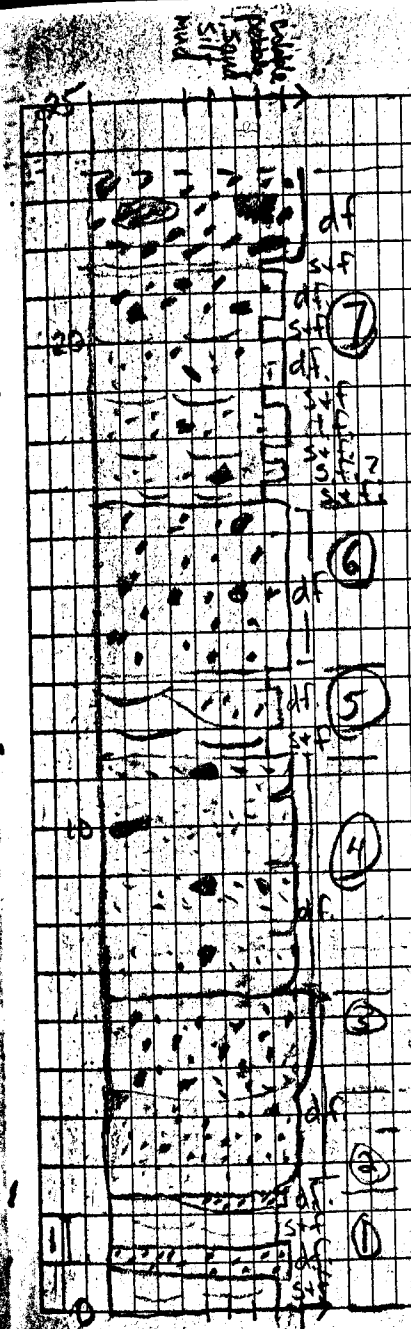
5/31/89

Los Cerrillos Area
Espinaso Fm

Strat. Section: Cañon de la Cueva

Unit	Meters	Th	description
	0		reddish-gray, scour + fill l.c.
		(66)	ss. with pebbly lenses + sparse boulders.
(1)			
			broad scour in scour + fill ss. unit with 2 cobble to
		(7)	boulder matrix supported breccia beds; infilling separated by discontinuous massive pebbly ss lens.
			scour + fill c. ss. with lenses
		(1)	of scour-filling cobble to boulder matrix supported breccia



(1)

df: debris flow
s.f.: sheet flood
s+f: scour + fill
ss + cong.

(jump across wash)

actual units are somewhat different in this diagram

max clast in breccia 80 cm (grn, plag-dacite)
max clast in s+f ss. 60 cm (soft, light green, plg-hbl dacite)

Dominant clasts - lt. gray plag-hbl latite, angular to subrounded

aux. clasts - lt green, soft, hbl latite subrounded to subangular; hbl-rich volc? subrounded; pink plutonic, subrounded; reddish brown mudrock, chunky to friable; lt gray plag-hbl latite w/ amph. xenoliths.

- sharp -

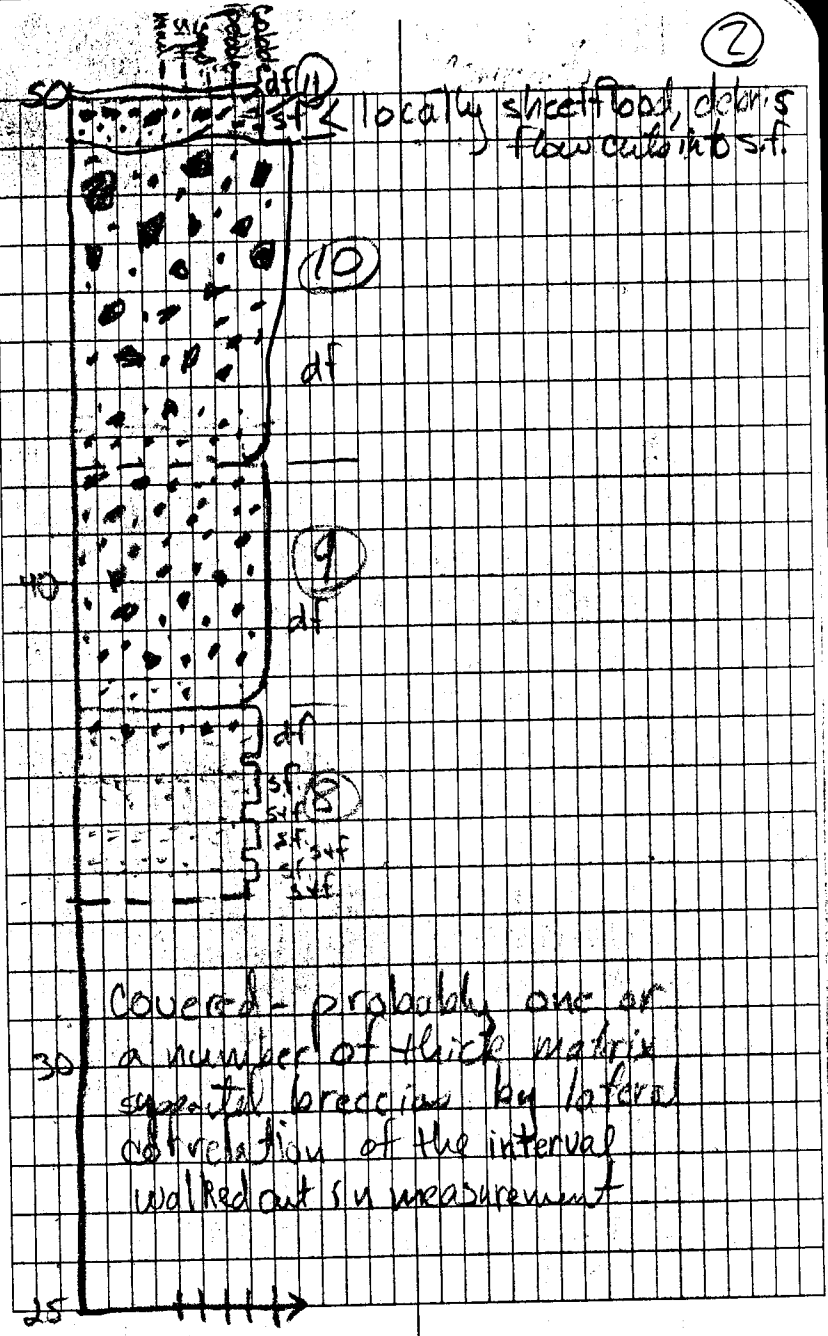
2.3 package of matrix supported breccias:

lower 4m: single unit, roughly (4) inversely graded throughout (especially lower 1 m), max. clast ~ 70 cm,

(2) (3) dom. clasts: lt gray to reddish-brown hbl-plag latite, mostly angular - few rounded, some lt gray clasts w/ rind

- sharp -

upper 5 m: multiple units, poorly (4) (5) exposed but contain sparse large clasts (up to 70 cm) in an otherwise pebbly -



locally sheetflood, clasts flow outs in b.s.f.

matrix-supported breccia

- sharp -

11.3 scour + fill pebbly ss. with scour-filling matrix supported

⑤ (1.8) cobble breccia. Clasts similar

1.8) to below.

- sharp -

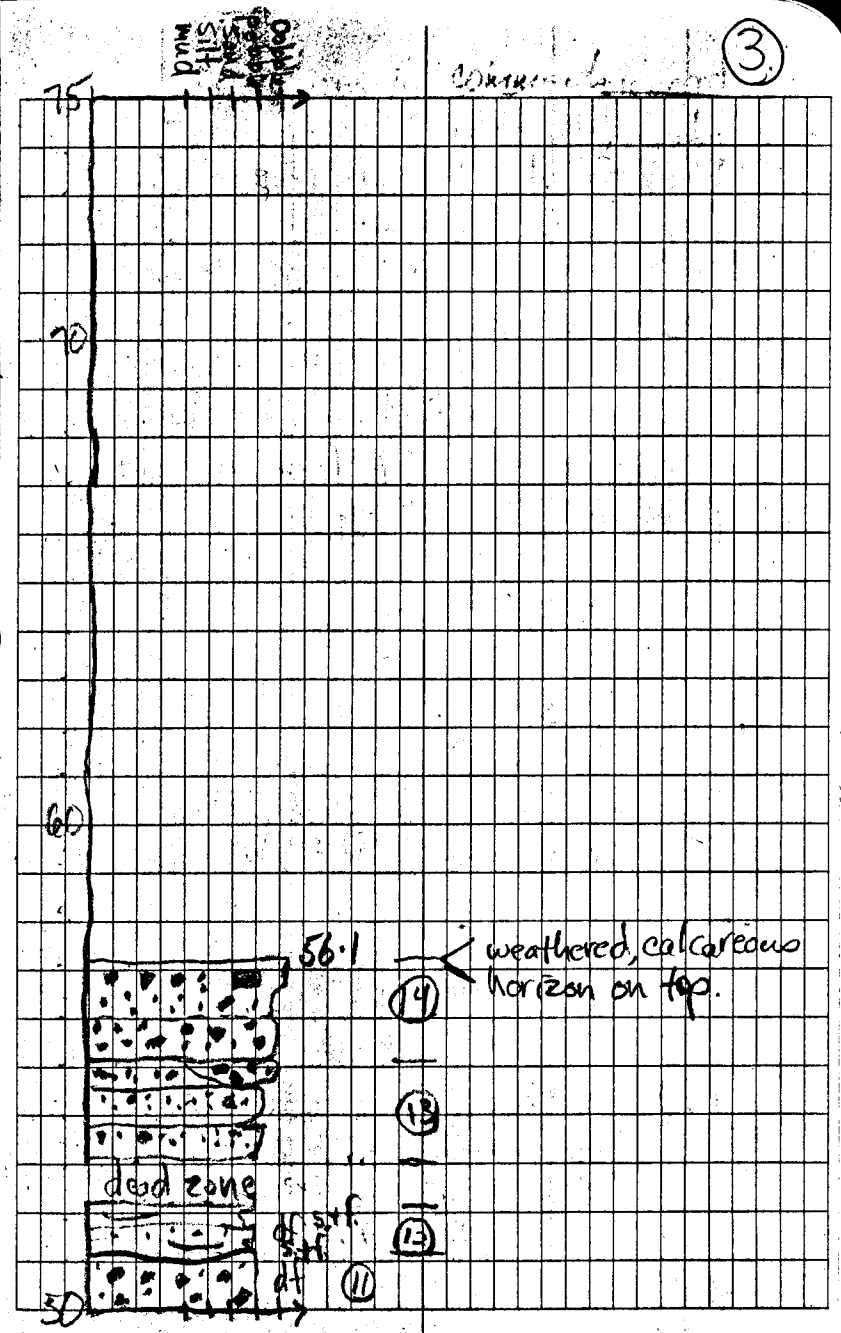
13.1 massive, matrix-supported pebbly breccia with abundant

⑥ (3.5) cobbles and sparse boulders (up to 40, aver. 30 cm), clasts similar to below.

- sharp -

16.6 interbedded thin (< 1 m) matrix-supported pebbly to cobbly breccia units and discontinuous

⑦ (7) scour + fill ss. in lower 5 m. Clasts are generally more rounded and cobbly near base becoming more angular and boulder-sized upward. Upper 2 m is cobbly to boulder matrix-supported breccia (boulders up to 2 m). Dom. clasts: lt gray to reddish-



brown or dark greenish-gray plag-hbl latite (sparse large hbl phen: up to 1.5 cm across)
- diffuse -

Note: Collect spls of lt. gray, reddish-brown, and dark greenish-gray hbl-plag latite clasts. Also collect matrix of breccia coarse ss spls from unit at base of section.

