
2		4	3	2

Many of the igneous clasts are grussified.



5	6.8
4	3.3m
3	3.9m
2	1.9m
1	0.5m
	16.4

SUNDAY, JUNE 11, 2000 clear, hot, slight breeze

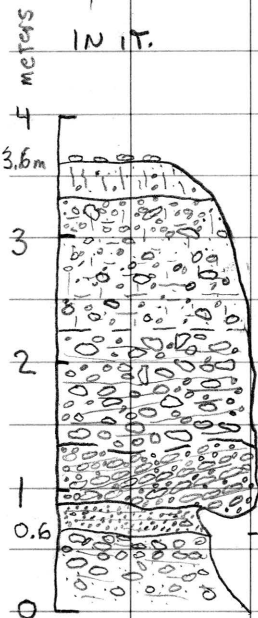
HAGAN QUAD, DIAMOND TAIL LAND. ON DIAMOND TAIL SECONDARY ROAD - ACCESS BTWN COYOTE + HAGAN. LOCATION where ROAD ASCENDS TUERTO-capped MESA. SE¼, NW¼ SECTION 34, T13N, R6E

There are good exposures of Tuerto Fm on the north side of the road, opposite the arroyo. CONTACT with Tg is well exposed. ON south-side road cut, Qf and the soil of Qf is well-exposed. This is as complete a section as you will find Anywhere of the Qf soil.

Below the Qf deposits are some

Q section

Some small exposures of QT_c in place, including the fine grained, red facies 3, poking out among hillslope colluvium. This Qc is several meters thick, fills colluvial hollows and has upwards of a STAGE III calcic horizon in it.



UNIT	w/D color	CARBONATE STAGE	Soil / Sed
5	10YR 4/4 10YR 4/4	—	silt-silt loam
4	10YR 6/3 10YR 5/4	III+ Powdery	
3	7.5YR 6/4 10YR 4/3	III-III+	
2	7.5YR 6/3 10YR 4/4	III	CArbonate overprinting RED sand
1	10YR 6/4 10YR 4/4	I-	
QT_c	upper brown facies 7.5YR 4/6 7.5YR 4/4		

Photos 11+12

Qf clast count

white SS	Pg	QUARTITE	Red SS P-m	Brn SS
IIII	IIII II	II	IIII IIII IIII	IIII
Green Pmh	Green banded Pmh	Black Pmh	K calcar-calcisilt	Siltstone
IIII IIII IIII	IIII II	IIII IIII	III	IIII I
felsic volc	AA	GAP	monzonite	Basalt
IIII IIII II	IIII IIII III	IIII I	I	I
l.s.	chert	granite gneiss	bill QTz	
II		I		

Upwards of 2m of Qf is missing from the top of this outcrop.

QII exposures - fine sand, pebbles, silt
locally well-developed soil, stage
II+ - III Calcic horizons, v. powdery.
Not associated with a Terrace level.
Simply piedmont alluvium/colluvium and
valley alluvium/eolian deposits.

I think that there are two deposits here

① An upper silt-loam, v. sparse pebbles. 10YR 4/4
~~~ unconformity ~~~ Pink stage II $CaCO_3$

② A lower pinkish RED Argillic horizon w/
~1-5% pebbles, good structure, silt loam,
sandy silt, stage II - III - $CaCO_3$
5YR 5/6

I've got to think that some of this
red color is coming from erosion of Tg
~~~

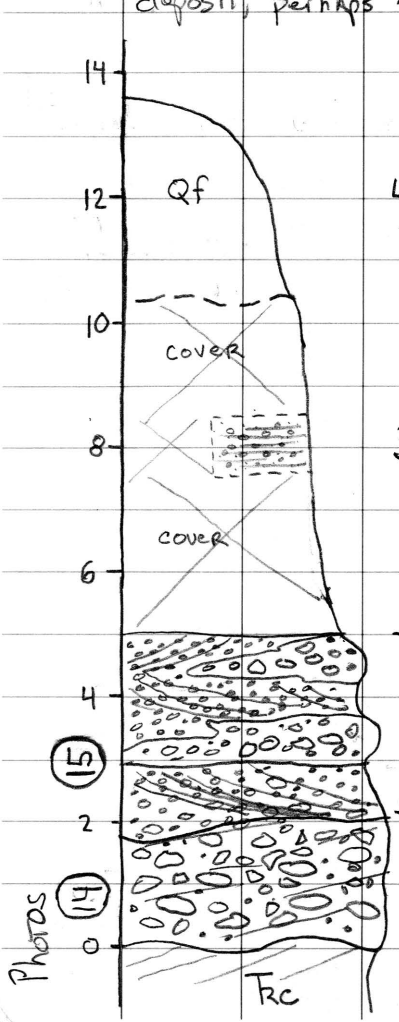
SAN Pedro 1 - East of PUERTECITO on QTc finger projecting NE out of La Madera.

There is a great deal of slumping on this nose, the basal contact btwn Tmc and QTc is obscured. My best estimate measures a total of 13.5m of QTc and Qf.

These are the best exposures, but they are far from good! At best, I can distinguish three MAIN UNITS -

1. a lower cemented unit that distinctly fines upwards
2. A middle pebbly + cobble sand, reddish brn color and with a 0.5m caliche colluvial cover

3. An upper Qf bouldery l.s.-clast deposit, perhaps ~ 3-4 m thick.



Clast count in unit 1

P-M red S.S.	l.s.	chert	pЄ quartzite	ℙ S.S/ cong/.
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 II	60 20 80	I	I	IIII

mica metamorphic schist	Amphibolite	Pink granite	Sandia Granite	GAP
I	I	𝍸 III	𝍸	X

red gneiss	Bull QTZ	Pg
IIII	I	I

Clast count in Qf

P-M red SS	l.s.	pЄ quartzite	ℙ SS/cong	Pg
III	~100	𝍸	II	II

mica schist	Amphibolite	Pink Granite	Sandia Granite	Red Gneiss
III	II	I	Present	𝍸 I

Bull QTZ	Gneiss	Green stone?
Present	𝍸 I	I

San Pedro 2 - SP2

A pediment / terrace gravel at 6020'. Very rich in PE quartzite + l.s. ~1-2m thick.

Puertecito wells - East of Puertecito as the Puertecito Road climbs up onto the QTt strand. Clear evidence of thickened, tilted Tuerto immediately east of projected fault exposed in Arroyo Tuerto

QTt tends to be thicker (~6m or one contour line) on the ridge south of Puertecito rather than to the north. Similar to relation observed in Arroyo Tuerto.

List of Camping supplies we need/forgot

- bucket
- spices
- Propane tank
- Aluminum foil

Field Camp
Tuesday June 20th, 2000 cool, breezy

Arrived at Red Hills Campground, Gros Ventre valley. Lehigh Field Camp

CONTACTS / PERSONEL

Ed Evenson George Stevens Nate Harkins	EES 341
Diana Latta Adrian Johnson Nate Gardner Staci Esminger	EES 41

$$\frac{25'}{x} = \frac{1'}{0.3048}$$

3048
25
15240
60960
7.6200

$$\frac{1''}{7.62m} = \frac{x''}{10m}$$

$$7.62 \overline{)1000.} \quad 1.44$$

762
3380
3048
332

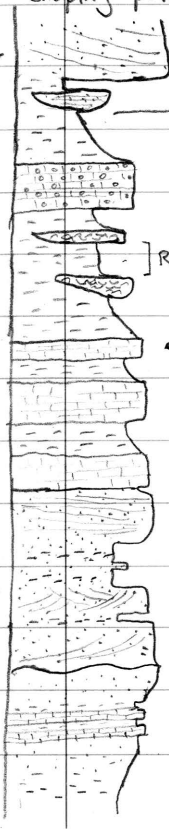
2762
4
3048

Field Camp '00 June 22, 2000

Warm, clear, breezy

Section Measuring - Red Hills

320° / 4 NE section is opposite wildlife display pullout, lower slide lake



Section Measured by FJP + SEP

BASE-TO-TOP (*) ← NOTE

UNIT	Thickness (61)	
1	24	Red siltstone w/ local, thin green siltstone beds coarsens-up to interbedded red siltstone + gray fine S.S. + calcarenites, thin to medium bedded.
2	25	medium to thick bedded gray calcarenites with thin red siltstone interbeds. Coarsens up to red SS w/ many shale rip-up clasts
3	5	medium bedded red siltstone overlain by a med. bedded red S.S. plane parallel lamin. weak channel forms, 10 cm-thick green, bioturbated siltstone at top
	Kc ↑	
	K-Jn ↓	
4	45	Salmon trough + // bedded medium SS, medium to v. thickly bedded. Thin to medium bedded lenses of red fine ss + siltstone ~10m lateral continuity. Calcareous
5	62	Salmon + white, medium-coarse edimite S.S, 20 cm trough + tabular cross-set S. NE paleoflow. medium bedded calcareous
6	6	white plane parallel, medium bedded calcareous S.S.

