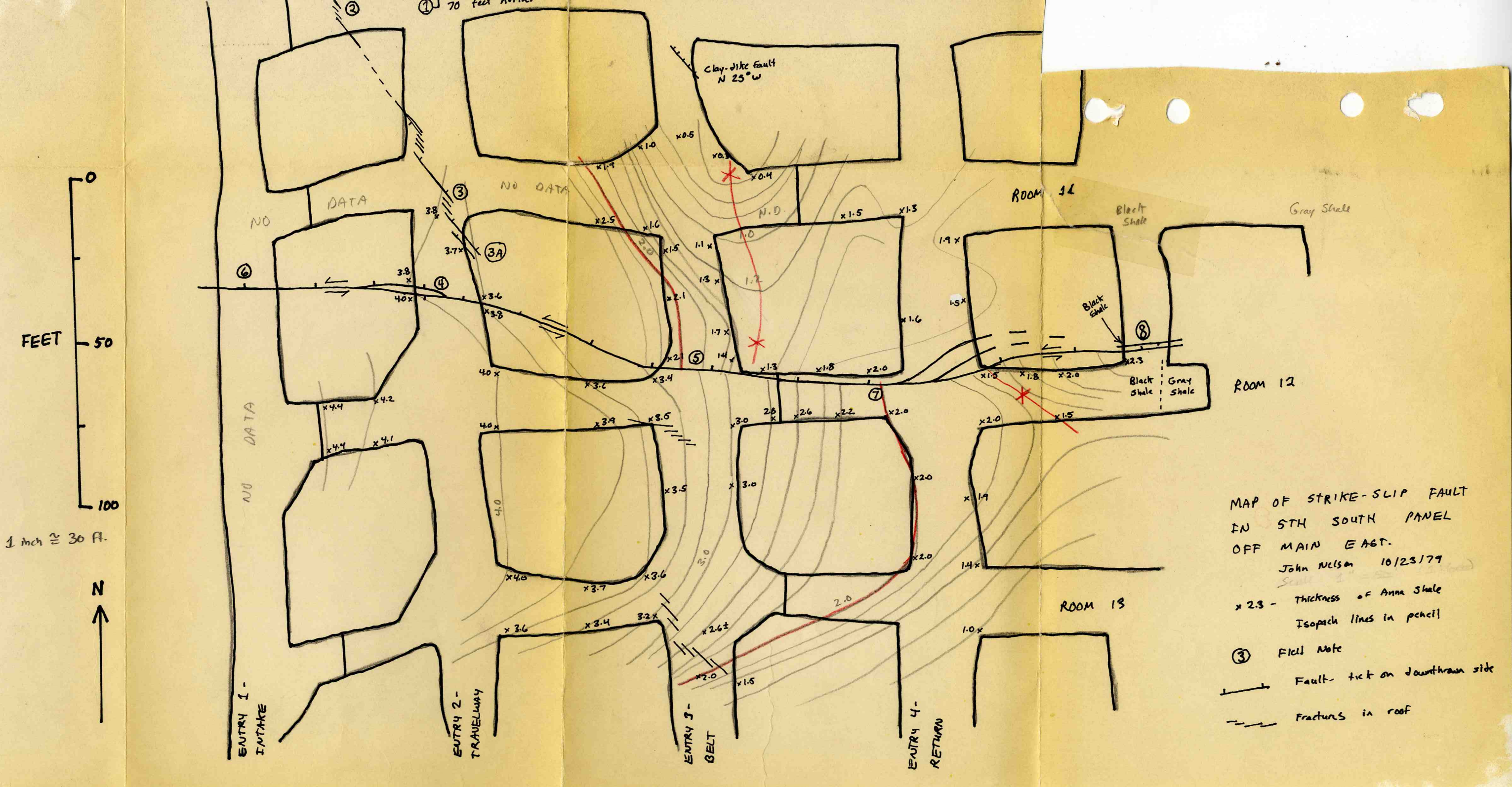

0
FEET
50
100
1 inch ≅ 30 ft.
N
ENTRY 1 - INTAKE
ENTRY 2 - TRAVELWAY
ENTRY 3 - BELT
ENTRY 4 - RETURN
ROOM 11
ROOM 12
ROOM 13
Clay-like fault N 25° W
NO DATA
Black Shale
Gray Shale
MAP OF STRIKE-SLIP FAULT IN 5TH SOUTH PANEL OFF MAIN EAST.
John Nelson 10/23/79
x 2.3 - Thickness of Anna Shale
Isopach lines in pencil
③ Field Note
Fault- tick on downthrown side
Fractures in roof

so that we are able to take continuous measurements of the thickness of the Anna Shale along the pillars. Fred Krausse noticed that the shale north of the fault on the west rib is 2.1 feet thick, while the shale directly south of the fault is 3.4' thick. This suggests that considerable lateral offset of the shale has occured. Therefore, we took many measurement of shale thickness and then constructed an isopach map of the Anna Shale (see map included with these notes).

The isopach lines are very clearly offset along the fault in the vicinity of Stop 5. The 3.0-foot isoline, which is perpendiculat to the fault, has been shifted about 60 feet in a left-lateral sense. East of the 3.0-foot line a "saddle" or belt of thin Anna Shale has similarly been offset about 70 feet. Even allowing for an error in calculations of 10 feet, this is considerably more displacement than any of our previous observations had led us to believe would be found.

6.) Strike-slip fault is exposed in the westernmost entry (intake air) again as nearly a single, sharp plane. The north side is downthrown about 1.0 feet.

In an effort to demonstrate lateral movement on the fault, we measured detailed sections of the coal seam immediately north and south of the fault on both ribs:

(OVER)

West Rib of Entry

North of Fault
Roof- Anna Shale
1.02' Coal
0.01' Pyrite
1.35' Coal
0.03- 0.10' Clay
0.92' Coal
0.05' Dark clay and fusain
1.91' Coal
0.02' Clay (Blue Band)
2.3' Coal
Underclay. 7.61

South of Fault
Roof- Anna Shale
2.45' Coal
0.02' Clay
0.95' Coal; fusain
0.01' Clay & fusain
1.97' Coal
0.03' Clay (Blue Bd.
2.4' Coal
Underclay. 7.83