Covered (colluvial)
- diffuse -

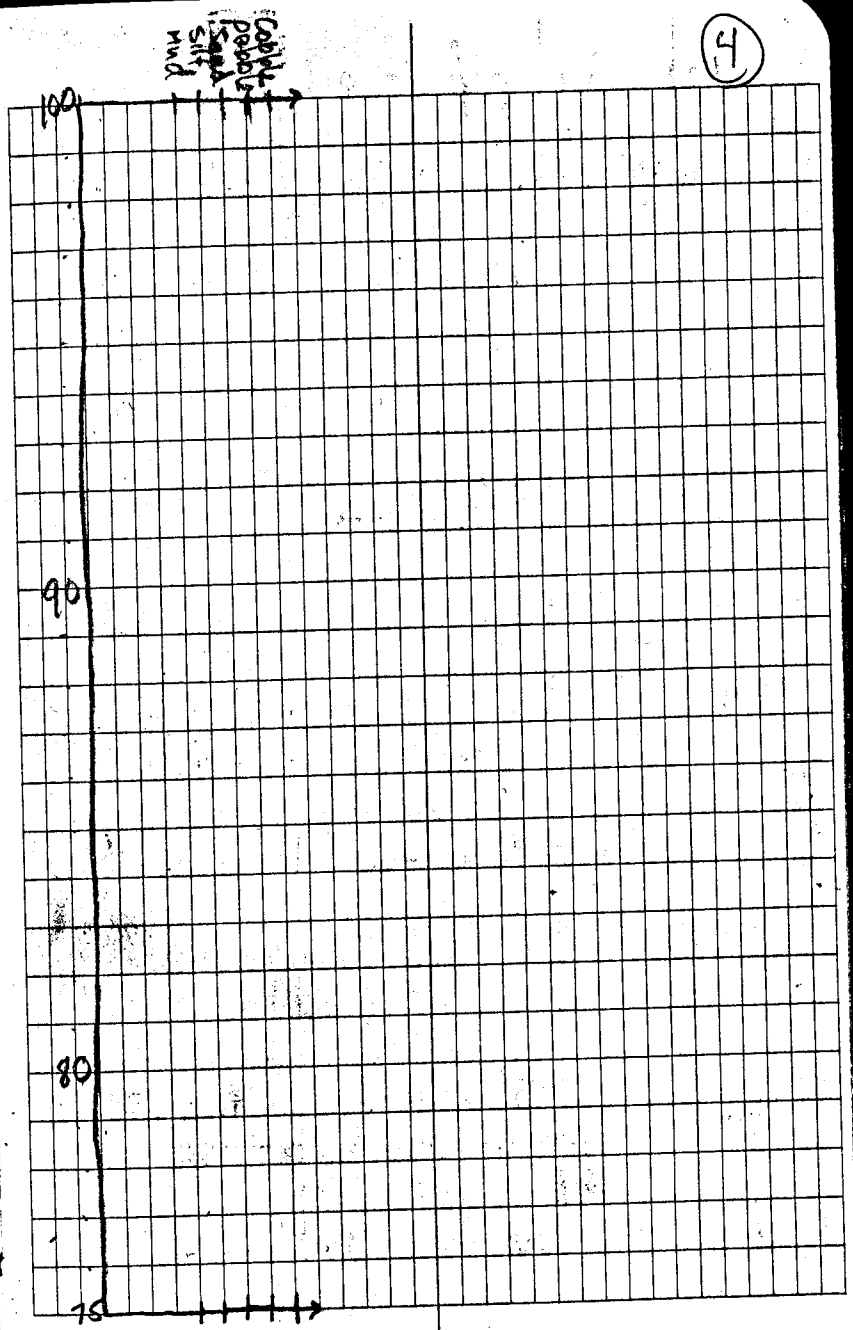
33.6 poorly exposed; ± pebbly to sparse cobble-bearing,

(8) (2.5) in places vaguely stratified, clast-supported breccias.

37.1 massive, inversely graded in lower 15 cm, matrix-supported breccias. Mostly pebble to cobble, rare boulders. ~~May be a debris flow unit at top~~

(9) (5) - diffuse (Covered) -

42.1



42.1 jumped to next hill-

(4.5) massive, pebble + cobble dominated clast/matrix-supported breccia, angular clasts (up to 40cm) include basal + gray + reddish-brown plag-hbl latite, some flow-banded lithologies

— diffuse —

(10) = 4.6

similar to above except larger clasts (up to 100cm) and presence of flow-banded hbl-plag latite clasts. On cliff section in wash, unit (10) forms thin basal layer with abundant weathered lt gray clasts + flow-banded clasts.

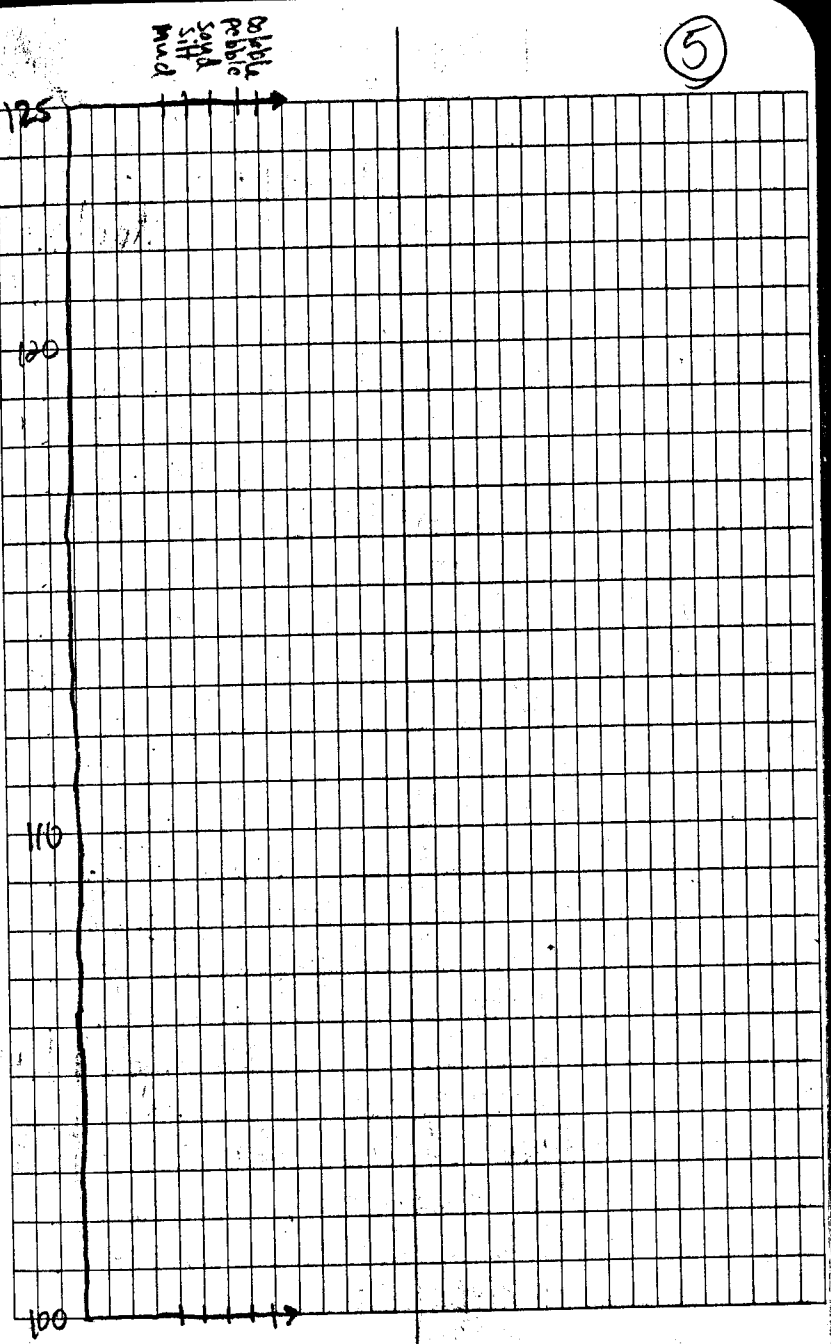
(1.5)

* problem why different weathering along wash compared to the hillslope

-sharp-

49.1 inversely graded, massive pebble + cobble breccia w/ boulders more common toward top

(11) (2)



(5)

dom. clasts: lt. to med. gray or reddish brown plag-hbl lithic clasts; few flow banded clasts.

-sharp, undulatory-

51.1 interbedded scour & fill ss. & conglom. with vaguely
(12) (1) stratified & thin (<20cm) matrix and clast supported breccias

-sharp-

52.1

interbedded massive, inversely to non graded, pebble to cobble breccias with sandy lenses. Upper .5m is cobble (up to room) to boulder breccia on a undulatory lower surface

-sharp-

54.1

(14) (2) massive, pebble to cobble breccias, locally separated by thin sandy lenses. Clasts up to 1m near the top; include lt gray

to green soft, crystal-rich dark gray, and some flow banded clasts. Discontinuous ~5cm band of white, friable clay-altered clasts overlying – also fairly calcareous (5oiR)

– sharp –

56.1 End of Day

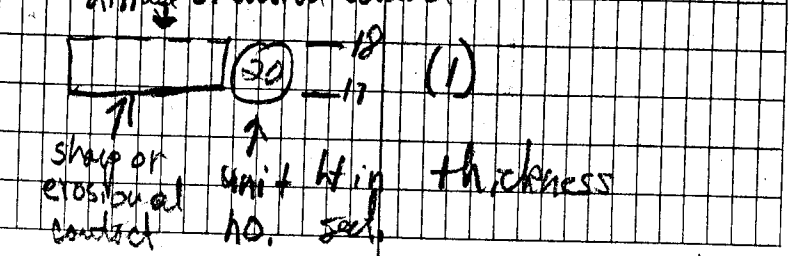
New note-taking strategy:

- massive, clast or matrix supported breccia → debris flow breccia
- vagarely stratified, clast or matrix supported breccia → sheet flood breccia
- planar to slightly trough-like coarse laminae filling troughs (ss. + pebbly to cong.) → scour + fill ss., pebbly ss., or cong.

Units broken for groups of strata with similar qualities or patterns of beds.

Items to comment on:

- lithology: bedding, grading, variations within the unit, color, grain size
- clasts: composition, shape, size, alteration, cooling fractures, dominant + aux. clasts
- lateral variations: clast sizes, lithology, nature of lithologic contacts
- contact: type, roughness, coloration, undulation
- special: first appearance of major + minor clast types; presence of clasts with zeolitho (+ type of zeolites)



6/1/89

Los Cerrillos - Espinaso Proj.

left the section at 56.1 m on 5/31

56.1 weathered, calcareous horizon

(15) d.f.

61.6 covered from 57.6 to 61.6

(16) weathered d.f.? (channeled into laterally fill w/ s+f.

62.6

(17) s+f ss. + s.f. peb. brec.

66.1

jumped to next hill

66.1

(18) d.f.

68.1

(19) s+f ss. + sf. peb + cob. brec. + d.f.

73.1

(20) s+f ss. + s.f. peb. brecc

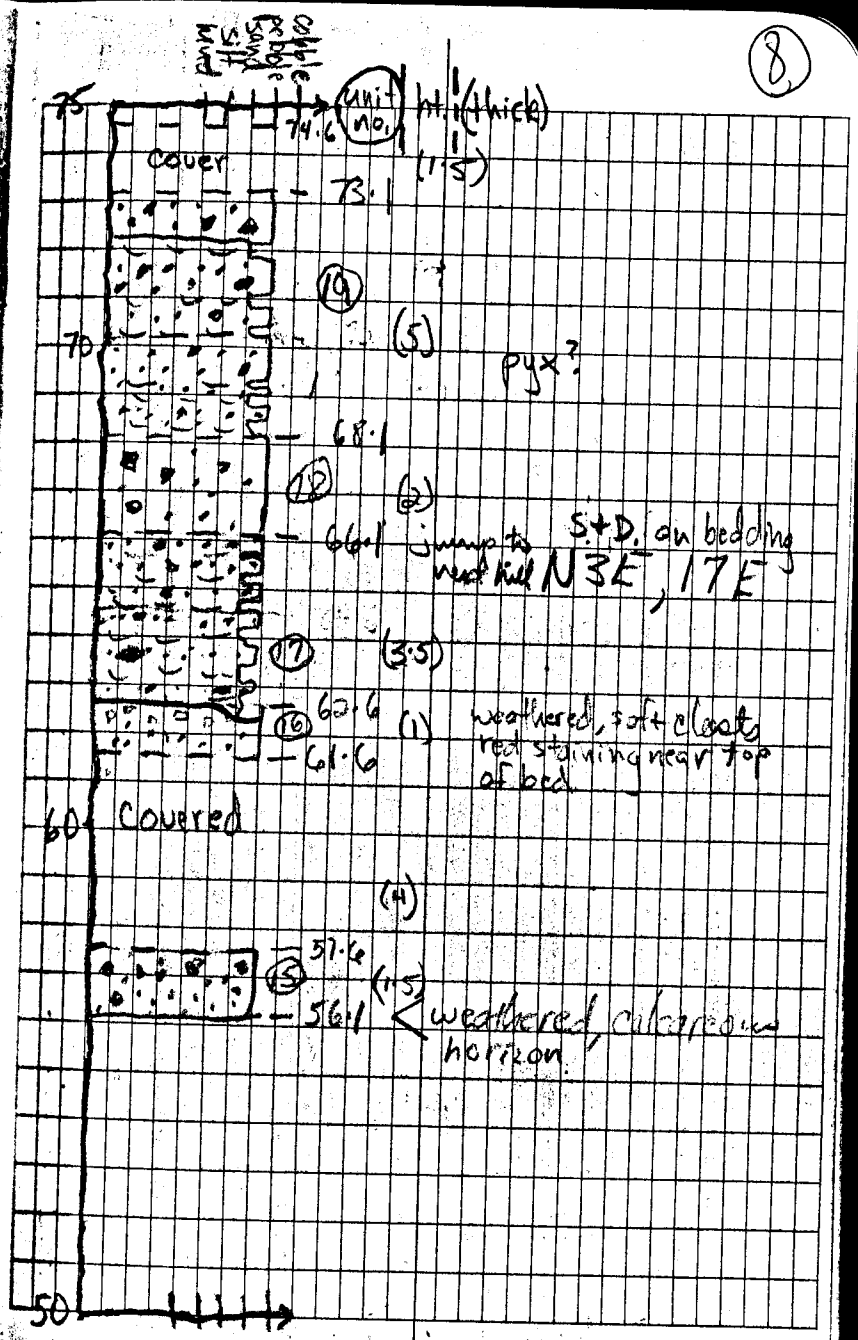
81.6

cover

84.6

(21) s+f ss + s.f. peb. brec.