UNIT	Thickness	
Gypsum Springs		
7	35	medium-thicky bedded pink+gray laminated calcarenite. 5-10 cm trough x-sets interbedded w/ brn-red calcareous mudstone local intraformational breccia. Top bed is very thicky bedded, intraformational breccia whole unit coarsens up.
8	50	red calcareous mudstone w/ few thin calcarenites - 20' thick. Abrupt transition to gray calcareous mudstone with few thin calcarenites which increase upsection to medium to v. thicky bedded gray wavy-bedded + laminated calcarenite w/ v. thin + thin gray calcareous shale interbeds. V. few pelecypod casts in top calcarenite
Lower Sundance		
9	95	olive-gray shale - numerous pelecypod body forms. Interbedded lens and channel gutters of packstones - mostly pelecypod casts.

Unit	Thickness	
10	11	Red mudstone + siltstone, calcareous
11	36	Olive gray unit, with increasing fossiliferous packstones, Thinly-bedded near top
12	20	medium-thickly bedded oolite packstone + grainstone GRAY Ledge former.
13	35	olive gray shale with increasing number of shell packstones, Thinly-bedded near the top
14	7	Gray oolite wackestone, medium-bedded
15	50	olive gray shale, interbedded w/ few packstone shell-Thin beds

Upper Sundance

16	~25'	Gray, Thin bedded medium ss, shallow trough x stratification. Gives up to a olive-gray siltstone + shale. ~10' Thick

17. ? Buff, thick + v. thickly bedded medium-coarse S.S. Broad, distributary-like channels

Total Thickness ~		(ft)	(m)
Jsu	2 1/2 5+		~7+
Jsl	~~250~~		~75
Jgs	85		~25
Tk-Jn	113		~35
Tkc	54+		~17
	527		

Friday, June 23rd, 2000

clear, windy, warm

Red Hills Ranch (Trail) road. Good drainage - The anticline is exposed within about 0.5 km of the road. And a major fault, but expressed as an offset Nugget cliff is exposed at the joining of the Mt. Lady and Grizzly Lake Quads. This fault continues north where it clearly cuts the Lavender Cliffs, placing upper Sundance in the west against Morrison in the east.

There is alot of cover - major Qls and Qacu throughout the valley bottom.

SATURDAY, JUNE 24, 2000

clear, warm, not as bragy.

The ridge forming the west side of oil well drainage. - OUTSTANDING exposures - worth walking the entire way. The AXIAL SURFACE is well exposed.

DINWOOD Fm is exposed in the core of the Anticline in oil pipe rd drainage and "double drainage" east of oil pipe Road. On AIR photos, it shows up as a highly reflective brown S.S.

Sunday, June 25, 2000 (69)

warm, clear, v. pleasant

Hike up the ridge on east side of Horsetail Creek. Very nice - along strike w/ JKtz. There are very good views to the north - northeast from the top of this ridge and then again on Peak 8423'. Big Ridge formed to the north is Jsu.

Wow! Red + gray qtzite cobbles (5-20cm) at ~ 8400' on swale east of knob 8600', Headwaters, west of drainage of oil well canyon.

Monday, June 26th 2000 (71)

cool morning. pt. sunny, warm

- Talk about surficial geology + Gros Ventre slide
- Horsetail drainage.
  20-50 million cu yard June 23, 1925
  - May 18, 1927 – 50' of dam washed out
  - 3 min. Lake 200' deep.

- 8200' head of Mormon Strike Valley, West Fork Horsetail. Big Pile of QTug. includes a muscovite garnet schist. mostly (virtually all) grey, red, white quartzite.
  There is one rock-type w/ a weird shell-impression like polished surface texture – silicified l.s.?
- some clasts have bigtime striations
- dark – volcanic/lamprophyre breccia.

Dinners + Lunch - Bfast

8/10 $7

8/11 $13

8/11 $12.50

8/11 $10

8/12 2.50

8/12 4 - Gas

8/12 30

8/15 $20 Lunch

8/15 $5 Dinner

August 11, 2000 Quito, Ecuador

Instituto Geofisico, National Polytechnical University

Meeting with Pete Hall, Patty Hall, and Alexandra

These folks are really doing this "seat of the pants" UN, QIA, USGS

Undergraduates at The Polytechnical Univ. are very well-trained, and well prepared for graduate work.

- Baby - French, working on Sed-strat + structure
- François Dumont, Shumm post-doc, has worked on fluvial geomorph here too
- Swiss ETH group is still here, collaborating.

- British geologic survey maps are available
- 1:25,000 topos are available and good.
- 1:60,000 B/W airphotos are available

Instituto Geografical Militario -
The dome-shaped building on the
Polytechnical Instituto

- The most immediate hazard to Quito is Volcan Guagua Pichincha, west of town (~4800 m). Southeast of town is Cotopaxi ~ 19,000' (5897 m)

August 12, 2000

cool, overcast mornings + evenings, warm, partly cloudy days

We will do a loop through Mindo, to Santo Domingo, a region dominated by a large alluvial fan of the Rio Blanco, NW of Quito. It will be important to observe the nature of the western escarpment as we drop west of Mindo.

The drainages follow a clear pattern of N-S, NW-SE

important map -
Provincial map of
Pichincha 1:250,000

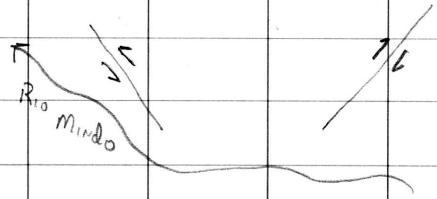
Photo 1.24 Volcano Cayambe

The western crest of the Interandean valley is an unremarkable feature - not terribly characterized by an upland surface. The valley bottom is wide, with a narrow, deep arroyo ~10-30 m deep

Rapidly, you pass out of volcanic rocks and into K turbidites, some of which look calcareous. These rocks produce mudflows; volcanic rks in Interandean valley slide.

Rapid transition to the Pinyon Fm - a slightly metamorphosed diorite?