East Rib of Entry

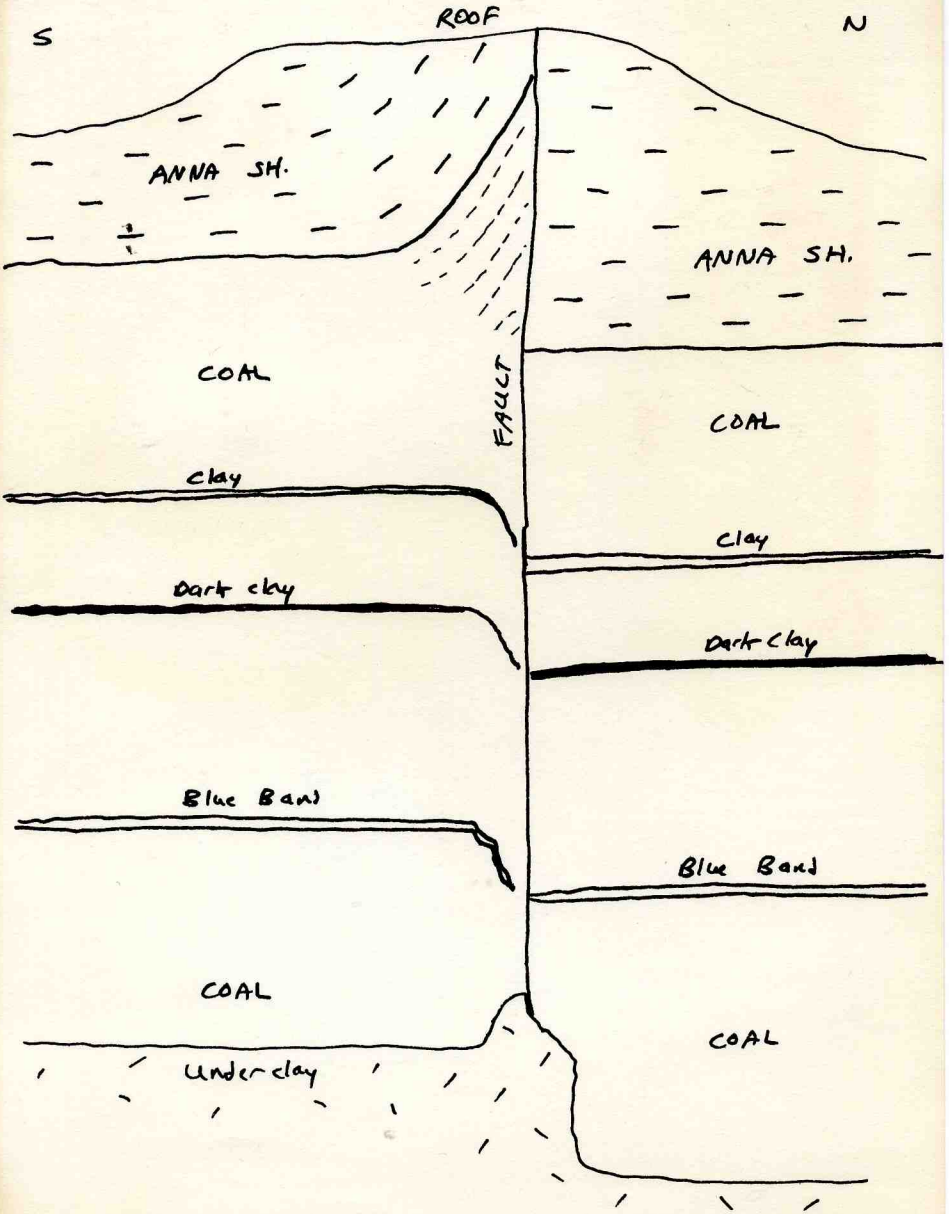
North of Fault
Roof- Anna Shale.
2.33' Coal
0.02' Clay
0.97' Coal
0.01' Dark clay
1.85' Coal
0.03' Clay (Blue Band)
2.24' Coal
Underclay. 7.45

South of Fault
Roof- Anna Shale
2.34' Coal
0.02-0.07' Clay
0.96' Coal
0.03' Dark clay
2.02' Coal
0.06' Clay (Blue bd.
2.55' Coal
Underclay. 7.98

A very good match-up of clay partings is seen. Differences in thickness across the fault are significant enough to demonstrate offset, but the amount and direction cannot be determined from these data alone.

The appearance of the fault on the west rib is interesting, and is shown by a sketch (over). The strata on the north butt against the fault with no drag, but the layers south of the fault are folded. The upper part of the coal and the Anna Shale are sharply tilted adjacent to the fault. Fred thinks that the tilted shale is not jointed, and therefore

STOP 6- Fault at West Rib



the joints are the same age or younger than the fault. I am dubious about Fred's interpretation because it is very difficult to achieve mechanically- shale is much weaker in tension than in compression, and so tensional joints should have formed before a compressional fold. That is, unless the shale was not fully lithified at the time; then it might have been able to fold before joints could form. To my eyes some of the joints do appear to be rotated on the gentle part of the fold, but no joints are apparent on the steep part of the fold, right next to the fault. Maybe the joints were there first, but were wiped out when the shale was folded.

In the middle part of the coal seam clay partings south of the fault are bent downward and squeezed out in the gouge zone. Some of the underclay seems to have been forced upward at the base of the coal, as shown in the sketch. Thus the apparent drag along the fault is not consistent in direction. This has been observed in a number of other places, and would be expected on a strike-slip fault.

7.) Strike-slip fault lies just south of pillar- here is a potential site for a major roof fall. The fault is a single plane to the west but eastward it splits into several branches that trend ENE and appear to be tensional fractures.

To the west the base of the limestone is down-thrown about 1.7 feet. The offset in the coal cannot be seen because the coal is mined out. Just north of the fault there are many NE- trending open fractures in the limestone. Most but not all are lined with tiny calcite crystals. South of the fault only a few open fractures are visible. Along the fault itself is a narrow streak of black mud, possibly crushed Anna Shale.

Where the fault splits the limestone appears to be highly brecciated and has open voids. Roof bolts

clearly do not anchor well in this stuff; a couple washed-out open bolt holes are seen.

On the east rib the coal is much disturbed and tilted in large blocks; no attempt was made to describe the structure in detail.

8.) Very large roof fall along strike-slip fault. Fred is more daring than me and he describes the section thus:

TOP
3-4' Limestone, buff-brown; north of fault only.
1-2' Shale, greenish
2' Limestone, buff
7-8' Sandstone or siltstone, light gray, thinly laminated near base, more massive upward.
1½-2' Limestone (Brereton), buff, nodular.
2.3' Shale (Anna) measured on west rib just north of fault. Small pyritized shells near base, and numerous very thin streaks of coal are seen. It is almost a "bastard limestone".
Coal.

The fault is shown by a gouge zone on the east side of the fall. The zone is nearly vertical and 4-5 feet wide; it is filled with a jumbled mixture of clay containing angular fragments, up to the size of a man's head, of brown, gray, dark gray and black material. The black possibly is coal or black shale which may have dropped down from a layer higher than anything exposed in the fall.

On the west rib the fault zone is seen as a funnel-shaped graben about 2 feet wide in the Herrin Coal. The funnel is filled with a jumbled mass of angular blocks of limestone, siltstone, Anna Shale, etc. some up to a foot across, and in the case of the Anna Shale fractured normal to bedding (joints ?)

The east rib is entirely blocked by fallen debris and there is no way to see the fault in the coal or

tell what kind of rock overlies the coal at the fault.

There is a lens of gray shale above the coal, south of the fault and just east of the intersection (see map). The gray shale pinches out along a line that runs north-south; i.e. perpendicular to the fault. The black shale immediately adjacent to the gray shale has small pyritized shells similar to those seen in the black shale just north of the fault.

Since we did not see gray shale north of the fault, we concluded that the left-lateral offset was less than the distance from the west rib to the edge of the gray shale south of the fault. That is, the slip was assumed to be less than 15-16 feet, as measured with the folding ruler. However, the evidence from the isopach map of the Anna Shale indicates a much greater slip than this; 60-70 feet (see Note 5). I do not see any way that the slip could diminish from 60 feet to less than 15 feet in such a short distance. And to repeat, I do not see how the isopach data can allow a slip of less than 50 feet at the smallest.