90.6



(22) df.
91.1

(23) sf ss + sf peb breccia
96.1 w/df. at top
top of dike hill
jumped to next hill

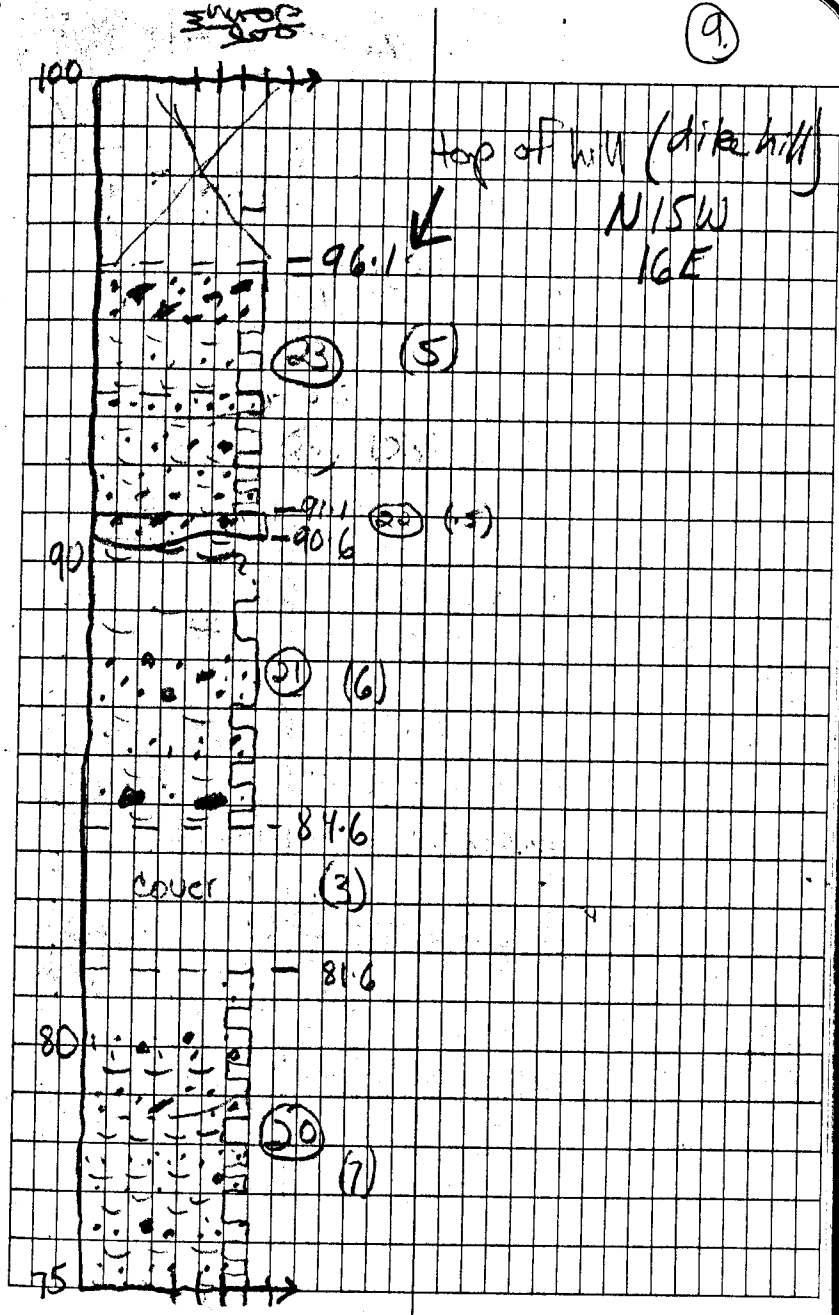
Dike orientation
N22W v 90
-covered-
108.1

(24) thin d.f. + sf brec w/ interbed
sf ss + peb.
115.5 -covered-
129.5

(25) sf ss + s.f. peb breccia
129.5

* photol at pt. A looking south - continuity of plg-hbl dike
Petroglyph dike N53E
near vert dips

photo 2: petroglyphs



– covered (* (25.5)) –

155.5

(26) d.f.

157.5 → (27) fall, flow or surge, acc. lap. locally flow or surge fills topo. on d.f. elsewhere thin red ash present

157.9

* adjacent to (27) dike cuts (petro. dike) through section and is sheared along contact. Adjacent country-rx are also sheared. Shear direction is approx NW-SE and all shear is lateral.

photo 3: bedding + acc. lap.
photo 4: bedding
photo 5: pyro flow + fall

sample STCC-27-1

144

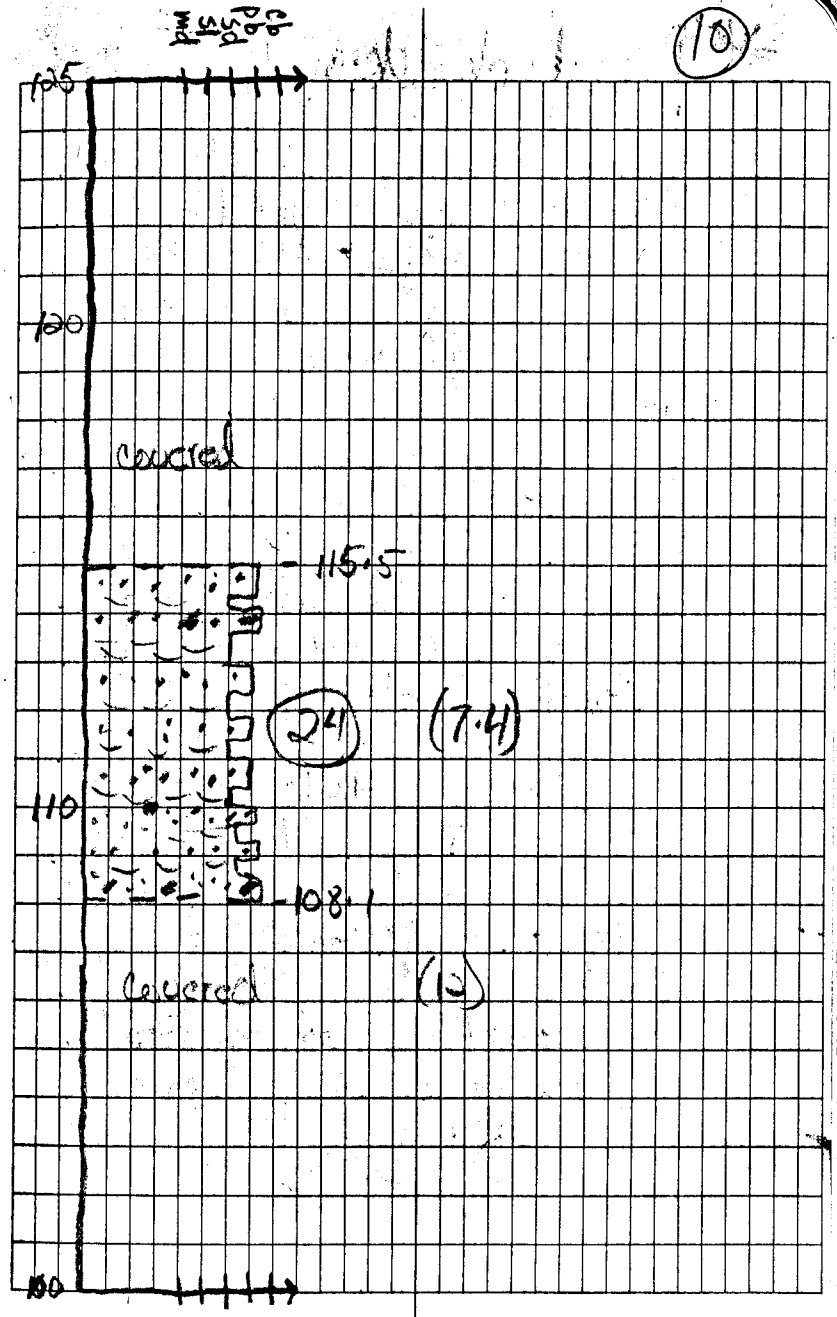
* (25.5) massive ss., s.f. ss + conq., d.f. – generally poor exposure

155

157.9

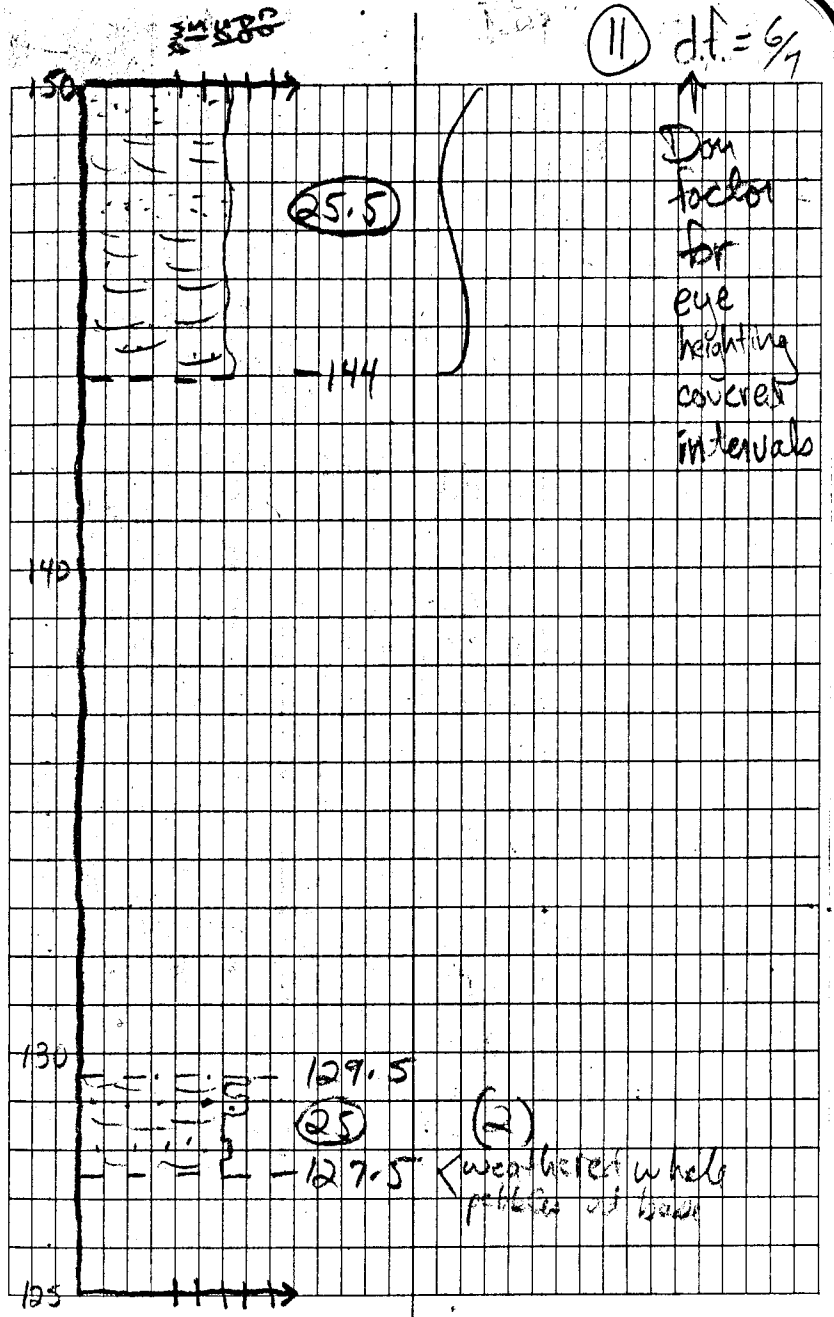
(28) s.f. ss., sl. ss + breccia, d.f.

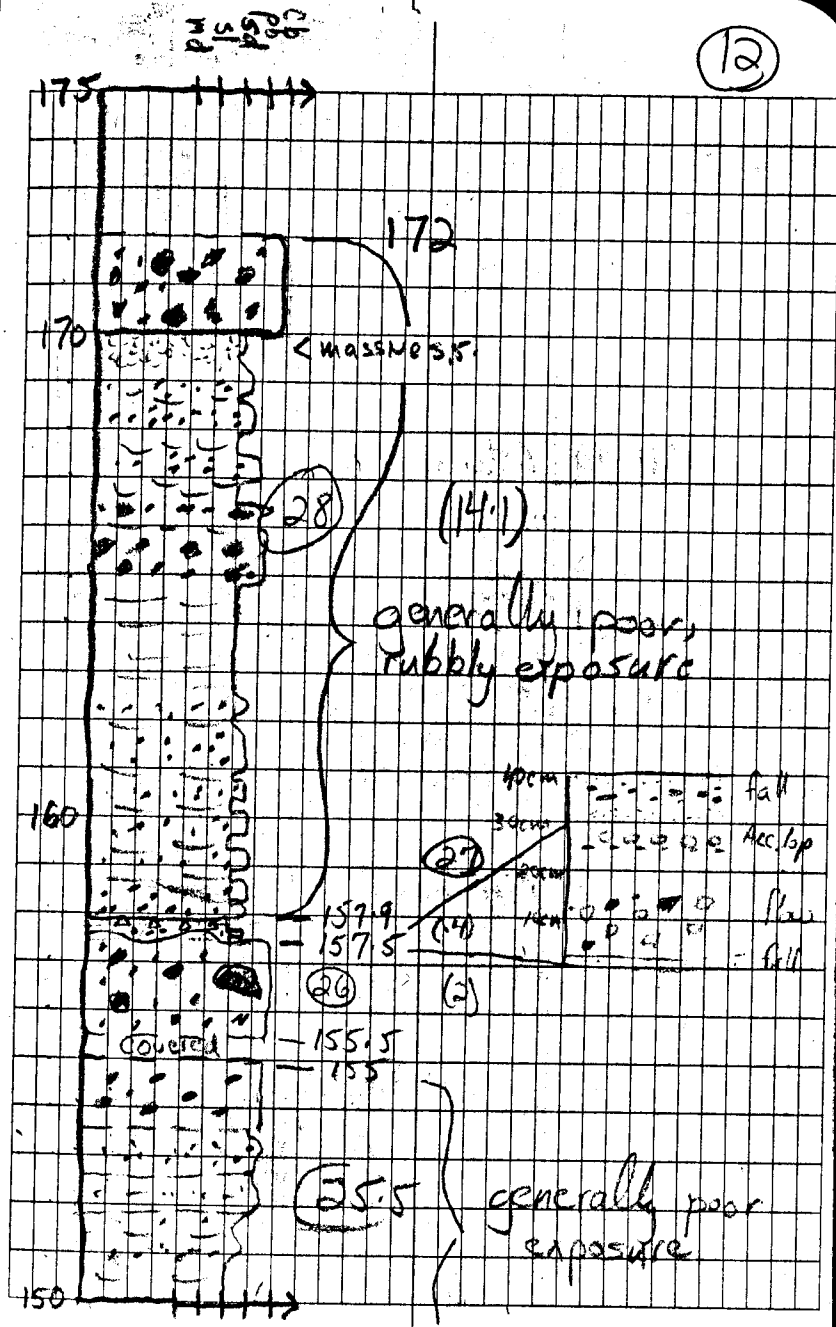
112



* Petroglyph dike: trend ~N50E, hbl-plag phyr in dark green aphan. groundmass. Cuts straight through strata except for at exposure adjacent to beds (26), (27), & (28), where nearly black chilled margins curve in & out of strata. Lateral shearing also observed at beds (26) (27) & (28) within dike & in adjacent rx. Also observed at south-facing exposure on the next hill northeast and. Location of petroglyphs noted on map

* PF on map: locality with exposure of reddish-brown weathering, dense pyroclastic rock; monolithologic breccia, lack'g fracture density & poor sorting over sand to pebble range suggest pyro flow origin. Unit forms small cliff locally near the top of the hill.