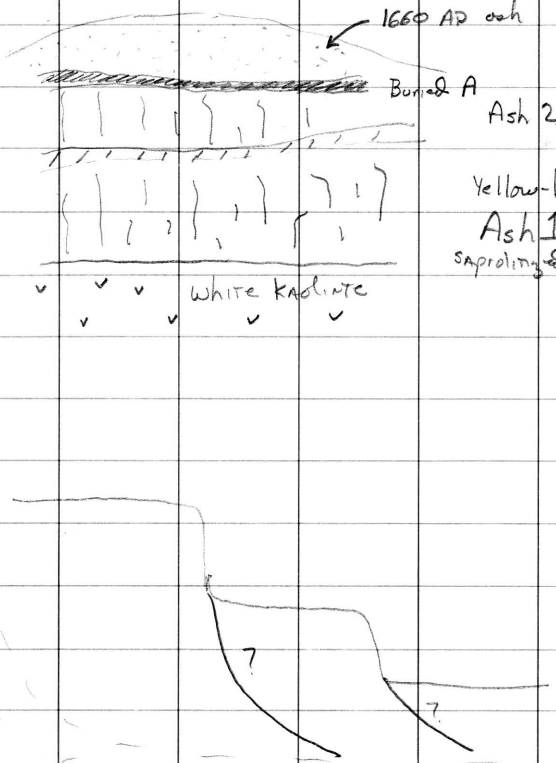
Mindo



★ Perhaps the most Amazing feature of the Mindo area is the fact that there is a long history of alluvial fan development - dominated by Lahars and associated volcaniclastics. The oldest fan heads onto an interfluve. In Mindo, there are 3 lahar terraces, the youngest being ~ 1660 A.D. In places, the youngest overlies terrace 2, of course, there is a general inset strat.

Photo 1.26 Volcaniclastic fan 1 above Mindo. Reminds me of the Pyue Fm. At least 25m thick, likely much more as the base is not exposed. This is the fan that heads to the interfluve

Photo 1.27 Really neat exposure on The Mindo Rd -



PUERTO QUITO, RIO CADNI

- The highway down to this point follows a high flat surface - ultimately you loose the 1660 AD Ash and everything is really well-weathered - very Red

RIO BLANCO - Bridge of Highway

There is a modern Terrace over an Indurated LAHAR. There appears to be one large fill Terrace, with two separate treads. The higher of the two has a nice brownish red soil

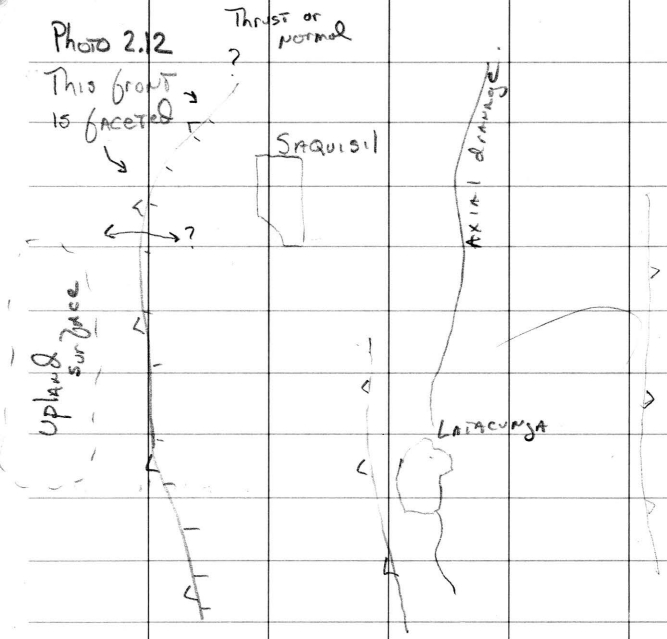
Begin the southern route, we stop at an overview of the EASTERN VOLCANIC ARC
- really outstanding views of Volcan COTAPAXI
- remaining PHOTOS of roll 1,

- PHOTO 2.8 Nord + Sud ILINIZA.
; These volcanoes are dead, but you see their DACITIC domes extruded from the former edifice.

- PHOTO 2.7 Volcan CORAZON.

- PHOTOS 2.8 - 2.12 PANORAMA of the SOUTHERN INTERANDEAN valley in and around SAQUISIL, A TOWN NW of LATACUNGA. ☆ NOTE upland surface ☆

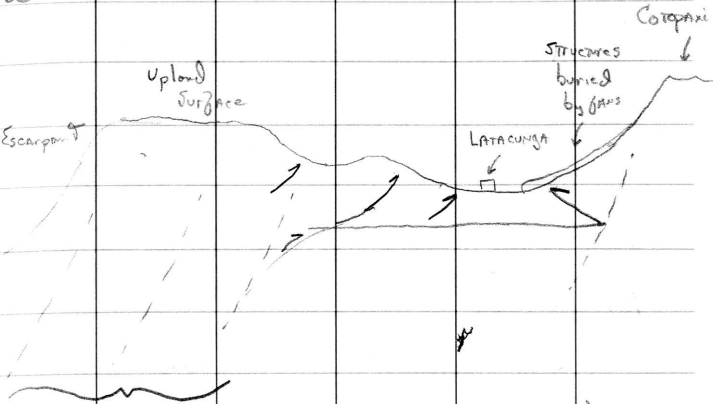
Photo 2.12



There are some Thrust focal mechanisms.

One thing is clear, The ACTIVE TECTONICS are NOT well expressed IN The TOPOGRAPHY. AND IT IS NOT clear if These faults are compressional or extensional

W



Check all That - This is clearly an active fold + thrust belt. The Andean strike for km - almost no dissection, very few cross-strike drainages. But reasonable exposures in and south of POALÓ.

Pyroclastic deposits of Chalupas caldera ~400k are involved in the folding.

PANZALEO - AMBATO 1:100,000 sheet

Bridge of PAN AMERICAN Hwy, south of Salcedo. Exposure on W side of road shows middle Plest. fluvial forland basin fill exposed in the footwall? of an east verging thrust - same ridge we saw at Pontó. Sequence is capped by the 400 k ignimbrite.

Photo 16 - part of the exposure with down-to-the south growth, normal faults.

Photo 17 - Across the valley, on the east side, a west virgin structure has beautiful west dipping fold limb. The limb is onlapped by a l. Plest valley fill

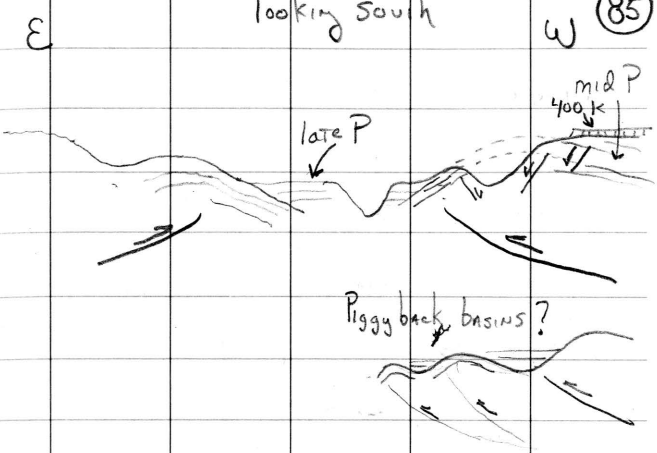
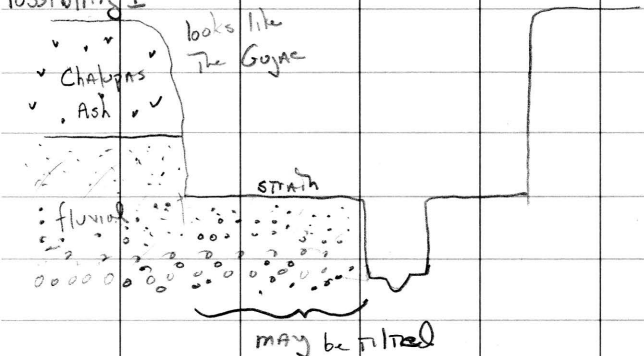


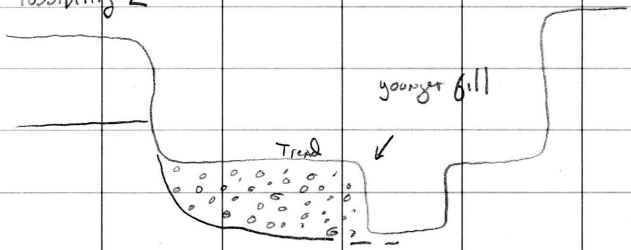
Photo 18 LAGO YAMBO. A very odd, spoon-shaped lake that sits high above base level. Folds exposed from the lake overlook (on Pan-Am Hwy) appear to be both pre- and post Chalupa Ash. On the eastern folds, there is more evidence of Chalupa Ash folded.