One possibility is that there are several strike-slip faults in the roof fall, with a total slip of 50-60 feet, and only the southern one, with less than 15 feet slip, can be seen. I consider this quite unlikely in view of the width of the breccia zone on the fault that was visible. More faults may exist and be hidden in the fall, but I am convinced that the visible fault is the major one.

Another possiblity is that the lens of gray shale is less than 50 feet wide east-to-west. (Only about 10 feet are actually visible). If this is so, then the north end of the lens could have been offset entirely through the crosscut and now be hidden within the pillar west of Stop 8.

I should mention that Fred observed gray shale northeast of Stop 8 near the place marked thus in pencil on the map. The exposures were poor but the

gray shale was evidently a small lens, certainly not over 100 feet wide and maybe only a couple tens of feet. We cannot even be sure if this gray shale was ever linked with the gray shale observed south of the fault at Stop 8.

Fault Zone on the 6th South Panel.

Entries 1-3 have just been mined into the strike-slip fault; Entry 4 is not yet up to the fault but should meet it within 50 feet.

On the 3rd Entry (belt) the fault was struck on day shift October 22, one day before our visit. According to the face boss a large rush of water and methane gas poured into the entry as soon as the fault was struck. Now there is only a little water dripping out, and no unusual amount of gas. The roof has been supported at the fault with bolts and three-piece sets.

The fault zone is a graben about 5 feet wide filled with the familiar jumble of angular blocks of shale, limestone and siltstone. Many wide open cavities are seen between the blocks. It is little wonder the miners got a rush of water here. All the open spaces in the breccia probably were filled with gas and water, which ran out immediately and now, a day later, is almost completely drained.

On the 2nd Entry no gas and very little water was met at the fault. The fault is seen to be more or less a single sharp break along the west rib; it splits and widens to the east but there are no open spaces and no breccia as in the 3rd Entry. The coal is finely crushed in a funnel-shaped graben on the east rib. Very little vertical offset has taken place.

In the 1st Entry the fault has just been mined through-we go in right after the roof bolter. Here is a single fault with nearly vertical plane, the north side is downdropped about a foot on the east rib and about 2 feet on the west rib. The strata are

cut cleanly except for a little folding in the Anna Shale just north of the fault. The fault surface has well-developed horizontal striations and mullion. Very little water is seeping along the fault.

All this is a dramatic example of how rapidly the character of the fault and the mining conditions can change along strike.

7th Panel South

We make a very brief visit to the 7th South. This panle is not yet up to the strike-slip fault, but they have run into very wet conditions at the face and must pump continuously. Water is dripping, and in some places pouring out of roof-bolt holes and out of fractures in the roof, and sometimes out of places where no fractures are visible. Gas is bubbling out of the floor and the face of the 1st Entry smells of H_2S. We notice plastic lines are attached to several roof bolts at this face, and water is being pumped away. Some miners tell us that the lines are there to take away methane gas, which is still being emitted in considerable quantities.

We suspect much of the problem is due to extensional fractures in the roof, allowing water to seep into the coal. The immediate roof is Anna Shale, and the thickness of the limestone (if present) is not known.

October 24, 1979
Experiment with Split Sets

Freeman is experimenting with a new kind of roof support called split sets. Split sets are hollow tubes about six feet long with a slot along one side. They are made of spring steel, are tapered at the top, and have a six-inch-square metal plate at the base. They are installed in holes drilled by a roof bolter. A hydraulic hammer, fitted to the boom of the roof

bolter, is used to drive the split sets home. The hammer is said to be extremely noisy.

The experimental section is in the 4th Main West about 6200 feet inby the Main South. Only a small area (about 50 feet of the entry) has split sets, and they are supplemented by standard resin bolts. The bolter that installs split sets is down so we cannot see it work. It is a twin-boom Lee-Norse bolter which has been fitted with the hydraulic hammers.

They have picked a difficult area for this first test. The roof is about a foot of weak black shale, overlain by thinly bedded siltstone or fine-grained sandstone. In places thin, nodular limestone is present at the base of the siltstone. The roof is very irregular and quite wet. Most of the split sets are leaking water- they are hollow tubes. In contrast most of the resin bolts are not leaking water. We notice that many of the split sets were bent during installation. This may be due to inexperience of the crews, or maybe the roof shifted a little while the sets were being placed, and caused the sets to bind in the holes.

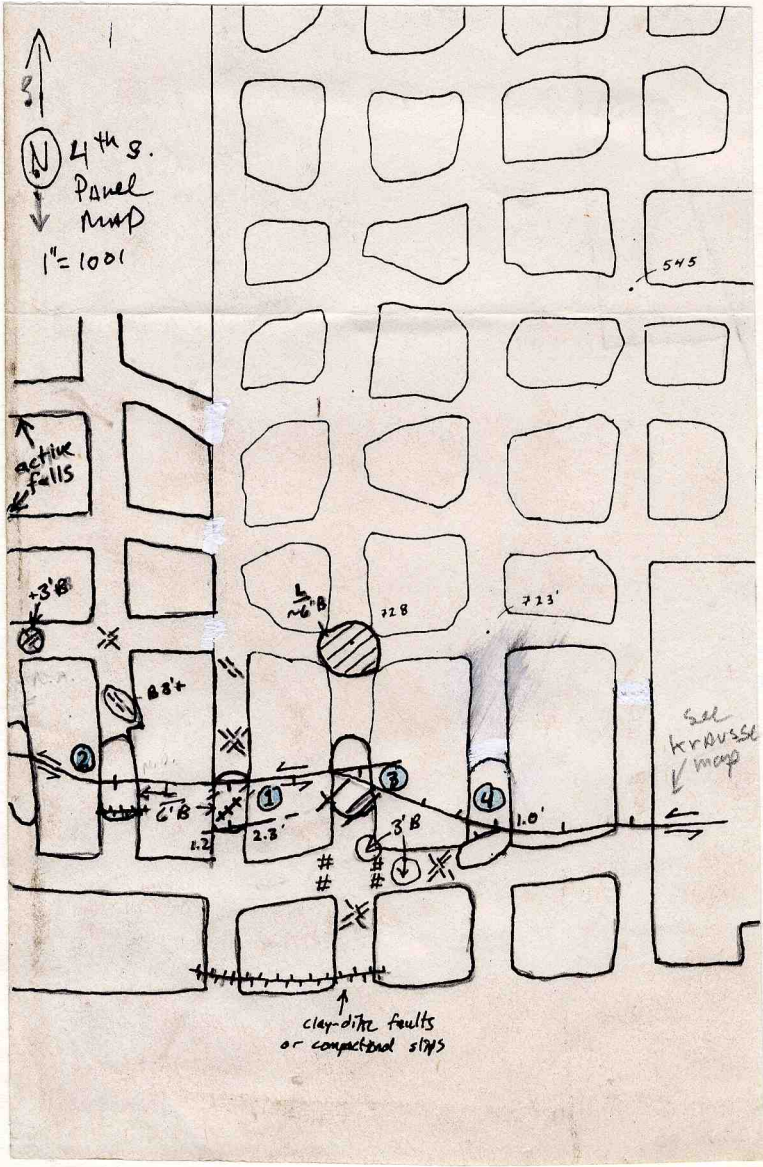
According to the face boss, when the machine is running again they will continue placing split sets in the 4th Main West.