175
170
160
150
172
< mass NE 5°
28
(14.1)
generally poor, rubbly exposure
40cm
30cm
20cm
10cm
fall
Acc. lap
fall
27
(1.4)
157.9
157.5
26
(2)
covered
155.5
155
25.5
generally poor exposure

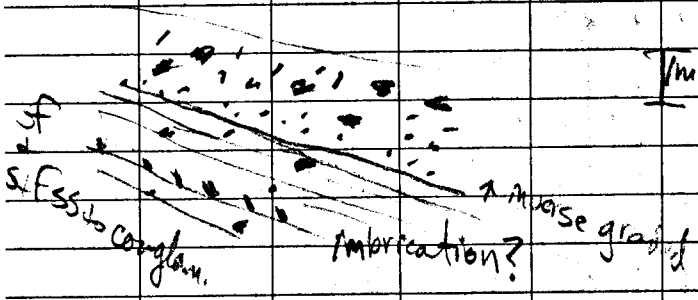
6/15/89

Los Cerrillos - Espinaso Proj.

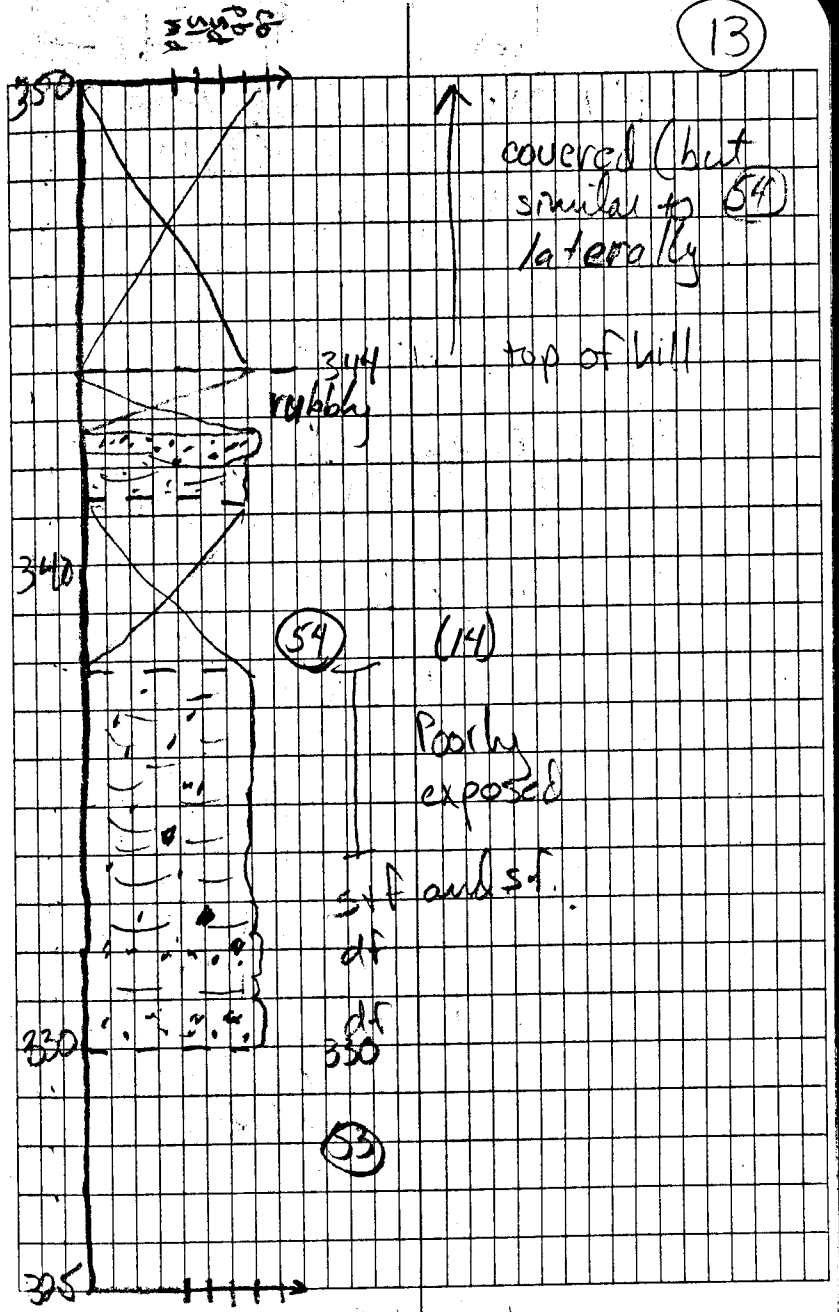
Approaching Cañon de la Cueva section from Galisteo Rd.

outcrop north of road, east of windmill

MU-19 (stereo loc. system)



Site # MU-22: photo of radially fractured clast (dark gray plag-hbl with dark cont.) photo 36



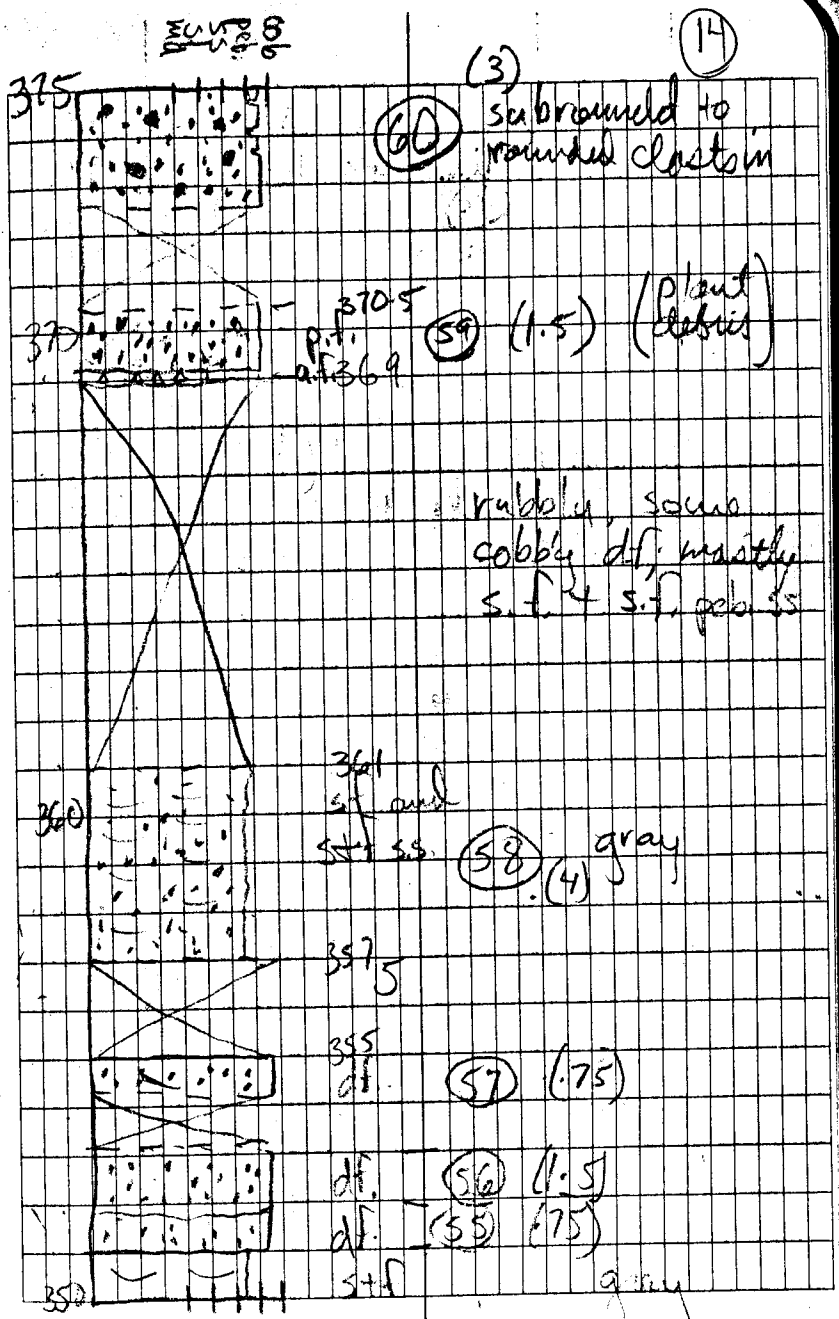
MU-31: Rhyodacite?/Latite?
intrusion: ⊥ finely x̄-line hematite & locally epidote? mineralized - some plag visible, mafics hematized, interstitial q-tz.

Correlation samples
Sample RLF: intrusion

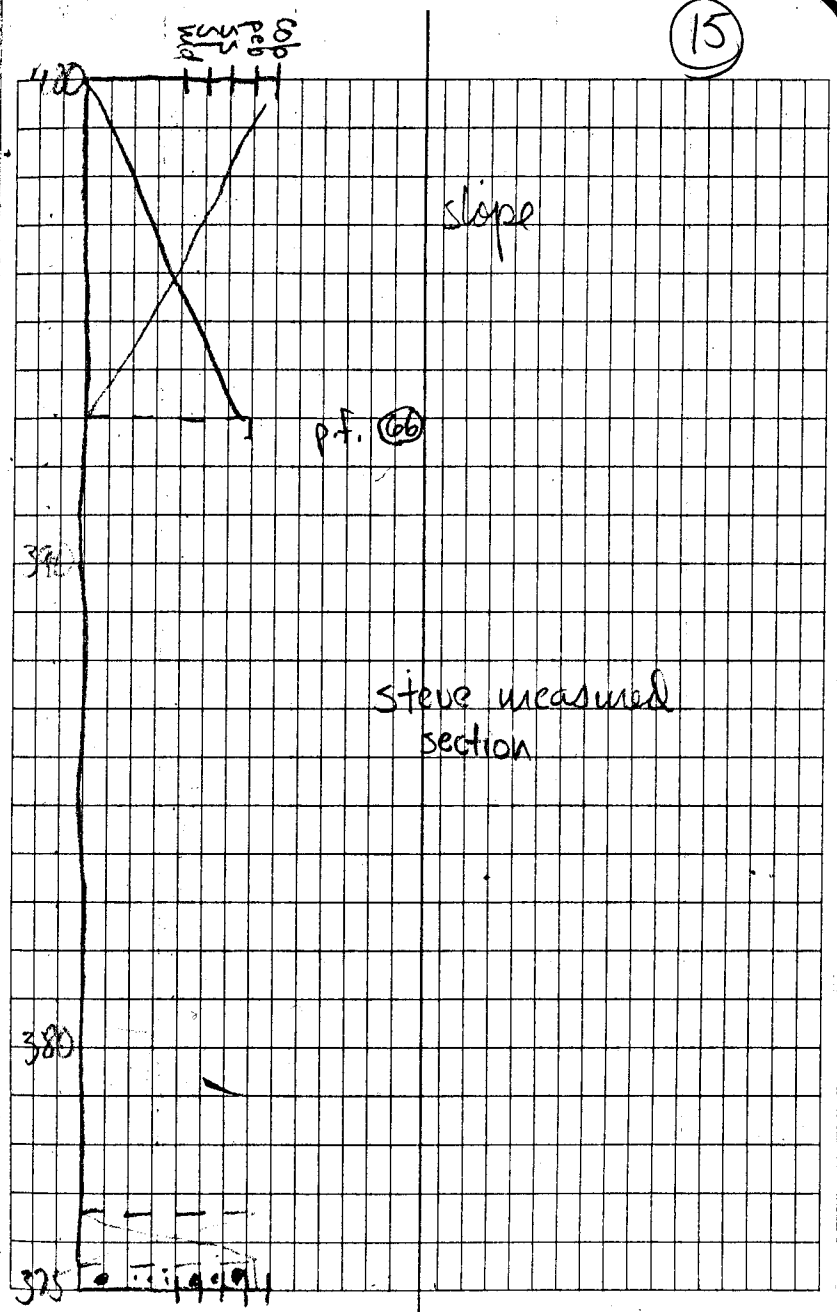
Sample LRF: lithic-rich flow (white + dark gray clasts) above thick d.f. below Lava flow