Rio Yanayacu, east of Salcedo

Possibility 1



Possibility 2



What an incredible cobblestone Rd + bridge to get to this vantage.

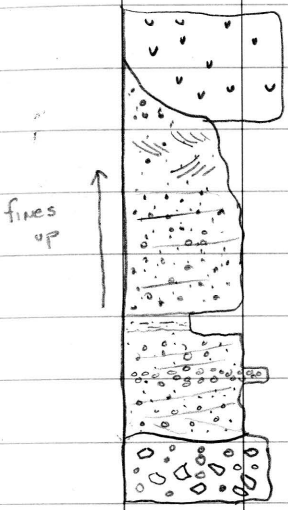
Photo 19

Photo 20 strath of Rio Yanayacu from upwards of 5 complex response straths.

Above; Photo 21 Inner gorge of river showing pre-Chalupas fluvial deposits with possible Terrace Alluvium capping them.

→ less well sorted, Ang, + coarser.

Basic stratigraphy is:



Chalupas Ash - up to 300m
~400k?

fluvial deposit
100 - 400 m "Salcedo" fm

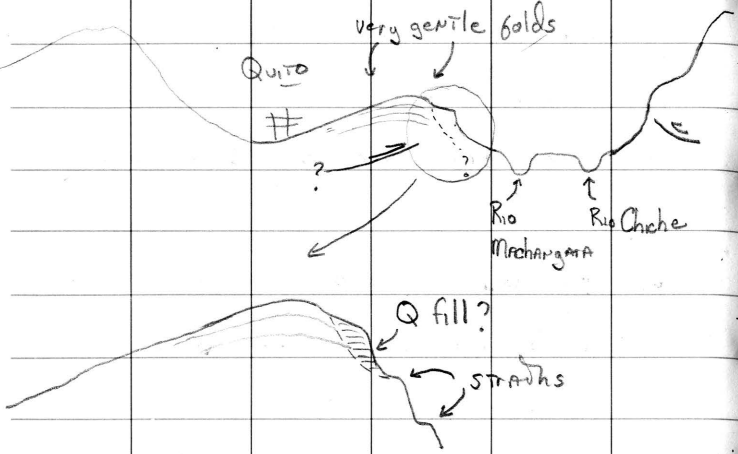
Lahars from Cotopaxi

Monday August 14th, 2000

Again, beautiful, clear morning.

Did some hiking in Quito today and have some impressions on the topography. The ridges in the valley very well may be fault cored anticlines in an overall little transpressional thrust belt. In this respect, the Quito basin may behave just like the Latacunga basin, but the topography is greater. In any event, the ridges here in Quito have very distinct benches protruding from nearly the ridge crests - and the drainages have numerous unpaired stands with little lateral continuity. The preliminary conclusion is that this basin has been

exhumed - and recently!



Drive Through Pifo + over the pass - 13,000'+

1. unbelievable black mollisol ~ 1-2m thick with numerous Ashes + obvious changes in color
2. Glacial deposits - moraines on west side with an inset 30 K lava; younger dryas moraines at the summit; ~13-14 late

Wisconsinan moraine.; Pre late Wisc. at Papallacta

3. Young Andesite flow just east of the summit that dams the stream, making a small lake
4. Highest grade metamorphics are schistose-gneiss
5. Pre Wisc @ 2600m before Chalpi, valley goes to a distinct V shape

Rio Papallacta

Photos 3.13 - 3.14 Rock-involved landslide & associated debris flow.

Puente Maypa - valley is wide here w/ Terraces.

A nice, 100m thick Andesite/basalt lava flows into the valley at ~ Cuyuja

It comes down the Rio Quijos valley. At that point, there are ponded deposits. Many hanging valleys/waterfalls and locally the base of the flow is exposed atop mesas. No buried gravels found.

Police station

~5 km upstream from Baeza, the flow is at road level and an exposure to the north shows a wonderful waterfall + alluvial material w/ a honking soil. Photo 3.18

The soil is exposed in a new slump ~100m below Baeza. It is ~2m thick of fine-grained, deeply weathered, red loamy material, largely devoid of clasts

that overlye a more clast-rich, yellowish material w/ clasts, that overlies a black matrix supported, unweathered ☆ Till? This deposit looks all the world like the weathered Till at the Clearwater-Quartz divide- A weathered, orange deposit in super-sharp contact w/ an unweathered Till. If this is NOT a Till, then it is a very interesting debris flow.

Tuesday, August 15, 2000

Again, beautiful in the morn.

STOP 1 - North of town - Calderon

Nice overview of basin - basin fill + Terraces + incision - Photos 3.20 - 3.23 one for David.

Cangahua eolian - "L. Pleist"

Chalupas + equivalent ~ 250 k

Chiche conglomerate

Guagllabamba Volcanic breccias

Photo 3.24 Deformed slump block overlying Cangahua Fm.

STOP 2. Btwn Rio Pisque and Rio Guagllabamba valley, north of Guagllabamba

Unbelievable! Possible site for an impact

section. Unbelievable flight of terraces
Photos 3.25, 4.1-4.2
Photo 4.3 deformed, slumped P-Q
lacustrine? beds.

STOP 3 Near San Jose de Chaltura
Rather unremarkable exposures of the
northern fill stratigraphy. Again, there are
multiple generations of the Cangahua Fm
overlying local volcaniclastics, etc.
I'm not too enthusiastic about the prospects
of working this section.

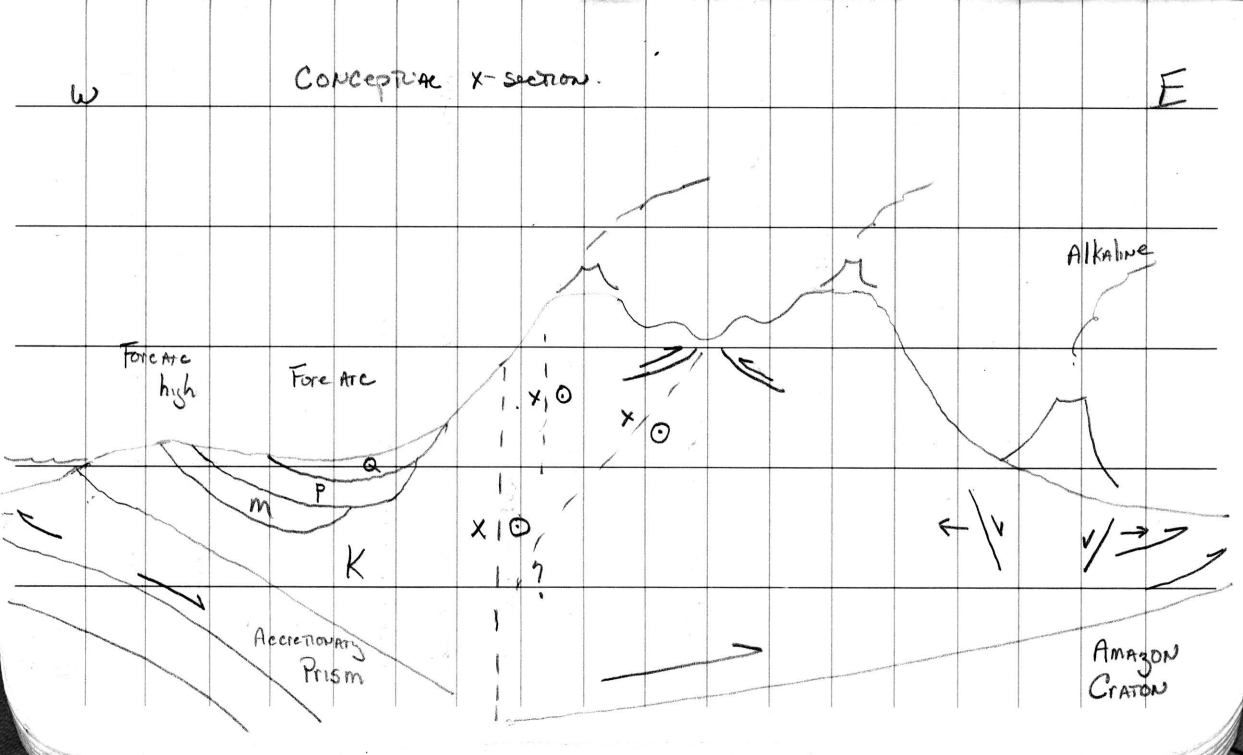
Rio Ambi' - again, very good terraces
Imbabura volcano Photo 4.4

The terrace treads appear to be undulain

by rounded alluvial gravels, locally weathered + discolored red + orange.