4th South Panel

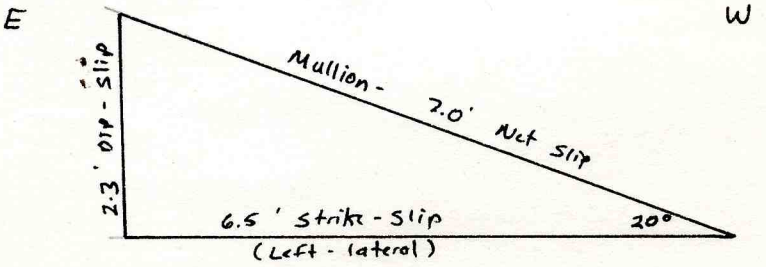
The 4th South is now mined out and we understand it will soon be sealed. This may well be our last chance to observe the strike-slip fault in the 4th South. The 3rd South is already sealed.

1.) Fault zone in 1st Entry (former intake). There are two main faults about 15 feet apart, striking slightly north of east and forming a graben. Between the faults the Anna Shale, 6 feet thick, has fallen to the base of the Brereton. The south fault is nearly vertical and has the north side downthrown;

Crown II
Field Map - Oct 23-4, '79



the top of the coal is offset 2.3 feet on the east rib and 1.2 feet on the west rib. Near the east rib there is very prominent mullion on the fault in the Anna Shale. The mullion plunge about 20 degrees to the west. Assuming that they indicate the overall direction of slippage, then the fault has about 7.0' of net slip and 6.5 feet of strike-slip (2.3 feet of dip-slip observed on east rib).



The north fault appears to be a sharp break in the limestone, but in the shale and coal multiple fractures are present and the situation is confusing. The main fractures trend roughly 060/60 SE (thus not parallel with fault in limestone) and show a few inches of dip-slip. I would call them extensional fractures. The coal is pulverized along them and locally breccia has dropped downward along the fractures, which probably were open at the time of movement.

The exposure illustrates the differing behavior of coal, shale and limestone to the stresses. It also demonstrates that the structural character of the fault changes along dip as well as along strike.

Between the two main faults, northeast-striking open fractures are visible in the limestone. One in particular is an open crevasse up to several inches wide and lined with tiny crystals.

Northeast-striking fractures are very prominent in the Anna Shale north of the fault zone. Some of the fractures show small vertical offsets.

2.) Fault in next heading to west (crosscut between Rooms 10 and 11). There is a large roof fall, open but not re-bolted. We can see the main fault running east-west through the center of the fall. It is nearly vertical and has very little vertical offset. The Anna Shale is squeezed upward a little into the limestone. South of the fault is a zone of crushed Anna Shale, dipping about 35° to the south. Where this zone intersects the top of the coal it turns abruptly into a vertical fracture or small fault which penetrates the entire seam. It is marked by a very thin zone of crushed coal. Layers are inconsistently offset a couple inches at the most vertically. The major movement on this fault probably was strike-slip.

The limestone exposed in the fall has many NE-trending open fractures.

In the next crosscut to the west a major roof fall blocks our access to the fault. The main fault appears to be farther north here than in the crosscut to the east; thus the zone is trending ESE locally.

Due north of here are two large roof falls actively working-good to find business elsewhere.

3.) Fault zone in 2nd Entry (travelway). A very large fall has occured and is extensively cribbed, making the view difficult. The following is an estimated section:

TOP

5' ?	Clay, greenish, soft, sticky. Some fallen down.
2-3' ?	Limestone, light brown, impure.
6' ?	Siltstone, light gray, thinly and irregularly laminated, argillaceous, micaceous. Upper part is more thickly bedded, may grade into limestone
0.2'	Clay, gray.
2'	Limestone (Brereton), brownish, argillaceous, nodular, highly fractured near faults.
6'	Shale (Anna), black, with a prominent yellow band just below the top.

Coal.

A complex pattern of intersecting faults is seen. The most prominent fault is the northernmost one which strikes roughly east-west and dips vertically. On the west rib the Brereton Limestone is cleanly offset and dropped 2 feet down to the south. The fault in the coal is hidden by debris. On the east rib the fault seems to have less dip-slip but the zone is wider; several feet. A major fault surface exposed in the Anna Shale has prominent mullion which are horizontal or plunge very slightly to the west.

This fault is probably the fault that formed the north edge of the graben at Stop 1.

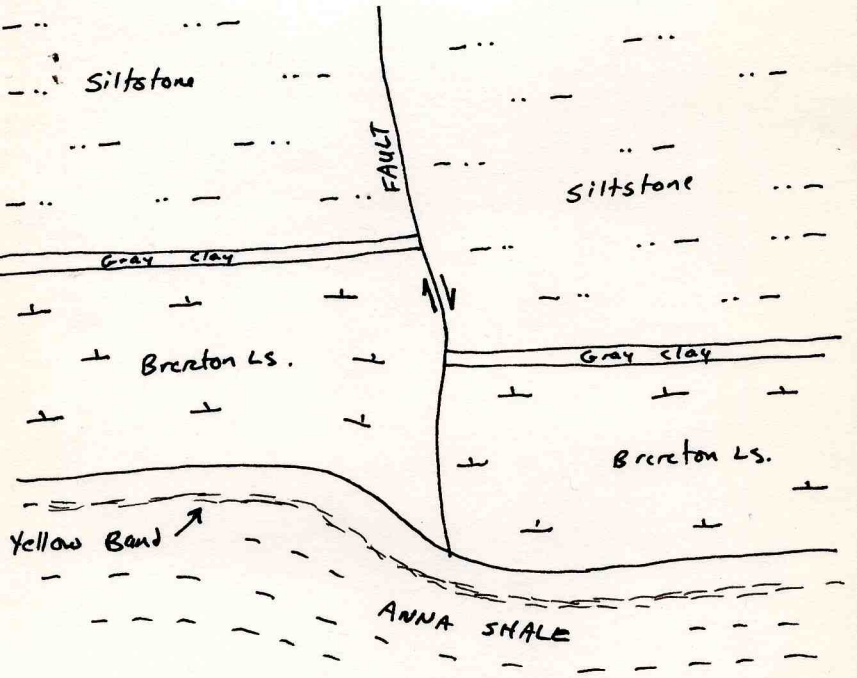
A second fault branches off the first and strikes southeast (140) intersecting the east rib. This fault has very little dip-slip but beautiful, nearly horizontal mullion in the Anna Shale and coal. On the east rib the coal north of the fault is folded sharply upward (very similar to Stop 6 in 5th South). The axis of the fold is essentially horizontal. Thus the fold is not due to drag. Drag folds on a strike-slip fault should have vertical axes. The fold may be due to (1) compression normal to the fault plane or (2) wedging of this small block between two faults or, possibly (3) underthrusting of the upper block after strike-slip movement.

A third fault strikes roughly 055 and intersects the main fault somewhere above the middle of the entry. On the west rib this fault gives a striking example of differing behavior or different lithologies (see sketch, over). The siltstone and Brereton Limestone are cleanly sheared (brittle behavior) but the Anna Shale is folded (ductile behavior).

Still another zone of fractures and small faults striking NE is seen near the southeast corner of the roof fall.

4.) Fault zone in the 3rd Entry (belt). Good exposure in roof fall. The main fault strikes 100/90, and has the north side downthrown 1.0 feet at the east

STOP 3. View Looking SW along fault at west rib.



rib, less throw on west rib. Mullion indicate horizontal movement. This fault probably connects with the second fault at Stop 3.