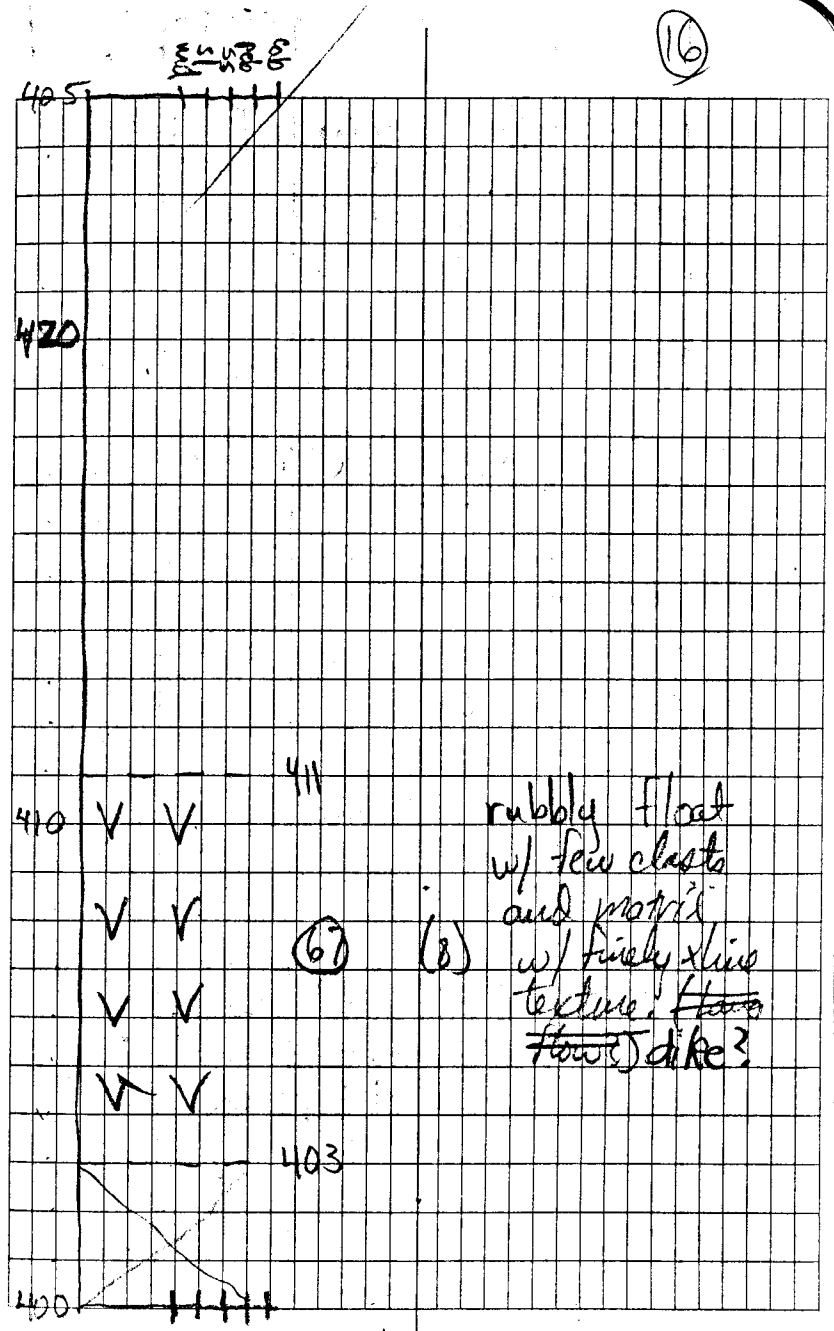
Sample HF: hackly flow rock

Bed (59): laterally extensive ash and pyroclastic flow - traced for a distance on map thickens + thins carbonized + oxidized plant debris



Bed (66) ledge former along washes to the north + northeast of bed (59)



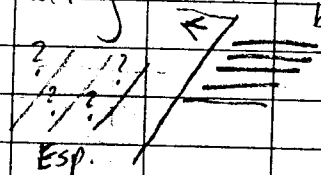

405
420
411
410
403
400
(7)
(8)
rubbly float w/ few clasts and matrix w/ finely xline texture? dike?

6/20/29

Los Cerrillos - Espinaso Project

East end of study area, Windmill valley.

MU-36: hill on east side of valley -



fault orientation N23E.

Bedding Orientations:

MU-37: tilted Espinaso breccia (sf. breccia, small d.f.)

N85E, 25°S

MU-38: depositional contact between transition + (sf. + df.) breccia of Espinaso

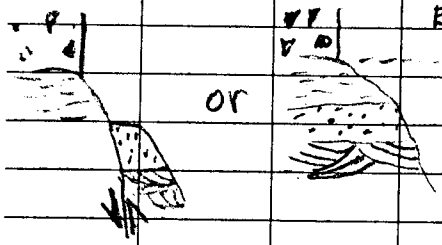
N39W, 7NE

MU-39: Yellow pebbly ss. forms terrace off west side of ridge.

(17)

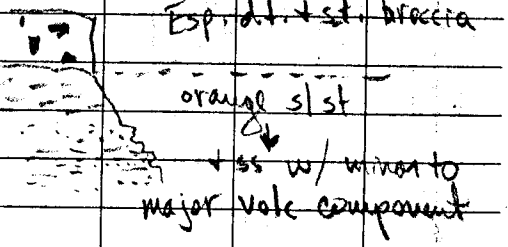
MU-40: Well bedded Espinosa ss. and pebbly breccia
N50W, 7NE

MU-39: contact scenarios

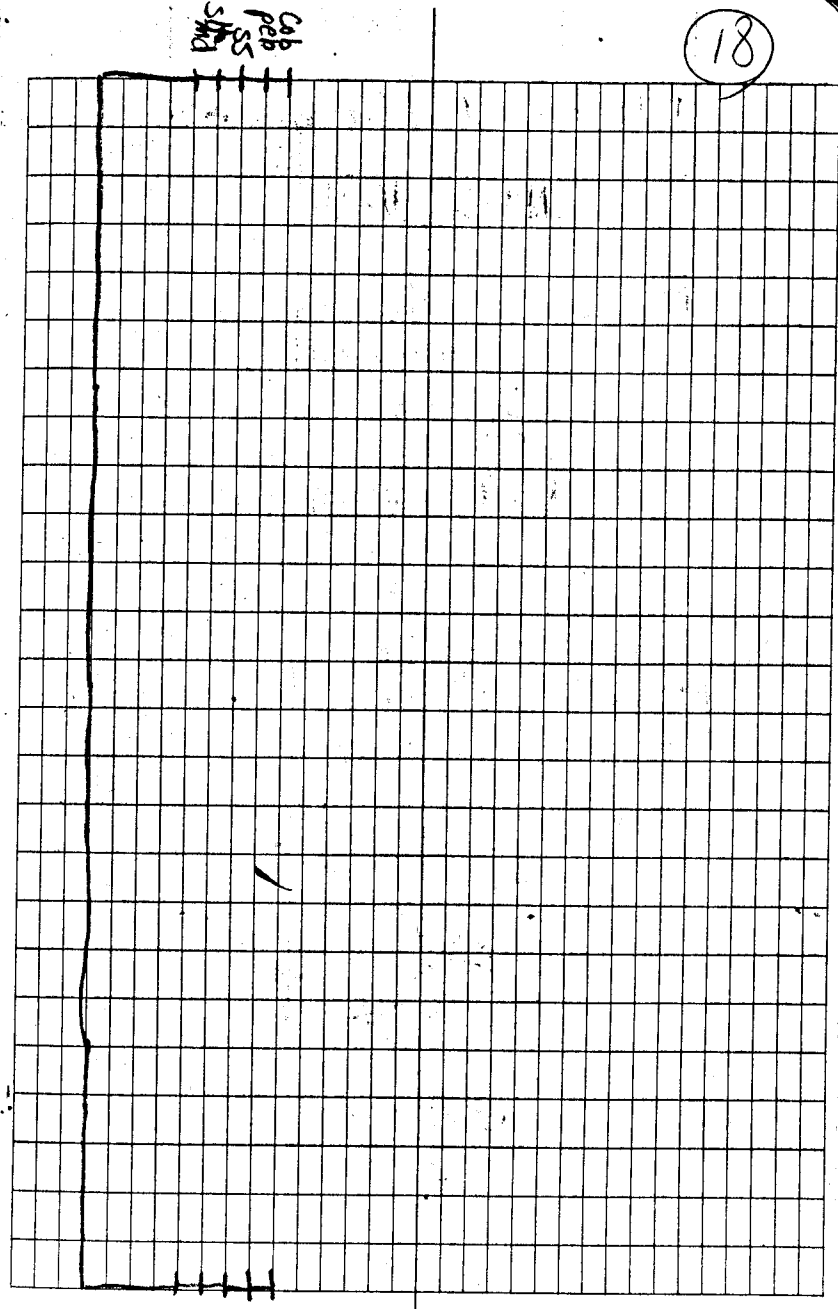


or

elsewhere along westside of east bench along Windmill Valley



possible scenarios:



MU-41: N61W paleo-trough

N75W, 16 NE

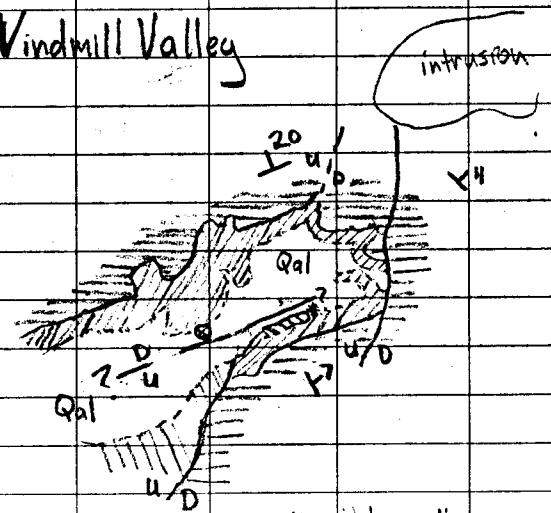
MU-42: orientation of beds on either side of major fault

west side: N50E, 20 NW

east side: N75W, 11 NE

Interpretive sketch of structure & transition zone problem:

Windmill Valley



* pebbly yellow ss

Intrusion: plag-hbl bearing Latite?

Galisteo-Espinaso transition unit: red to orange slts/vfss w gray ss & pebbly breccia increasing upward - volcanic component obvious in most rocks.

Key:

⊗ - Windmill

Tg (Galisteo)

Tge (Galisteo-Espinaso transition)

Te (Espinaso)

7/6/84

Cerrillos Project:

- Recon west of CC section:

MU-67:

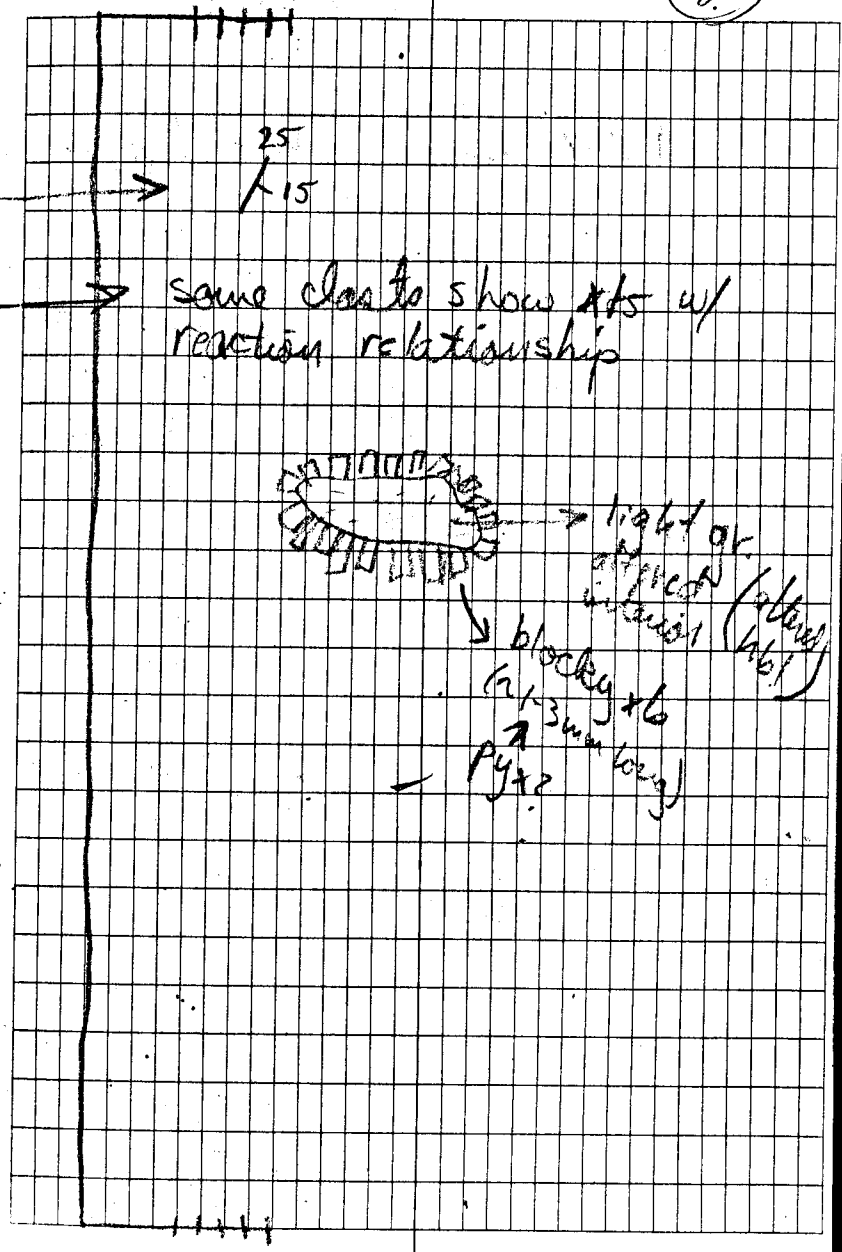
- Common pgx-hbl w/ white to dark gray matrix clasts in sm wdd d.f., s.f. ss$_{cgl}$, + scour + fill ss + cgl
- rounded qtz pebble in d.f.