In the IBARRA area there is clear evidence for thick alluvial fills beneath the terraces - in general, they fine upwards

STOP 4 North of Ambuqui, Rio Chota valley. This is a fold + thrust belt that deforms late Miocene rocks. They are volcaniclastic, likely derived from the EAST. Thrusts verge EAST, but are likely dead. Structural anticline + synclines are buried by Plio-Pleist. volcaniclastics that are flat lying.


W
CONCEPTUAL X-SECTION.
E
Alkaline
FORE ARC
high
FORE ARC
Q
P
m
K
ACCRETIONARY
PRISM
AMAZON
CRATON

Photos 4.5, 4.6 Chota valley - terraces and granitic gravels (from Eastern Cordillera) in a windgap.

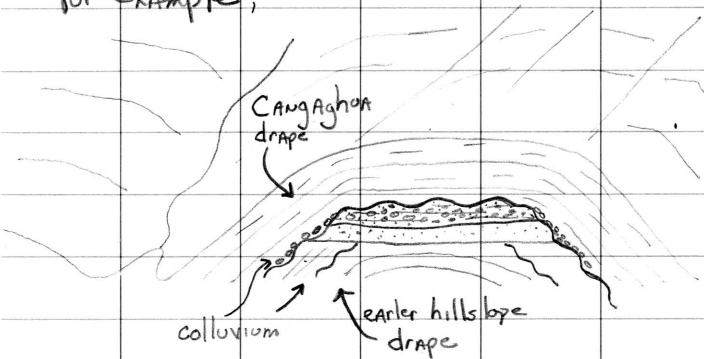
Photo 4.7 Bridge to Salinas - Thrust fault in Q seds - likely the 1868 Ibarra Earthquake. Almost certainly a thrust with cumulative displacement down Rio Ambi section. - Several meters of post 3000 yr displacement. East-verging. Offset of a Rio Chota Terrace. ~25 m of incision in 3000 yrs! Actually NE verging - like the faults in the Latacunga area.

Late stage, transpressional tectonics, related to the onset of oblique subduction

There are a few observations needed to wrap-up the day. First - The west facing escarpment of the Eastern Cordillera is faceted and it really appears to have

U-shaped valleys flanked by lateral moraines. But my view was quite distant and I am not sure.

Second, the stratigraphy of the Cangaghua Fm is very, very complicated, for example,



WARM, OVERCAST

Wednesday, August 16th, 2000

Wrap-up meeting at The Instituto

- mapping + characterizing faults as they strike NE across the Interandean valley is a major concern of the Ecuadorians.

- There is

Saturday, October 14, 2000 (103)

Hudson Valley fieldtrip w/
Bruce Idleman, Dave Anastasio,
Don Fisher, Tim Byrne.

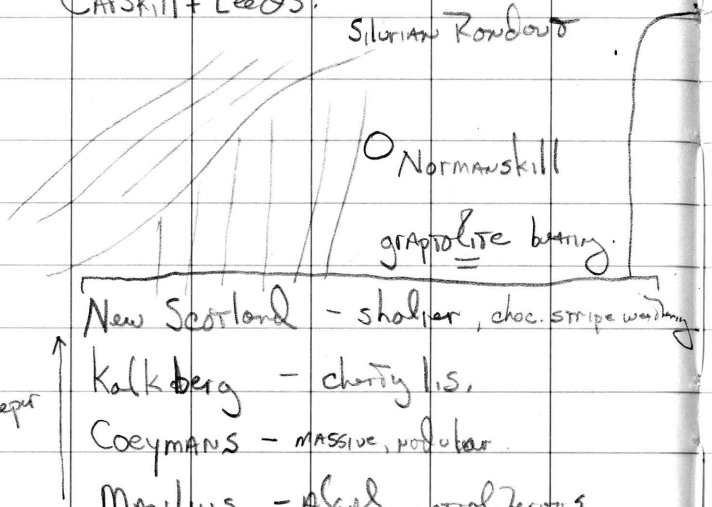
STOP 1 MA-NY border, Sunset
overlook off Appalachian Trail, near
Bish Bash falls btwn Rts 23 and 22.
Photo, view across the Taconics, to the
Catskill Escarpment
Rocks here are kyanite-bearing Є?
distal shelf meta-greywackes.

STOP 2. Mt. Ida. Silurian + Devonian
Carbonates unconformably overlying Taconic
flysh w/ step bedding + cleavage
W 23B, N 66 - Trucks entering
Keil Contracting.

Bradley 1988, Tectonics → migrating forebulge of the Taconics

Lunch at Dutchman's Landing, Catskill, NY.

STOP 3 Rt 23 outcrops brown Catskill + Leeds.



Beacraft

Outcrops are structurally complicated. A phase of thrusting + shearing to the west ... Then folding ... the faults are clearly folded.

STOP 4 Rt 23A begin ascending the escarpment - Esopus overlying Helderberg Group. Detachment (upper) in the Esopus Fm. Big quarry on Right side of road. or Abandoned road / on ramp for Highway.

Matshak STOP 4

Sunday Oct. 15, 2000

field trip to CT-NY w/PSU, CU

STOP 1. Bartholomew's cobble. shelf carbonates, metamorphosed, Beckmantown Fm equivalent, greenschist facies marble. Tremolite calc-silicate mineralization

STOP 2. Council Caves. Near East Hartland opposite Leggett Rd for the trailhead. Rowe Terrane, Rowe Schist, Metasedimentary Rocks of the rooted Taconic Rocks.

STOP 3. Intersection of 4 + Rt. 84 Hartford Basin Redbeds + basalt

Exit 39

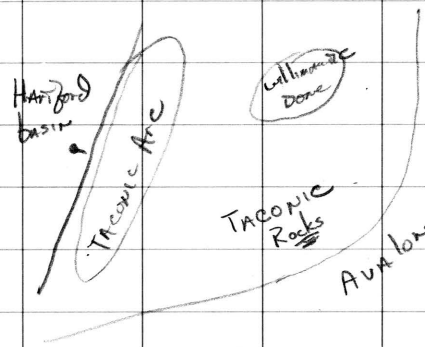
Honey hill - Lake Char fault zone

→ Night stop

STOP 4 Gillette Castle, CT.

Mylonitic Rocks - part of Wilmantic Dome core complex.

N-S extension in Alleghenian, NW-SE extension in the Mesozoic. Top to the NW on the Taconic Arc & Rocks.



Pelham Dome & Masapeakit Dome in Mass might be extensional features too - targets for the drainage story.

Lastly - At the outcrops below Gillette Castle, there are many pseudo tachylites. - OUTSTANDING!!! Paleoearthquake! Melt horizons x injection of quenched melt (cooled black glass). These pseudotachylites are brittle features superimposed on ductile mylonite fabric.