A second fault striking 065/60 NW intersects the first fault near the middle of the entry. This fault has less than a foot of dip-slip (normal) movement. Striations in one place indicate mostly dip-slip movement, but other striations are curved. There are small folds adjacent to both faults at Stop 4.

Several small compactional slips are truncated by the main fault, but we cannot match any on opposite sides of the fault and estimate the amount of strike-slip.

On the main fault at the west rib, one surface shows three and possibly four sets of striations, with the following orientations:

Fault Plane	trends 120/82 SW
	Striae 18 E- youngest, best shown
	Striae 21 W- secondary
	Striae 31 W- faint
Possible	Striae horizontal.

So the main movements were strike-slip, but the direction of dip-slip apparently varied in different stages of movement of the fault.

The fault is exposed in the 4th Entry but is difficult to study, according to Fred. No roof fall has occured so the fault can only be seen in the coal. Farther east a long pillar of coal has wisely been left in the fault zone; no rooms intersect the strike-slip fault.

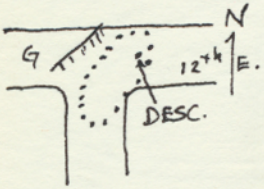
Jan.-June '80

Mine Notes - Freeman Crown II -Macoupin County

Trip: Jan.3-4, 1980 by Phil DeMaris

Coverage: 3rd N. Panel
2nd N. Panel (last visit)
Fatality site identified
Comments
Samples -J-6 to -9

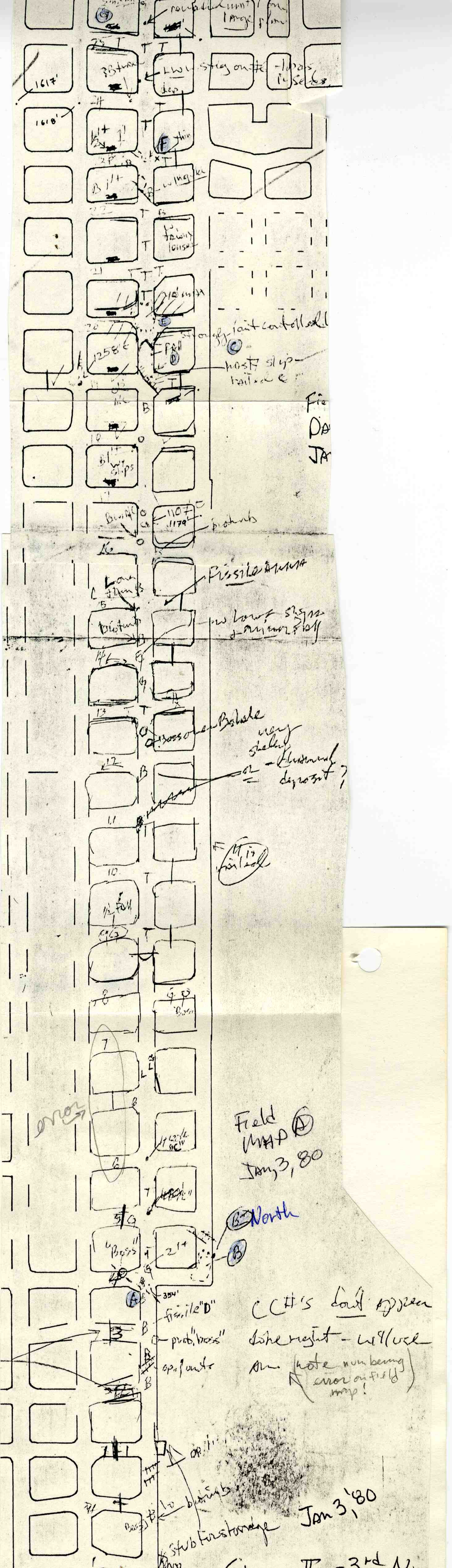
On the way to the 3rd Panel on the 12th E. Main, a large fall blocks the entry. Where described there is thick Energy, some Anna sh., and a few thin nodules of Brereton; planar bedded siltstone, micaceous, lt. gray, overlies the rest. The fall is the 4th C.C. east of the 1st N. panel's "C" entry. At the corner of the 11th E. and the 1st. N. panel travelway, there is a nice, large, fusainized tree trunk, 4.5' X 0.7' thick with thin fusain "extension" on one side.



At the 3rd N. Panel, got references where the "D" entry started.

A. The SW corner here has much "white top" material injected on coal/Anna contact; prominent "boss" is in the crosscut. Thin "G" roof begins on the N. side of c.c.; it thickens rapidly to the North. Anna shale has dispersed fusainized hunks of material to 6 cm. across; also some small u/i shells, 2-4mm.

B. Ls. caps fall - well fractured (but mostly healed) at base; some dripping. Energy to #6 contact shows much interlamination and deformation on small fault planes.



1617'
1618'
1258
strongly joint controlled
host slips
Fissile
very shallow
deposit?
error
Field MAP A Jan 3, 80
North
354'
"Boss"
fissile "D"
prob. "boss"
CC#'s don't appear to be right
(note numbering error on field map!)
Jan 3 '80

B.North Roof seq. is No. 6, 2½' finely-banded Energy sh., med. to dk. gray; Anna above; is not fissile. The Energy/Anna contact here is a highly mottled (bioturbated, I believe) gray shale which grades upward to a more normal Anna. Anna is finely laminated, with varve-like regularity, by a brownish-cream shale which also forms a few lenses. The top of the Anna is also bioturbate; small 1½-2½ cm. diam. "tubes" (cf. Planolites) are seen in the argil. base of the Brer. & these appear to effect the top of the Anna also; further, there are some smaller bioturb. traces (feeding tr.?) below the contact in the Anna.

Lunch; met Carl Griffen, face boss.

C. Strong mid-angle fault - on rib assoc. with shale and fusain band (!?). In roof fault has crushed an Anna conc.(brittle); tubes (Planolites) also present in Anna above.

D. Fall desc.: 4.2' Anna with a/c's at base; top banded w. lt. gray band; mottled contact to a greenish gray shale 0.7' thick; 3' min. micaceous siltstone above that; no certain Brer. seen; 8' fall at highest.

E. Fall desc.; 5.90' Anna to pyritic, gray remnants of Ls. (est. .3 -.5' thick); irregular contact to siltstone which is 4' min. in thickness. At the time I thought this was too far south to be under channel, but it could be. Huge a/c seen in c.c. gob pile.

F. Fall desc.; Anvil Rock sediments seen; 1' Anna left uneroded at center of W. side. Several lg. stems/logs in A.R. seds.; 2 right above Ss. lens in NW corner. 1½' Anna left

at SW corner; channel contact prob. in pillar to south(?); 72" bolts here (glues?).

G. Eroded a/c parts in a dk. gray mat'l. Coarse Ss. lens here eroding remnants of B (Anna) roof, I believe. Ss. sampled here (-J-6, with "white" down.

G.North To the North around the corner there is darker gray siltstone with plant frags. overlying erosionally a marine shale ("clod") with Brachs. & Gastropods. Had difficulty in distinguishing dark siltstone from dark clod. "Lawson" here has lots of stems of med. size (pteridosperm material); with some pinna, loose.