FH1 – On low hill above Feathered Harp Ranch (FH), interbedded Esp. s+f ss+cgl, thin s.f. breccia with rounded qtz pebbles + fine (red/orange) x-bedding in ss+cgl intervals

FH2 – Scour in d.f. filled w/ s+f. ss + peb. brec

N67E

MU-68: acc. lap bed (1-2cm) below resistant debris-flow ledge, acc lap bed + overlying res. (sometimes hackly) d.f. are laterally



continuous in 3 washes above Feathered bay.

MU68: paleocurrent — channel cuts into beds filled w/ d.f.

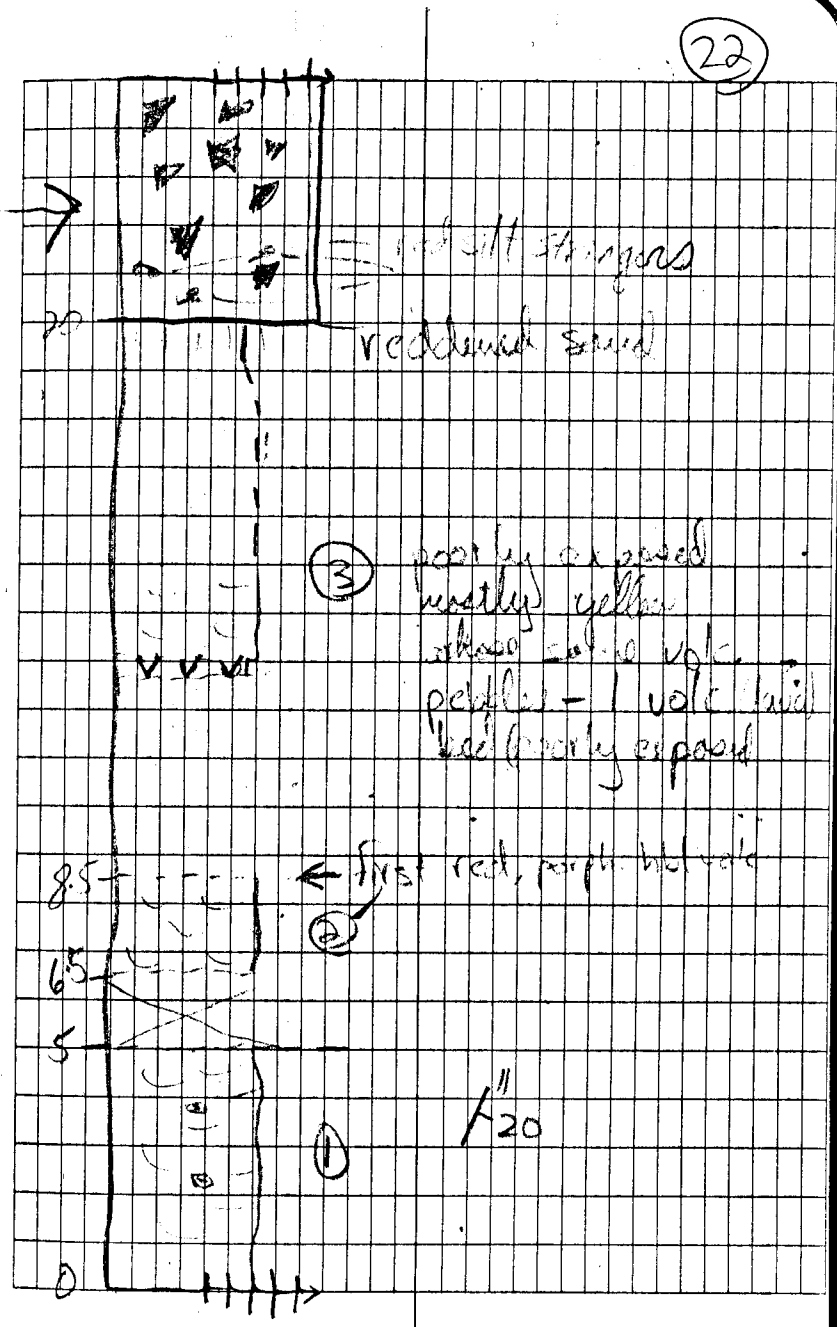
23

Cerrillos Project 7/11

Anaya Springs Cgm:
MU-12 Section

Galisteo ss. –
undulatory ss

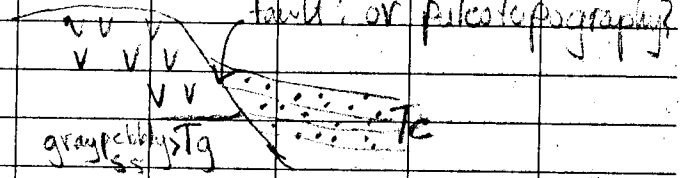
↑ N 20°

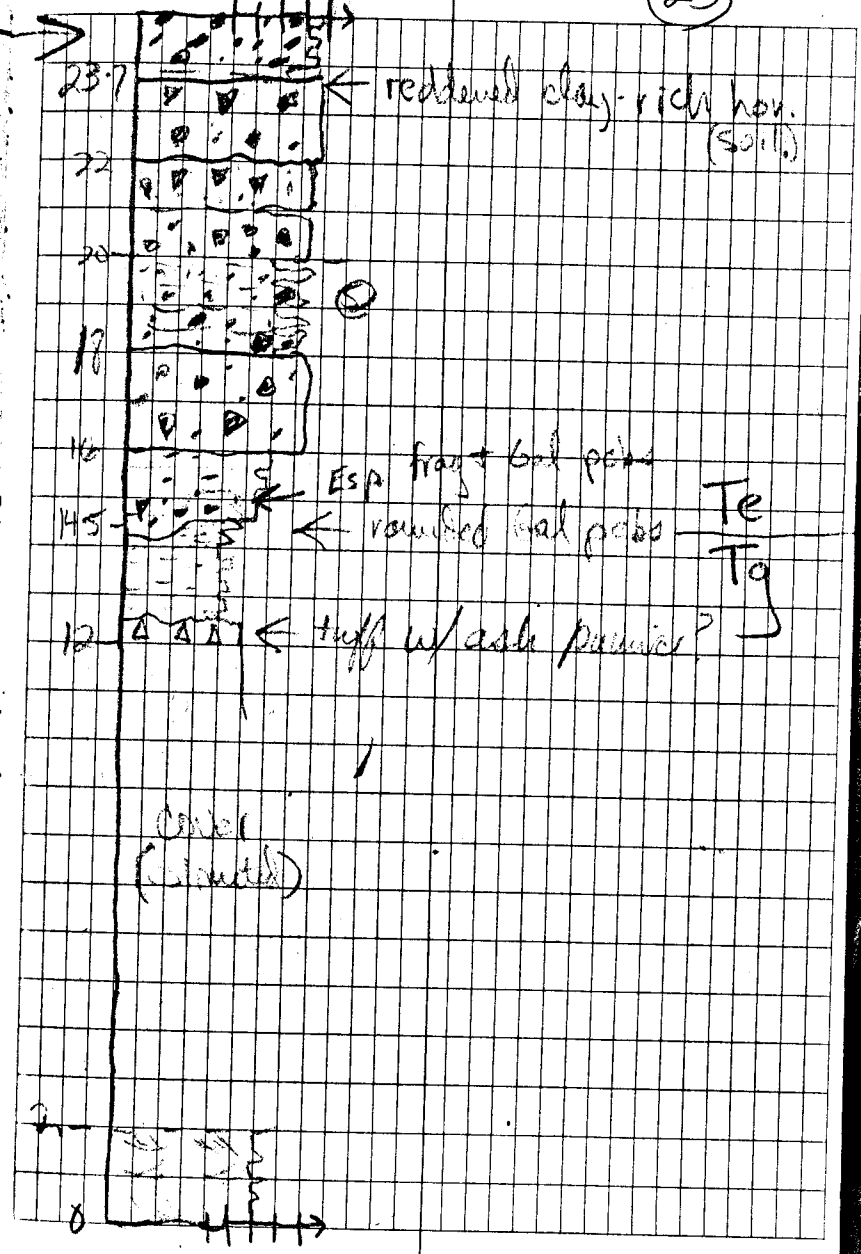


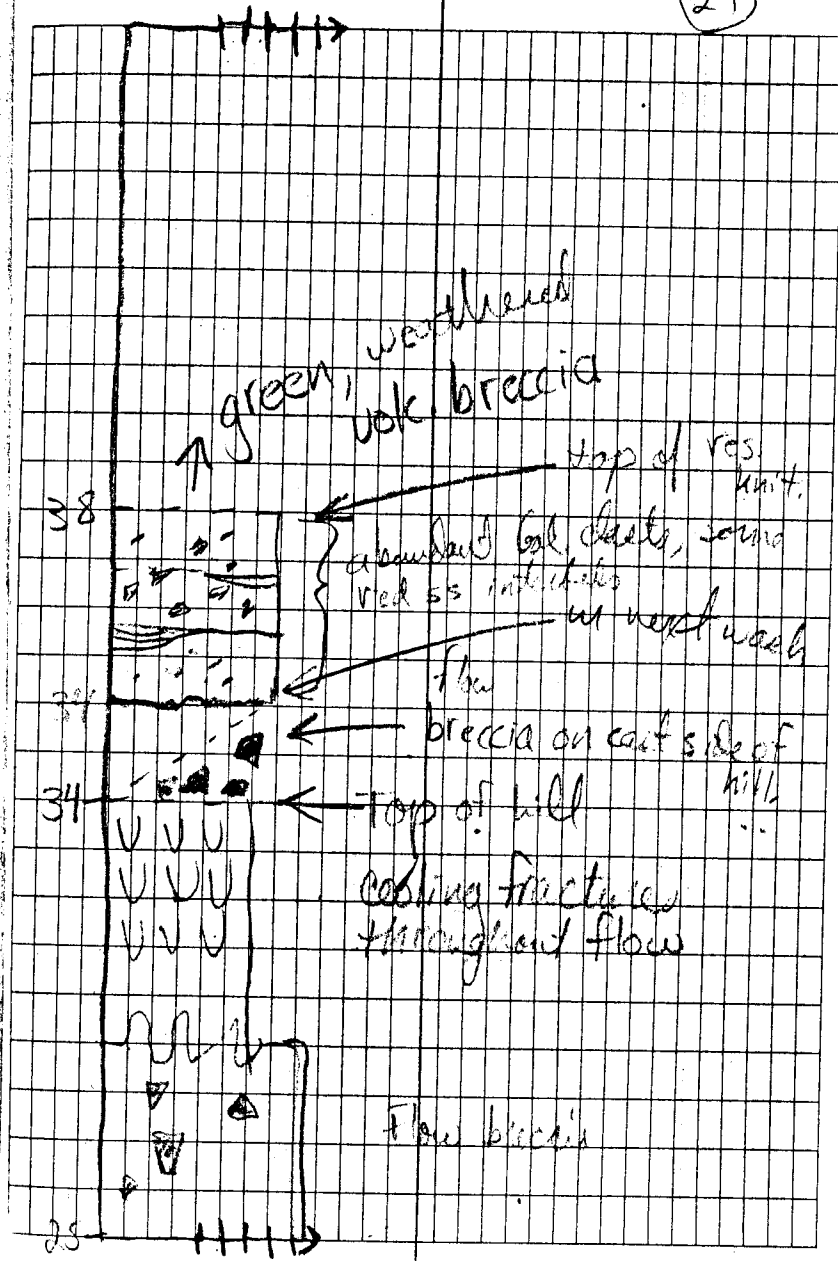
Arroyo ↑ Cyn. Section
Springs

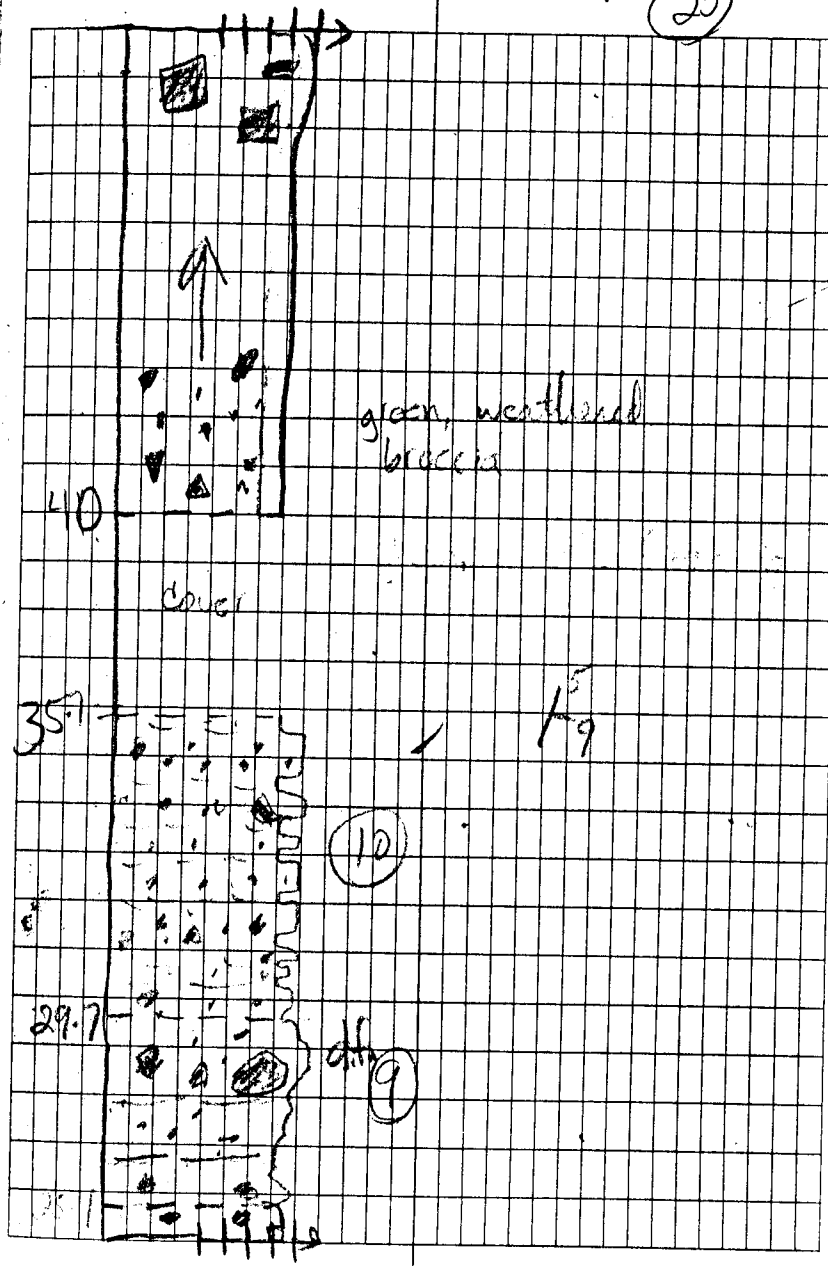
Problems w/ lava flow

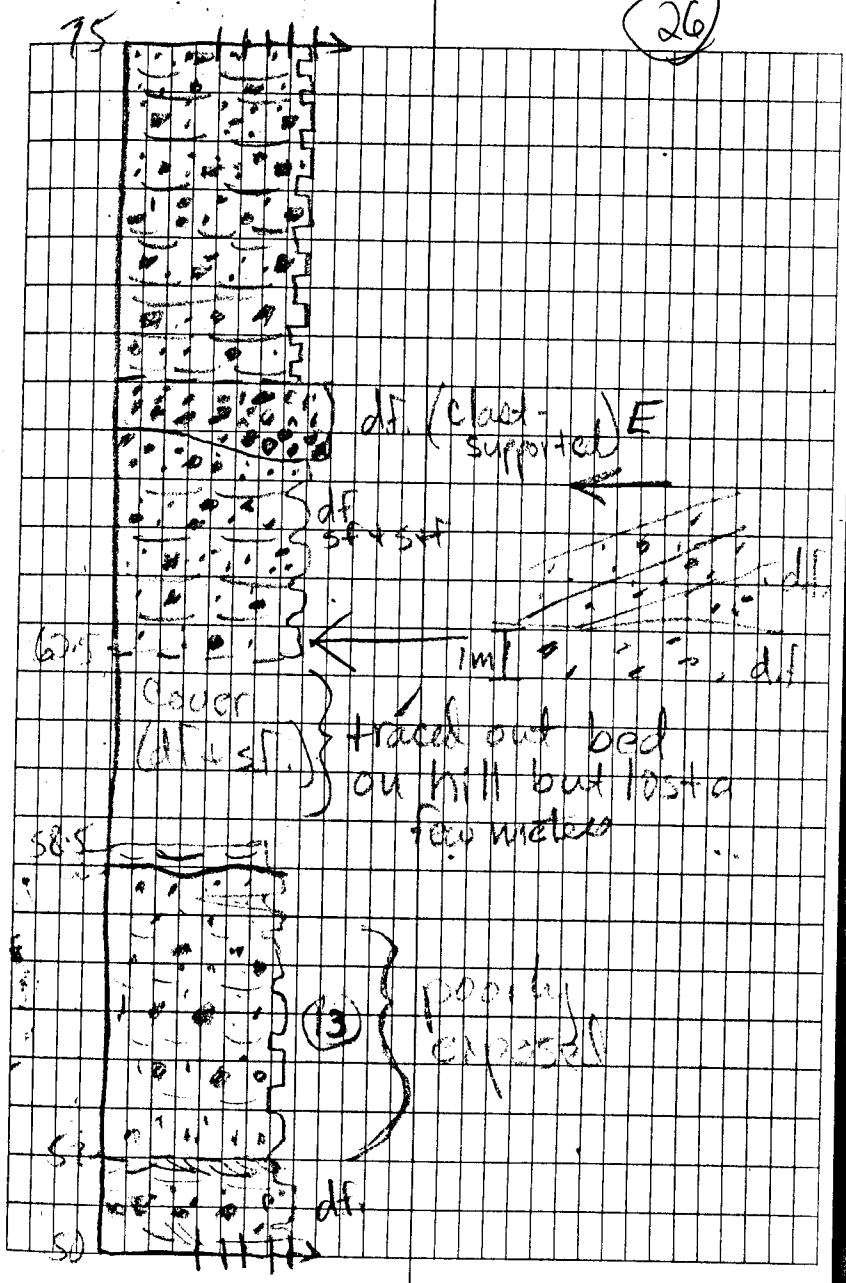