2001 NM Fieldwork

CONTACTS:

Cosmo Herrera Cuba Landowner
Home at Pegasus Sign, Rt. 196 SW of Cuba

Clovis Herrera - Nephew of Cosmo, owns house at ungated end of Zia Camp Rd

Mickey Herrera - Son of Cosmo - own's The Cosmo's grocery store in Cuba

Sherry Gaston - Jemez Springs Ranger Station

Jemez Pueblo - Stuart Gauchipin; Whatley

Melissa Mouk; 582 County Rd 55 Cerrillos

Gloria Ortiz - Melinda Inc.
Wagon Trail Rd
Access 3003; 3004

Golden.
John Barnett, Love Mt Ranch

Bill Cook - Cook Ranch
3211 Reese Ck Rd
Belgrade, MT 59714

Don + Cristy Pope
Ranch Managers

(From Im S. Gallatin)
Gate Access 1369

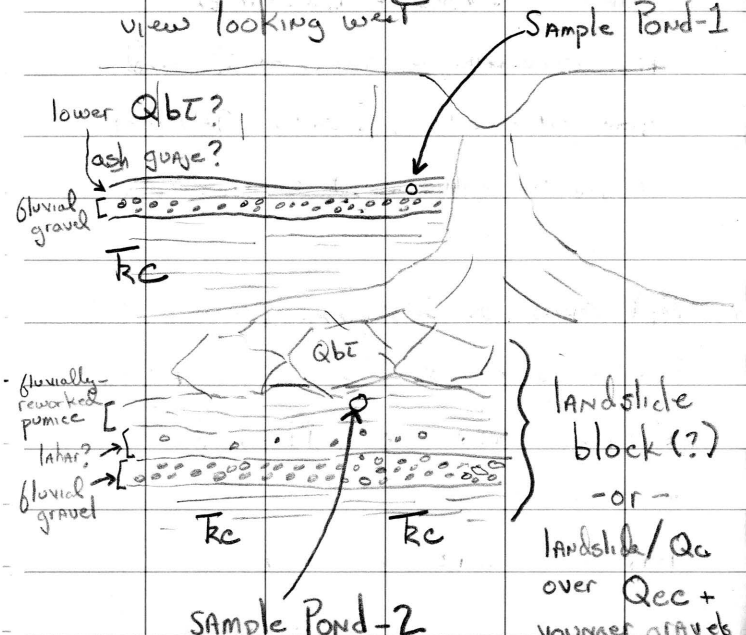
Arroyo Chorro Access - old Cash Ranch
Jim Ratchford
Forest Fenn
Randy Pope + Leslie Barkley
Karen Walker
Gate Access at Randy Pope's house 1316

April 29 - May 1

warm, clear, breezy

Three really fine days of reconning with Kurt.

Paliza Canyon, Ponderosa quad.
~ 0.5 km south of the group campground



JUNE 5TH 2001 clear, warm breezy

PALIZA CANYON, PONDEROSA QUAD w/
Bob Osborne
Mike Ramey

Reconned upper PALIZA CANYON in the morning confirmed Cochiti Fm at the gate above the campground and both BANDELIERS. Lower Bandelier is pumice-rich and salmon-colored

· Aft spent on EAST flank of SIERRA NACIMIENTO We accessed Abiquiu Fm at VAM3 Brown. JAMOSO Quad, Forest Rd 315. Here's the deal:
Abiquiu Fm here is ~30m of a granite clast conglomerate - 10cm clast

SYNITE composition

MAXIMUM DIAMETER. Smaller AMTS of a COARSE quartzite + SS are present. The clasts are mostly subrounded - they appear like they could be locally-derived from the SN. AT ABOUT 9200-9300', there is a bench in the hillslope - here ~ 50' of Pedernal chert crops out. Above that is 0 - ~300' of A white, fine, siliceous SS + siltstone - upper part of lower Abiquiu(?) Looks like fine-grained ZIA Fm!

Possibility: MATERIAL ABOVE Pedernal is EOLIAN-like ZIA (?) equivalent. Pedernal is PALEOSOL TIME correlative TO STONY desert IN NW ABQ BASIN (L. Oligocene).

SAMPLE SN-R-1 - Abiquiu Above Pedernal

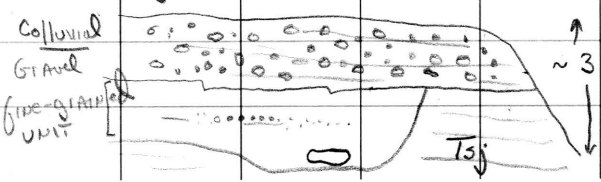
June 6, 2001 clear, sunny, cool morning. (115)

Field checking with Kurt + Andrew out of Crystal Creek Campground - Rt 126 w/ off Cuba.

Circle A Ranch Rd - to The Stanley property

Very nice badland exposures of Tsj ... And the overlying gravels Observations are very interesting because it appears that there may be granitic gravel interbedded in the upper San Jose Fm.

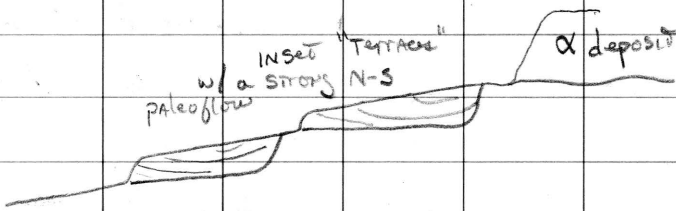
Garbage Pit exposure: looking east (Photo)



All along the Northern edge of the badland escarpment, there are places where it appears that there are little gutter channels of granite cobbles & sand within the San Jose Fm. Unless this is some cruel colluvial story - we cannot dig them out - we have to accept SN topography in the Eocene. This could be a good little project for Andrew.

⑧ Photos (end of Kodachrome roll)

There are exposures of the gravel in the NE part of the Amphitheater that look like this: (facing North)



The α deposit represents a 30-50m fill. Everything else is inset - largely fluvial with colluvial dribblings on top.
- really argues for a westward migration of the axial drainage

⊛ Photos of Mountain Front ⊛ (new roll)

Up at Regina (Armand Grollman's place) there are distal fingers of Woodward's QTep and QTol.

↓ ↓

2 buried soils + surficial eolian deposit

↳ red Argillics, stage II - II+ carbonate

↳ 1 buried soil, red Argillic, stage II carbonate

- right now... QTep = Pre Bull Lake
  QTol = Bull Lake
  Qal = Pinedale / Holocene.

June 8th 2001 Friday

SW corner of Madrid quad in Mtn w/ Sean Connell.

→ Accessed off of Galisteo Dam Rd

Baja Waldo Rd - south to the Ortiz Mt. Grant boundary

This is the feather edge of the Tuerto Fm. Like at the Galisteo 1 location of last year (2000) it is clear that there are 1, maybe 2 Trends of Tuerto below the constructional top. All of these share the same strath. Up to 4 QT. All QT and Trends of QT diverge downstream.

BW1 (BMJA Walde)

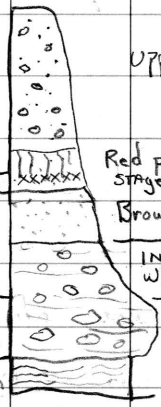
3919535 N 388600 E

QT_t unconformably overlying Blackshare Fm
↓
Upper Espinaso

9.7m

Base of QT_t distinguished by platy, yellowish Qtz clasts on gently dipping Teb (Espinaso - Blackshare).