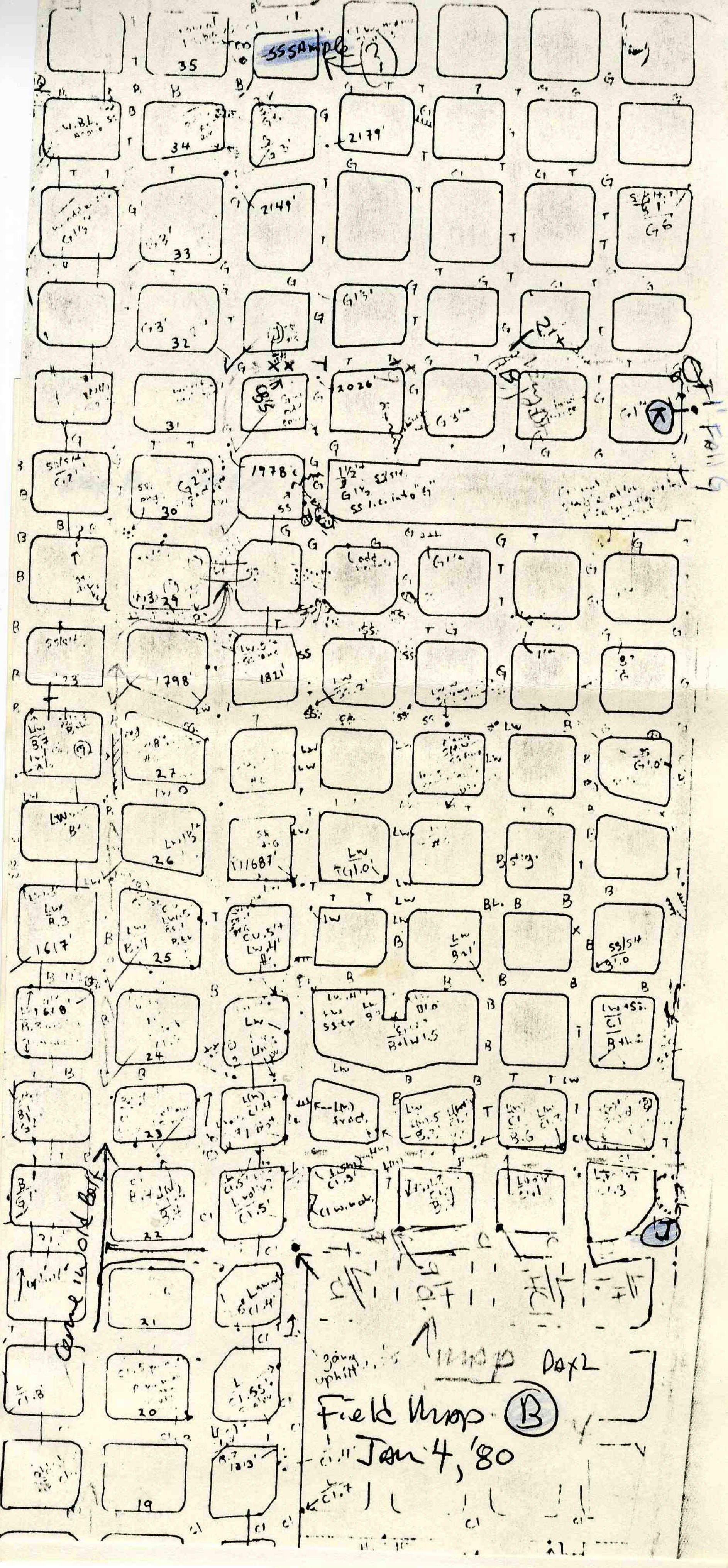
H. Confused situation; Ls. unit (Brer.) being eroded & decalcified; impossible to pick from clod, except for prominent plicate pectins. Thought it was fossilif. Anna at the time. Several nice middle-sized (2-4 cm.) Calamites casts in fill sediments.

I. Fossiliferous unit sampled; it is either "clod" or altered Brereton. Sampled; -J-7 and -J-8

2nd N. Panel

We walked to top of panel(48th c.c.) to check ventilation; seals were partly completed; flow was 4500 c.f.min. w. ½% methane; we experienced no breathing difficulties.

J. Last check in this panel; 22nd E. rooms mapped & new fall discovered. View is poor, but Ls. has fallen, even though base is flat & gave no hint of thinness; I est. 1½-2' of Brer, prob. partly eroded; is nodular, but this may be normal. I estimate 2' of siltstone


SS Sample
35
34
33
32
31
30
29
27
26
25
24
23
22
21
20
19
2179'
2149'
2026'
1978'
1798'
1821'
1617'
Came in old box
going uphill
Field Map (B)
Jan 4, '80

with trace of coal above it.

K. Wanted to recheck fall on N. side of channel; Anna 1' and less (eroded) in fall; locally ls. (knobby) is pressed down into the Anna. No Ss. seen here, but disturbance is obvious in roof.

Fatality site identified (June 13th, 1979)

Ed Banovic will soon be a face boss; Dave Webb assisted us; he will replace Banovic as Assist.-to-Supt. Dave gave me a base & we marked the site (either 42nd or 44th c.c. on the belt entry); we will visit the roof fall area next trip; site is in the 1st S.W. panel, and roof is reported to be worse than normal.

Comments

Dave Webb indicated there were plans to try out "split-sets" in Crown II; had an initial set of tests which were single cuts only which went OK.

On the way past "K.", in second panel, I sampled a Ss. dike in clod roof at about 2240' N. on the travelway just south of a linear row of Ls. bosses; this proved to be the most northerly Ss. exposure in the panel. (-J-9)

Samples (-J-6 to -J-9)

CII-J-6 Site G; Ss./pebble conglomerate; "white" on down side; could be set & cut for photo. Anna Sh. pebbles from 250' away, minimum.

CII-J-7 Site I; "Clod" or weathered Brereton; has nice brachiopod.

CII-J-8 Site I; "Clod" or weathered Brereton; larger piece; dark gray.

CII-J-9 2nd N. Panel; travelway @ 2240° North; Subvertical Ss. dike in "clod" roof; ca. ¼" thick and very pyritic.

Freeman United Coal Mining Company - Crown II Mine
Macoupin County
Notes by John Nelson on visit with Phil De Maris

January 23, 1980 3rd North Panel
off Main East Entries

Mapping eastward continuation of channel features.

1.) Noting difficulty in identifying roof strata. Here is mudstone, dark gray, with dark gray streak, poorly bedded to massive, finely micaceous, contains plant debris, Pecten, and crystals of pyrite near base. Slight dripping from roof. Bolts are 48" and 60" mechanical. Believe this is Energy Shale.✓

2.) Roof fall exposes base of competent layer, probably limestone: light green to brownish, mottled, with possible shell fragments. Below this is about two feet of disturbed dark gray to black shale, as above; possibly some Anna Shale overlying Energy Shale but units are not distinct. Much water dripping from bolt holes. No evidence of erosional contacts in the roof sequence.

3.) Immediate roof is mudstone, medium-dark gray, massive, soft and locally flaky, finely micaceous, slightly calacreous, contains abundant fossil fragments including brachiopods and a trace of carbonaceous debris. No solid rock visible above. Bolts are 36" mechanical. This resembles "clod" below Brereton Limestone but is thicker, darker, and siltier than usual. In places shaly coal at base, and small brownish nodules. We consider the possibility that it is the Bankston Fork Limestone or a facies of the Lawson Shale.