W ← XN → E

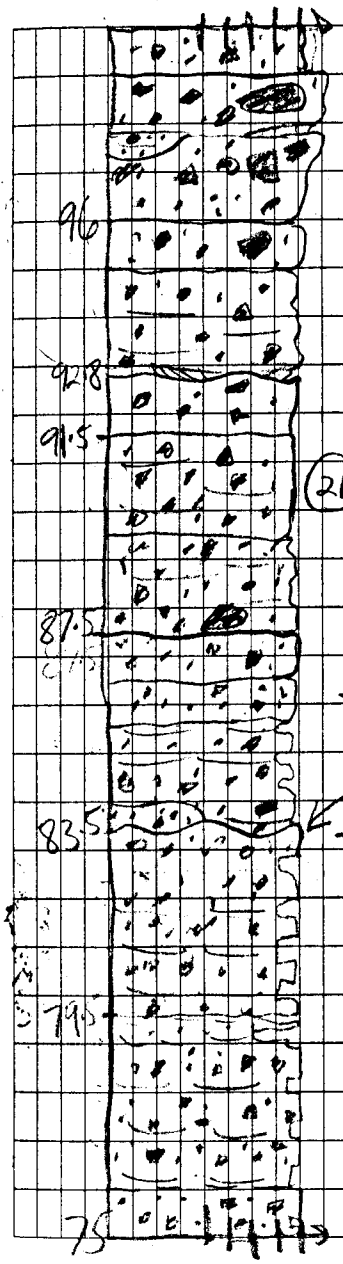





green, weathered
volc. breccia
top of res. unit
38
thin bedded tuff, sand
veins intruded
weathered
flow
breccia on east side of
hill
34
top of hill
cooling fractures
throughout flow
flow breccia
33


green, weathered breccia
40
35.7
29.7
10
9


df (clast-supported)
df
sf + sf
Im
df
Clayer
df + sf
Traced out bed on hill but lost a few meters
sf + sf
(3)
df.



(21) sl

pc in wash ↔ 90

top of hill → start again at free in ASC at end to start of hill
(17/13)

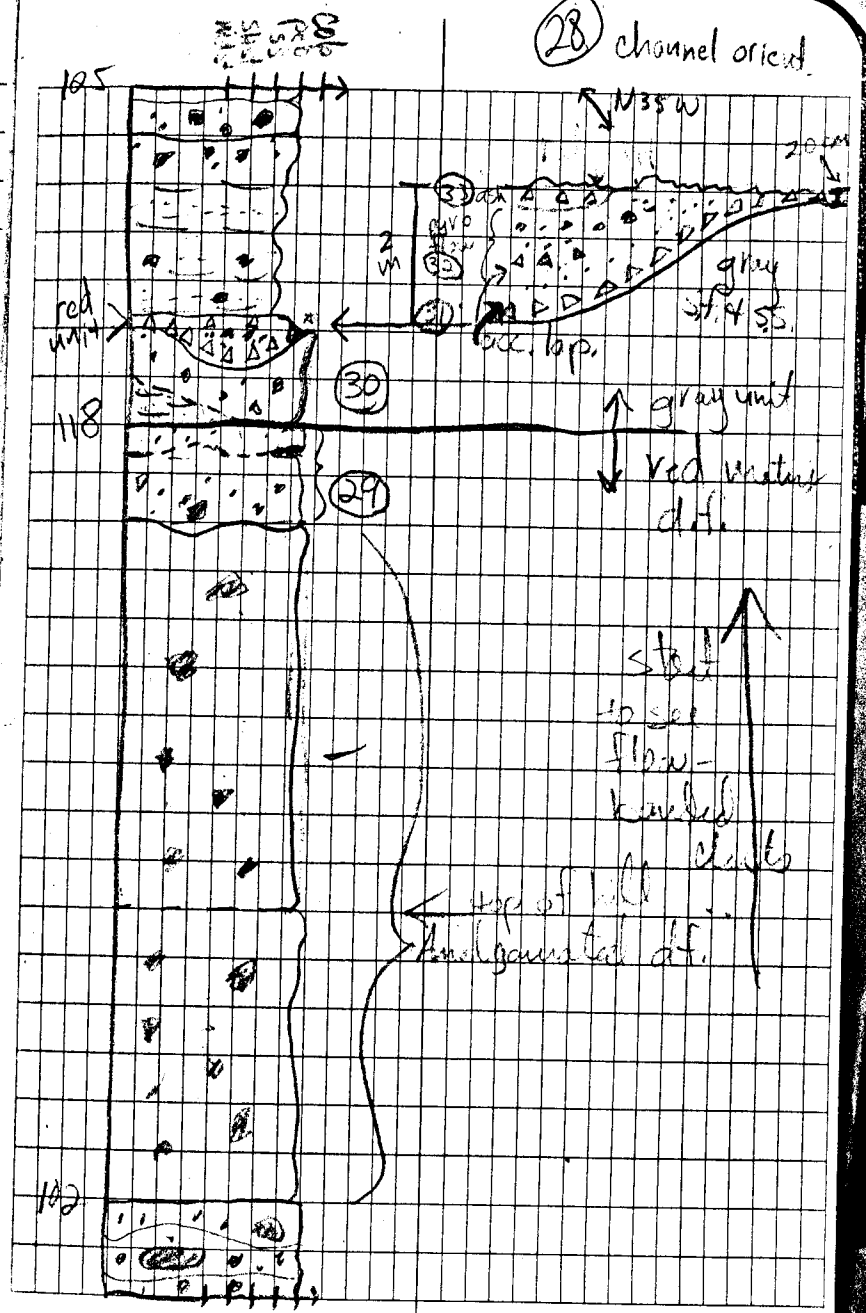
Cerrillos Project 7/13/89

Arroyo Spgs Cyn Sect

continuing from the last page

red matrix unit: hbl-pyx-plag glom phenocrysts, in clasts, greenish-gray hbl-plag phenocryst clasts, flow-banded hbl-plag phenocryst clasts and red top

photos 1, 2, & 3: panorama of (30)-(33)