BW2



Additional NOTES

UNIT

5 slightly effervescent

6 vfl - cu ; fl - cu for upper red soil, slightly to moderately effervescent 2 - fm - abk structure ; 1 m br

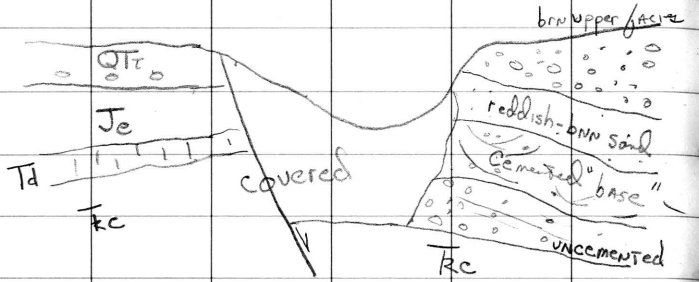
7. fu - vcu, A - sr, strongly effervescent

This location is ~ 0.5 km S of retention dam on Camino Sudeste

(BW3) - Soil in Tuerto Trend - STAGE III+ at least 0.5 m Thick - in a new house foundation. Upper part is broken up. Gravelly sand to gravel, few % grussified Ortiz rock-types.

Final Stop - Puertecito

- Definitely a fault present where the Rd drops into Puertecito →



dip ~ 10-15° East

Up the Arroyo at the projection of the Cucilla fault - is fault scarp colluvium + offset cemented base - perhaps this is the down-to-the-west master fault? 3904150 N 384040 E

Tuerto Fm here is mixed Ortho-
Carbonate Provenance.

SATURDAY, JUNE 9TH, 2001

WARM, high clouds, SUNNY

A large loop recon day today - East of the ORTIZ MTS - looping around the CAPTAIN DAVIS Quad ... visiting gravel pits along the way.

~6400'

GRAVEL PIT 1, ~ 2.5 miles north of STANLY on RT. 41 - maybe 3-4 m of gravelly sand atop Ppm. Surficial deposit is fluvial (?) + eolian brn sand + silt w/ rounded l.s. clasts, rare ORTIZ felsic clast + dark hornfel. - Brecciated (stage IV) calcic soil throughout. Clasts are 1-4 cm in diameter - one 10 cm in diameter was found. LANDSCAPE POSITION

suggests that this is a "Terrace" of Kamradt Draw. Is their major reworking of formerly older deposits ~6700' or higher?

Gravel Pit 2 - Northern edge of Stanley Quad on Rt. 41. Higher elevation ~ 6550'

There are ~10m, maybe more of Ortiz Provenance gravel. Many different Ortiz rock types - mostly subangular to subrounded, 2cm to 30 cm max clasts Avg ~10 cm. There are interbedded gravelly and red gravelly sand. There is a basal gravelly sand calcic cemented horizon. Clearly, this is a channel alluvium; eastern

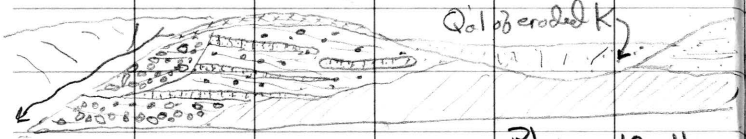
edge of the pit is a fossiliferous Pm. Smacks of Hawley's cut-fill model for the High Plains.

RT 41 Escarpment exposure - very good exposure. - definitely a younger channel incised into the 6660' strath of the QTc or To (?) strath lies at about 6560' ... 100' lower. Paleoflow is more or less oblique to the outcrop face ~ NE-SW. The northern portion of the exposure is one thick facies of stacked channels. To the south, the channels grade into overbank + paleosols. At the lip of the escarpment south of the exposure, there is only red pebbly sand in outcrop; the coarse channel facies is absent.

All Ortiz provenance. with some <5% and <1% reworked caliche horizon. P, M ss, siltstone

quick sketch, view looking EAST

N



OH (Ojo Hendiola) -1

Photos 10+11

m	UNITS	K	FACIES
12	9		7 Qf (w/granite clasts) Reddish brn 5YR5/8 poorly sorted + stratified gravelly, pebbly ss.
10	8		6 minor med-fine sand interbeds, discontinuous carbonate cementation.
8	7		5 pink pebbly medium ss. 10YR8/3
6	6		4 buried soils w/ Argillic horizon 2.5YR4/6 + stage I+ calcic horizons TO stage II+
4	5		5 fining-up channel sandy gravel 7.5YR5/4
2	4		4 coarse, sub ang-sub rounded channel 10YR7/3 locally $CaCO_3$ cemented
0	3		3 red-brn pebbly sand poorly exposed 10YR5/4
	2		2 cemented base 5Y7/3
	1		1

SE ¼, Section 13, R9E, T N

RT 41 Escarpment — well .·. I was wrong about "limestone". (I think) here, at 6720' is a 3-m petrocalcic. I'd be very surprised if this is not The Ogallala Fm. Base sits unconformably atop k. Composed of Qtzy, Mesozoic SS, Granite, +] subAng, subround very well-rounded quartzite.

~4 photos from this Locality

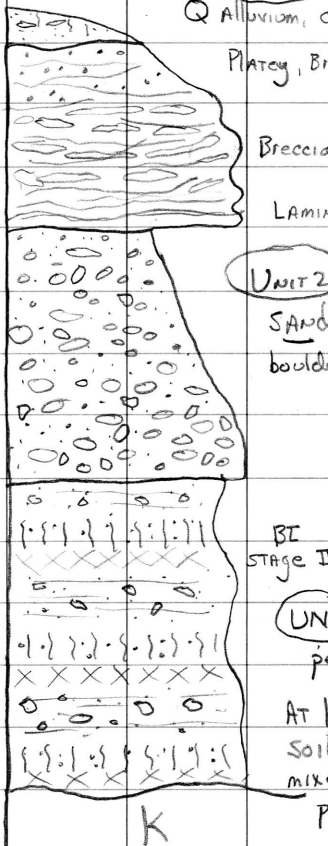
Clast Count, Unit 2

white SS	Qtzite	Red SS	Brn SS	L.S.	chert
IIII I	II		I	I	

White Qtzite (Pg)
IIII

Bull Qtz	Granite	Blk Pmh	Green Pmh	Green banded Pmh	Alt
II	IIII IIII II	II	IIII		I

GAP	felsic vol.	basalt	Augite Monzonite	Green w/ plag	Red Andesite
IIII IIII IIII IIII IIII III	IIII		IIII IIII IIII IIII IIII	IIII II	II



UNIT 4
Q Alluvium, colluvium, eolian
Platey, Brecciated, pebbly
Brecciated
LAMINAR
Calcic Horizon
UNIT 3
UNIT 2 Reddish-brown
sandy gravel. Coarse boulders ~40cm across
Bt
stage II+ calcic horizons
UNIT 1 Red gravelly pebbly sand
At least 3 major buried soils.
mixed Qtz, granite provenance.

OH-2

Who controls access on Santa Fe County Rd 38-B Anaya Ranch? It is gated ~1 mi east of the Capitan Davis Mt quad.

Santa Fe Real Estate - Jim Ratchford
- end of County Rd 55A
lock # 175 (1316) Old Cash Ranch Rd.
Tuesday @ 3:00 PM

Forrest Fenn - Santa Fe
ffenn@[illegible].com

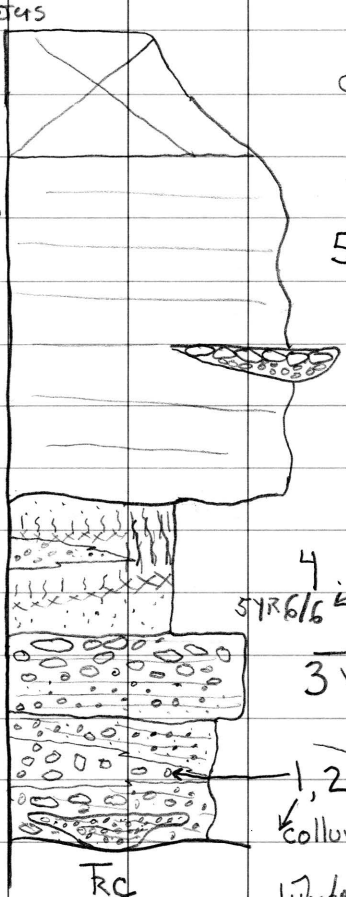
Don Pope, Ranch Manager
Bill Cook - Depression era Cowboy

Montana

Richard Montoya - Great Western Investments
(Melinda).
Brian Dennehee - Actor (?)
Karen Walker - real estate SF
Randy Pope - works → Earth Works.
Leslie Barkley

Photo

Puertecito Wells – quick section measure, clast count of lower (basal) QTi



Colors are 5YR 6/4 unless indicated otherwise.