4.) Immediate roof is shale, medium-dark gray, very silty, almost a siltstone; faintly laminated, micaceous, breaks in irregular slabs. Contains abundant large impressions of leaves, stems, etc.; Calamites. This is typical Lawson Shale of the channel-fill facies. A

couple of septarian concretions are present at the base of the shale right above the coal. These may be remnants from the Anna Shale. The Lawson Shale appears to grade laterally northward into the material decsribe at Stop 3, but the contact is incompletely exposed. See Phil's Note G.

5.) Exposure of silty Lawson Shale, with lenses of sandstone locally. In places lenticular or concretionary limestone occurs below the shale. The limestone is medium-dark gray, fine-grained, hard, not noticeably fossiliferous, and contains numerous vugs and fractures lined with crytalline white calcite and pyrite. Upper surfaces of limestone are brassy-colored due to disseminated pyrite. Matrix between and below nodules is grayish-black shale, similar to that at Stop 3. Evidently we have Brereton Limestone, with "clod" below, overlain with erosional contact by Lawson Shale. Fractures and vugs in limestone could be due to exposure during erosion.

6.) Roof is dark and silty calcareous shale as at Stop 3. Locally very thin phosphatic Anna Shale occurs beneath it, and also the shale is seen to grade upward into nodular limestone. Thus we have strong evidence that the dark shale is "clod".

7.) Clear exposure along west rib of belt entry shows:

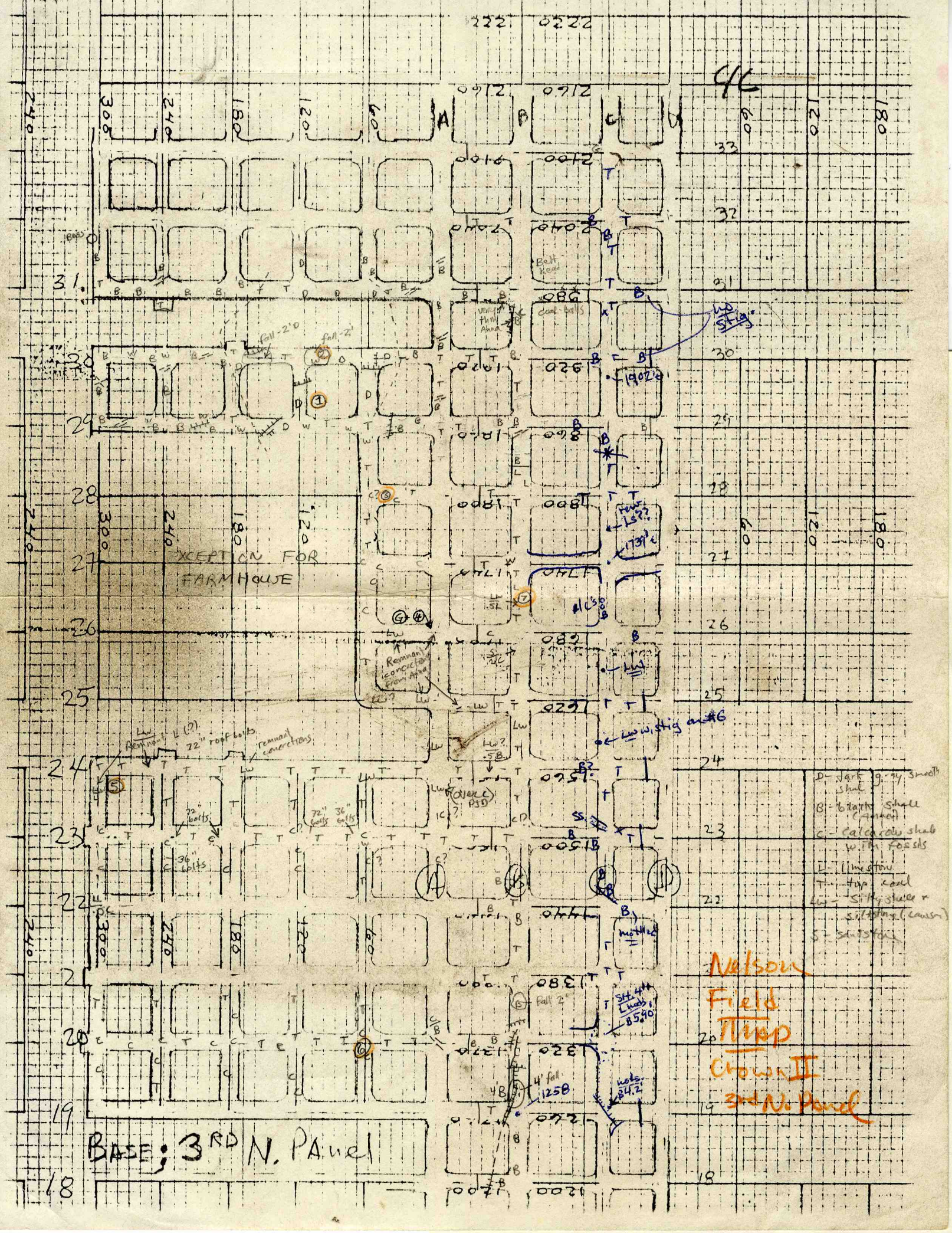
Lawson Shale, medium-dark gray, micaceous, locally sandy near base, abundant coarse plant debris. Sharp contact:

0.2' Limestone, nodular, dark gray with brassy pyrite at top. Grades into:

0.3' Shale, medium-dark gray, slightly silty, calcareous.

Top of Coal.

Here we can be sure that Brereton Limestone was eroded before the Lawson Shale was deposited.


BASE: 3RD N. Panel
EXCEPTION FOR FARMHOUSE
Nelson Field Trip
Crown II
3rd N. Panel
D- dark gray smooth shale
B- black shale (Cambrian)
C- calcareous shale with fossils
L- limestone
T- tan coarse
Lw- shaley silty (course)
S- sandstone

January 24, 1980. Mapping in Main East Entries near 8th, 9th, and 10th South Panels. Detailed study of strike-slip fractures noted during visit of Feb. 28, 1979.

The 8th South Panel has been driven about 4½ breaks from the Main East and now is idle. The floor is still wet in places but only the slightest dripping is seen from the roof, near the face of the belt entry. They have mined two to four feet of black shale, to the base of the limestone, and may have left bottom coal. Note fractures in limestone trending NE-SW. On the belt entry the 3rd intersection inby the Main East has fallen, exposing the following estimated sequence:

Base of Bankston Fork Limestone, green, knobby.
6-8' Siltstone, light gray, slabby.
3' Limestone, shaly, nodular-bedded.
3-4' Anna Shale
Top of coal.

It is a bit unusual to see limestone this thick fail except where it has been artificially cut, or is penetrated by faults.

1.) Fracture zone in 1st Main East strikes approx. 125 , appears as a narrow sinuous zone in the Anna Shale. The shale is crushed and in places horizontal slickensides are visible, but there is no appreciable offset. Accompanying the main zone are numerous narrowly spaced parallel or en echelon vertical fractures. The coal does not appear to be affected.

To the east is a second fracture zone, offset in en echelon fashion, and intersecting a third zone that trends 053.

2.) Open fractures in nodular limestone trend 053 and show as much as a cm. of separation in places. Most of them are filled with light gray clay but some are open and lined with fine crystals. Note also

steeply-dipping (75-80) fractures in coal with same direction of strike. Gas is bubbling from the floor in one place.