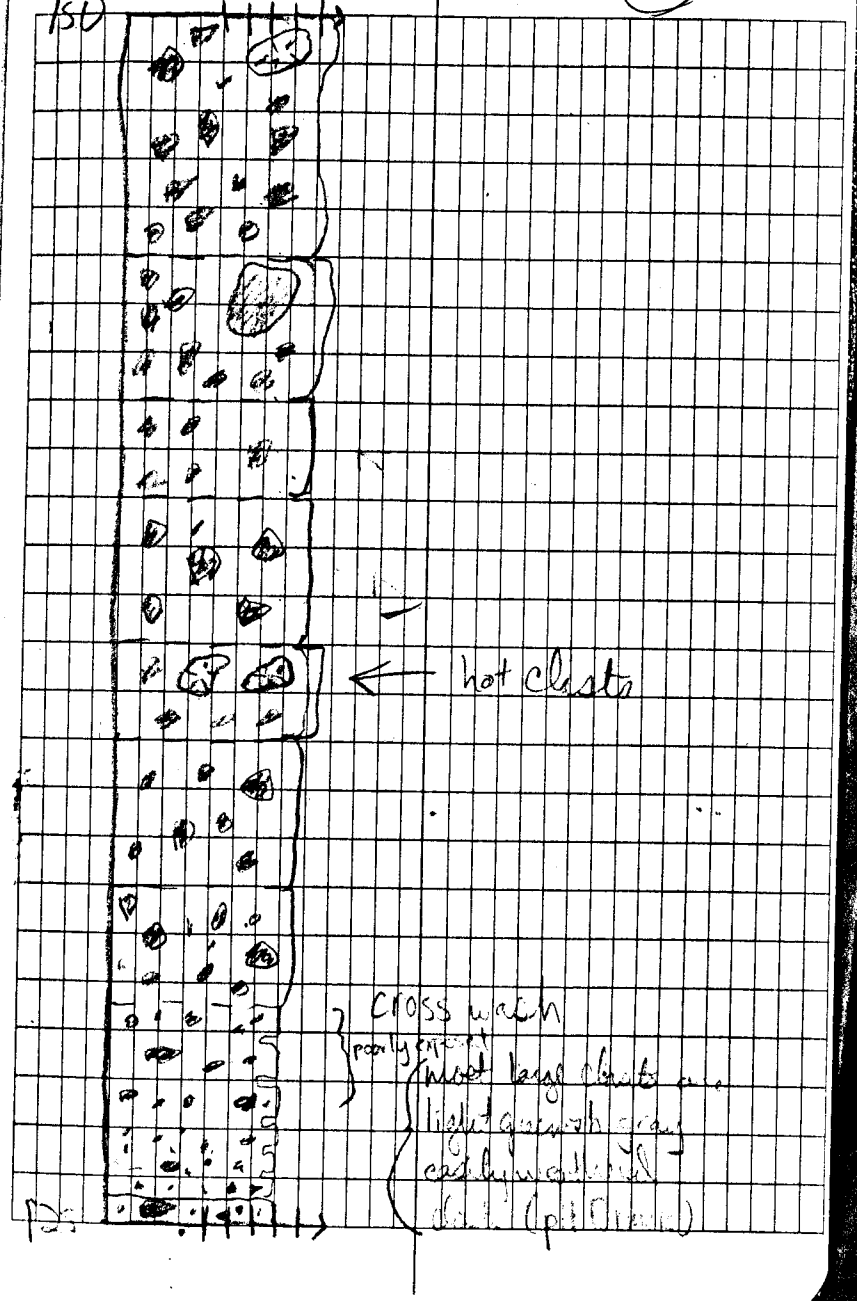
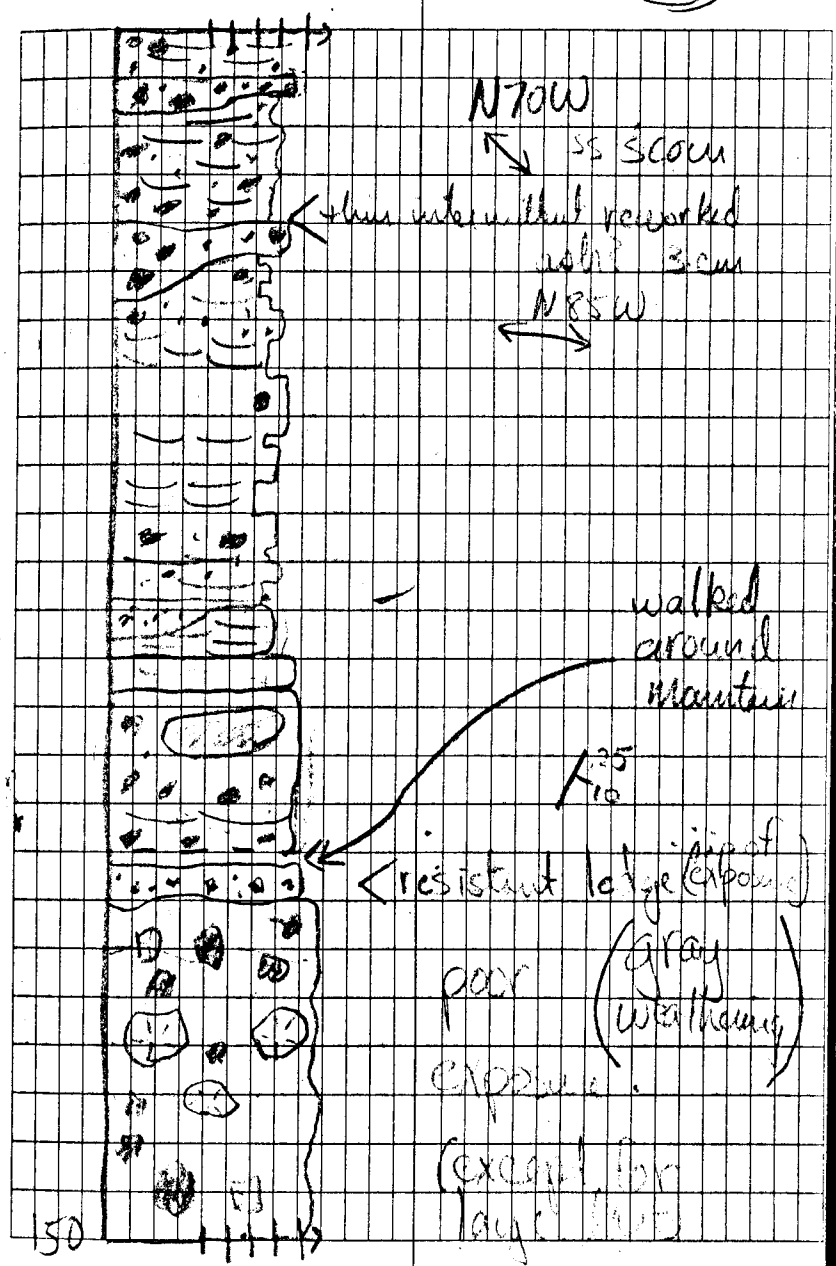
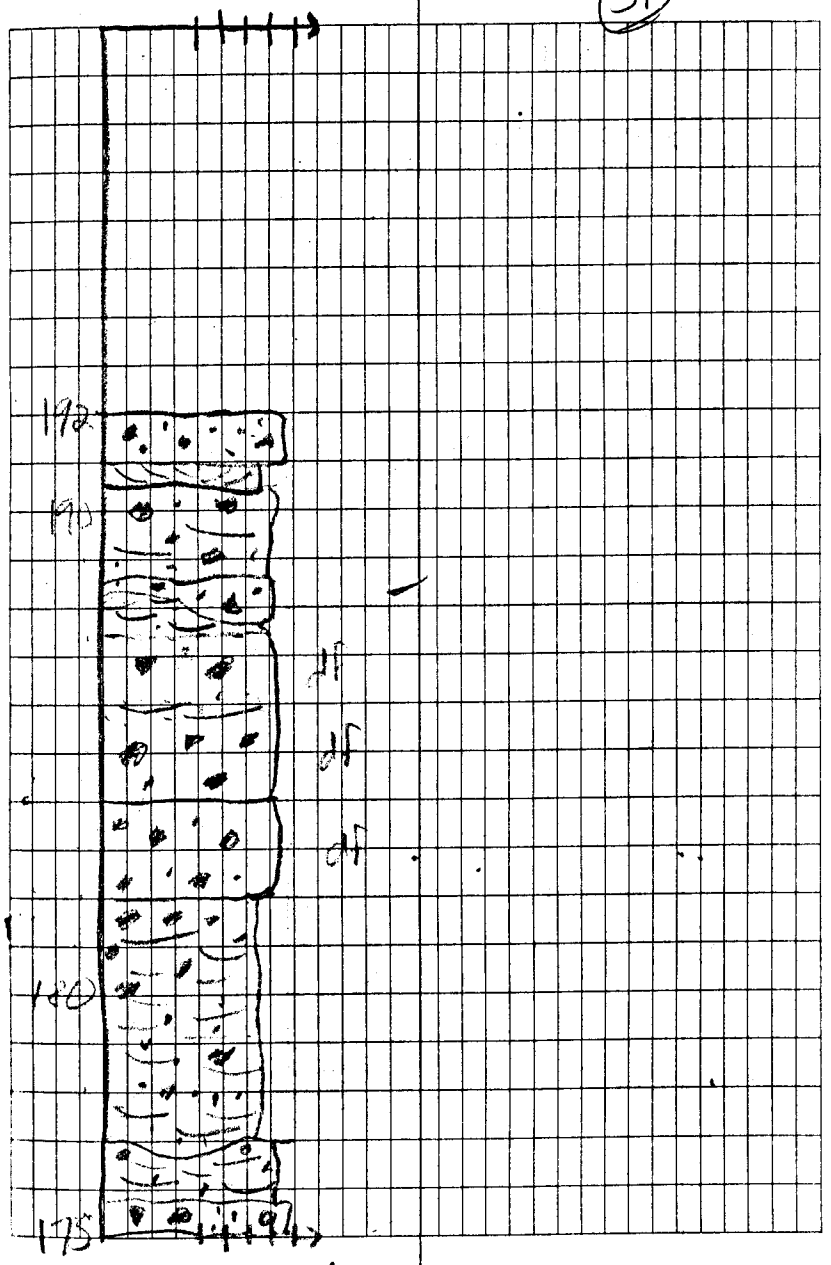

ISO
hot clusters
cross match
poorly ex
most

photo 4 & 5
- polygonal grades in hot crust
- hot crust



MU-73: hbl-bio-plag diorite

N26W steep to west



7/23/89

Carrillos Project

MU-65: NE trending dike dip steep to SE. → plag phen in light grayish-to green matrix

along traverse on the way to

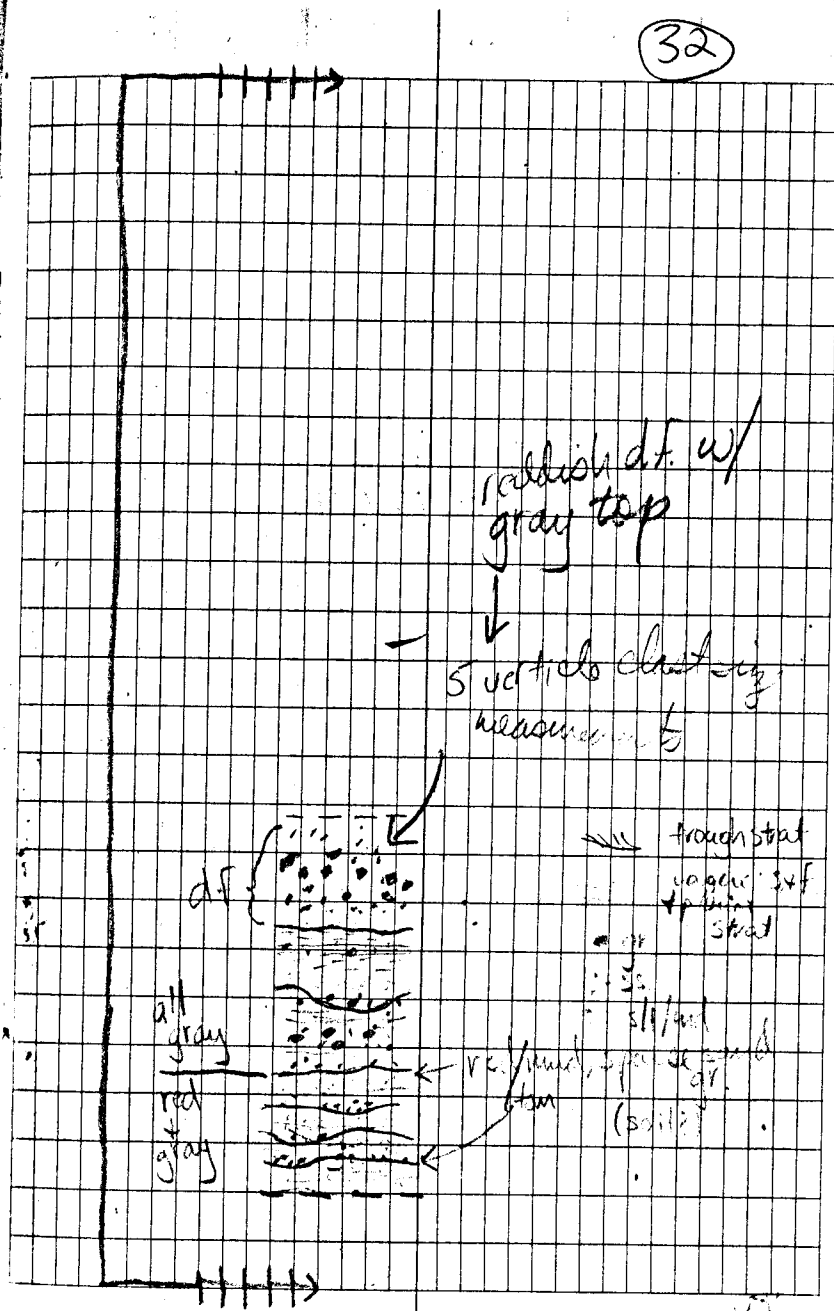
MU-63: NW trending (N 30 W) dike → pyx-bearing-plag in dark green matrix

Windmill Valley

photos 7,89: debris flows above trans. zone along west side of Windmill valley

MU-49: SW end of W.V.

schematic →



Section MU-59: starts at yellow pebbly ss in Gal. Nbeg. at windmill

bedding at Windmill

S 75

Windmill Valley Section:
starts at MU-40

- No pyx glauc. grains
- Red to Gray trans. at 50 m (color change is somewhat gradual)