CLAST COUNT

P-M SS	QTZITE	Bull QTZ	P-M siltst	L.S.	chert
卌	|	卌	||	卌 卌 卌 卌 卌 卌 卌 卌 卌 |||| 卌 卌 ||	

AA	A Monz.	GAP	BASALT	Black Hornf	Green Hornf
||	卌 ||			||	|

Ampibolite	felsic vol	Gneiss/ Granite			Green Banded Hornfel
|	||||	卌 卌 |||			|||

SUNDAY JUNE 10th, 2001 clear - hot as hell. No breeze.

(135)

HAGAN Quad - DIAMOND TAIL property - objective is to work out Qt stratigraphy at the confluence of San Pedro Creek, Arroyo Cuchillo, and Arroyo UÑA del GATO.

Terraces lie at two main "levels" along San Pedro Creek ~60' and 100' above the channel. At the big intrusive dike, where San Pedro Ck cut through, there are gravels at 5930' → Their base is cemented That same terrace is preserved upstream at ~ 6020' ~ 1 km upstream

Composition is dominated by L.S., with metamorphic rxs + local sed. next, and ORTZ rocks a very distant 3rd - minor component

→ Downstream of Arroyo Cuchillo - San Pedro confluence, the Qal is well exposed. (of a trib that heads to the SW.) The base of the thalweg fine-grained alluvium is ~1 m of coarse gravel. The lower 30 cm of which is cemented w/ carbonate. Forms a Knickpoint.

→ 4, maybe 5-6 straths w/ 1-5 m of gravel at the San Pedro - Viña del Gato confluence. These terraces are l.s. dominated, but contain more local clasts like basalt / lamprophyr. % of qtz clasts is also higher

maybe ~ 5%

Photos 13-14

There is ~5-10% granite clasts throughout all terrace deposits and a max clast size - 60 cm; Avg ~10 cm.

very distinctive mica-schist that always is well-rounded, discoid in shape.

Arroyo Viña del Gato apparently has a history of slipping off to the NE, off the K dip-slope.

The oldest, highest deposits here at the confluence are NOT cemented ... but do have the remnants of a thick calcic soil ... no cementation anywhere NW of the intrusive "wall" (except for base of modern alluvium.

Monday, June 11th, 2001 hot, high clouds, breezy.

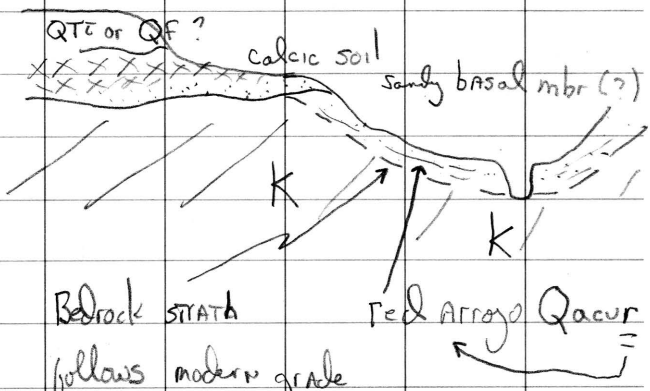
Unbelievable morning trying to secure permission to pass... no luck with Barnett ... no access through that ranch. But lots of luck via the old Cash Ranch Rd - end of Rt 55A. I'm finally in the quad! See map + previous page (p. 131) for contacts.

→ Dennehy Mesa - very critical location for QTz - 360° panorama that really shows off this distally-thinning wedge of QTz. ~20' thick, 30' max. There are several QTz clearly inset along the major arroyos. All appear to diverge downstream. QTz composition is 100% ortz clasts

Jet black hornfels, basalt (or basalt-like) and a red rhyolite porphry are very conspicuous. The Gray Andesite Porphry is very abundant. Here, QTt sits atop gently dipping Tg w/ coarse, pebbly channel gravels. QTt grainsize $\bar{X}$ ~ 10cm, max ~ 50cm; Angular to subrounded.

→ Cañamo Mesa. The top of this Latite Porphry has QTt @ ~6315'. At 6323' ... only BR. View up Cañamo Arroyo shows 2-3 Terraces w/ straths below the QTt strath. Exposures are not good. No gravel on Los Cabreros Mesa

→ Red Arroyo. This large embayment is gullied like many Arroyo systems. It is filled with a silty sand, reddish brn, with minor gravelly lenses and numerous buried calcic soils w/ Stage I+ to II morphology. It is possible that this is reworked basal Tuerto and that I should move the contact down ~ 20' to accomodate this facies.



Tuesday, June 12, 2001

hot, breezy, some high clouds to the east

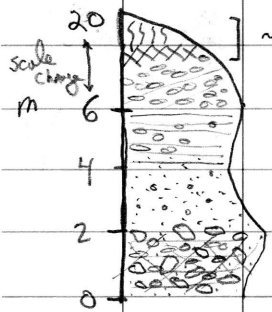
NW part of Capt. Davis Mt. quad. - Melinda property. Wagon Trail Rd. Behind gate w/ 3003 combo.

→ Wagon Trail Hill. Bachman maps this as Tg. I cannot confirm this - I think it is virtually all QTt. The deposits along Dolores + Viejo Arroyos is a Red Qal fill ~ 20-30' thick that sits atop K and Tg (?) bedrock. most of the sloping piedmont is Qal.. with a trad lower than what you expect for QTt.

→ Windmill area. This red Qal is ubiquitous. Here in a small swale, it

is exposed on a 40cm Bt 7.5 YR 4/6, over a discontinuous STAge II calcic

Dolores Gulch - exposures of A basal alluvial unit - very well cemented at 6200' - I think This is basal QTr2 / lower Wagon Trail Hill is QTr1 This QTr2 is inset into the older Tuerto. The base of QTr2 is



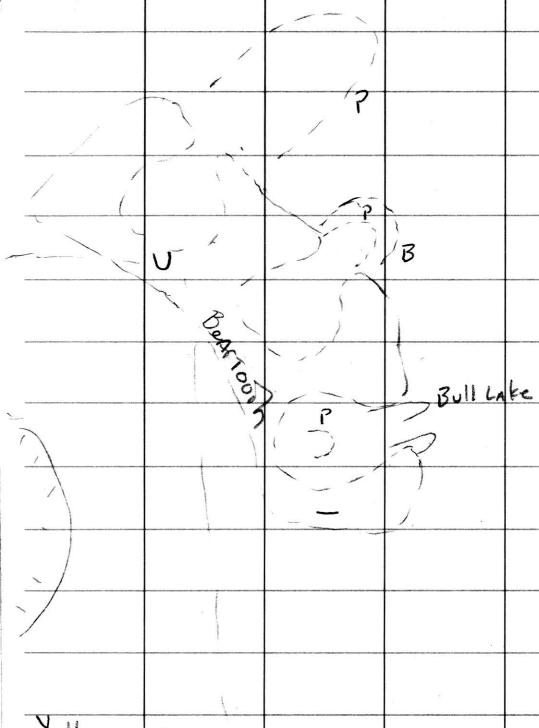
~ 2 m - STAge III+ calcic "normal" fan gravels.

laminar $CaCO_3$

Red pebbly sand

completely cemented base

all groundwater cemt.



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