3.) Fracture zone trending 113 has abundant slickensides and mullion indicating horizontal movement, and has a few inches of dip-slip (inconsistent). Zone is nearly vertical but curves along dip. Both the coal and the limestone roof are affected. At the southeast corner of the intersection the fractures form a narrow graben at the top of the coal. The graben is filled with broken chunks of shale and limestone. Near the north rib a knob of limestone is possibly offset about one foot, left-lateral. A smaller similar fault to east.

4.) Numerous northeast-trending fractures along a wide zone in the limestone. These fractures are wider and more intense than those at Stop 2. Note minor seepage of oil from several. Some fractures show minor dip-slip separation, and shale or coal adjacent is deformed or steeply folded.

5.) A wide east-trending zone of fractures in the coal and roof, shows apparent strike-slip movement. Tight folds and fractures are seen in the zone; most fractures are steeply inclined and show dip-slips of several inches, both normal and reverse. Limestone in the roof shows a herring-bone pattern of fractures, the "head of herring" to the east. Direction and amount of strike-slip not determined.

The northeast-trending fractures become more intense and increase in dip-slip as they approach this zone. The two strike-slip faults from Stop 4 do not continue on straight-line projection. I believe they may join within the pillar and turn to a due east heading, as seen here.

6.) Small fault trending 025 has striations dipping 20 north, and the west side of the fault is downthrown,

Right-lateral movement of several inches is therefore indicated. This fault has the proper orientation and sense of movement to be a second-order or conjugate shear to the main, east-west trending, left-lateral fault.

7.) Closely-spaced open fractures trend NE and are seeping much water along with a little oil. The zone appears to become narrower to the northeast, away from the main fault which presumably lies within the pillar.

8.) Fault with horizontal slickensides and mullion, and form of narrow graben at top. To the west it trends ESE, but it turns to nearly a due east heading. South of this fault NE-trending fractures are numerous, and much water is dripping. In contrast, few fractures are present north of the fault, the Anna Shale has ordinary joints, and no water is dripping.

9.) Location: Travelway (western entry) of 10th South Panel, just inby 2nd crosscut. Strike-slip fault, the probable continuation of faults mapped earlier. Main fault plane strikes 109 and is curved strongly in dip direction, though the overall dip is nearly vertical. Horizontal striations and mullion are very well shown. The fault "scissors" across the entry: on the east rib the coal is downthrown to the south 1.25' but on the west rib the north side is downthrown 0.7'. Note a distinct difference in strata on opposite sides of fault on both ribs:

East rib

South of fault	North of fault
Base of limestone	Base of limestone
1.9' Anna Shale; sharp contact	1.5' Anna Shale, grades
0.15' Dark gray fossiliferous shale (bastard limestone)	into: 1.9' Energy Shale
1.3' Energy Shale	Top of coal
Top of coal	

West rib

South of fault	North of fault
Base of limestone	Base of limestone
2.7' Anna Shale, no pyrite at base.	2.4' Anna Shale with pyrite at base. Shear zone with breccia in shale.
Top of Coal.	Top of Coal.

The Energy Shale pinches out westward within the entry. This can be seen directly at the face, as well as inferred from strata on east and west ribs. The differences in strata across the fault signify that the north side moved westward, i. e. left-lateral slip, probably several feet and certainly less than the width of the entry, about 18 feet.

Sketches (over) of fault on east and west ribs.

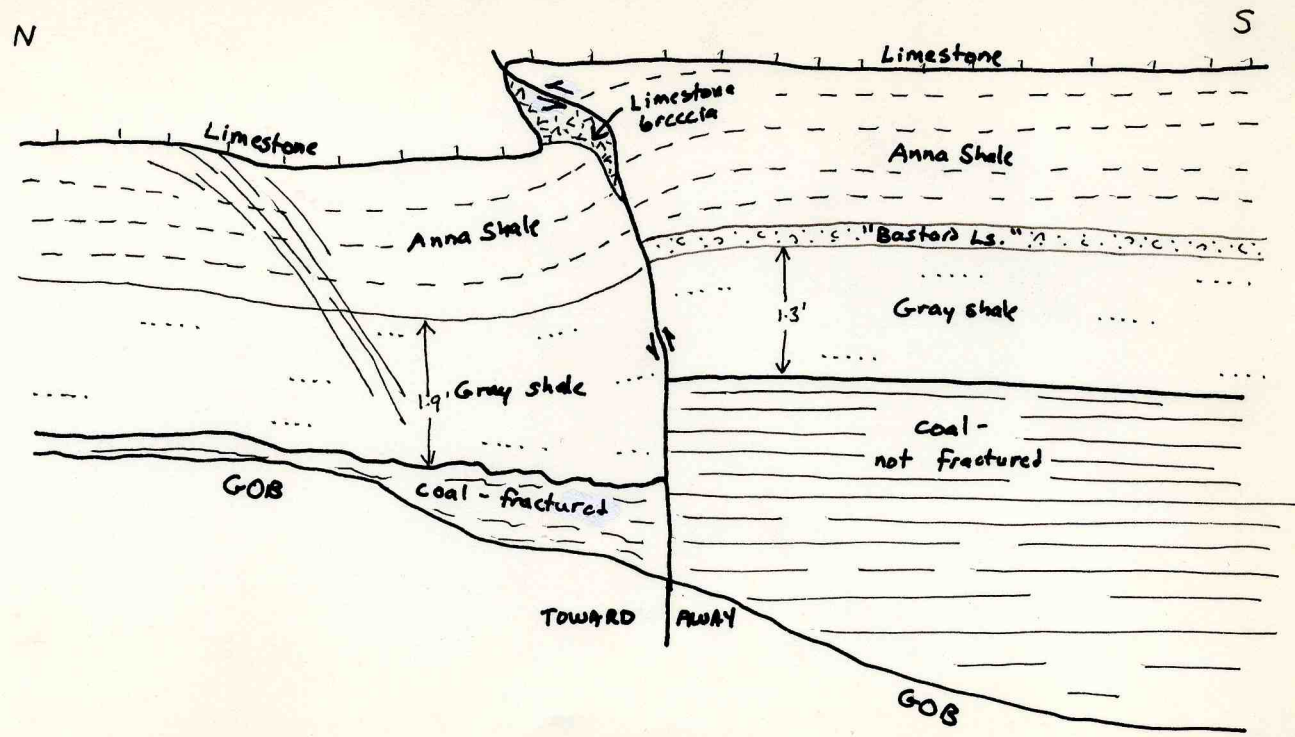
10.) Two segments of strike-slip fault form an en echelon set. The southwesterly segment dies out within the entry, and the northeasterly branch continues through the rib. Between the two faults the limestone is intensely fractured with northeast-trending fractures connecting the two faults.

January 25, 1980 Main West Entries near face.

Dick Webb, the new assitant to the superintendent, told us of (A) a fault trending northwest-to-southeast and having little offset but severely affecting roof stability and (B) an area of abnormally low coal, as low as three feet, apparently pinching out from the bottom, possibly an area of non-deposition. We visited the Main West to check out these two reported anomolies.

I checked the area where the fault allegedly was encountered and found no faults of an unusual nature. Near the faces of the 5th and 6th Main West, inby the 8th North Panel, and locally on the 7th and 8th M.W.,

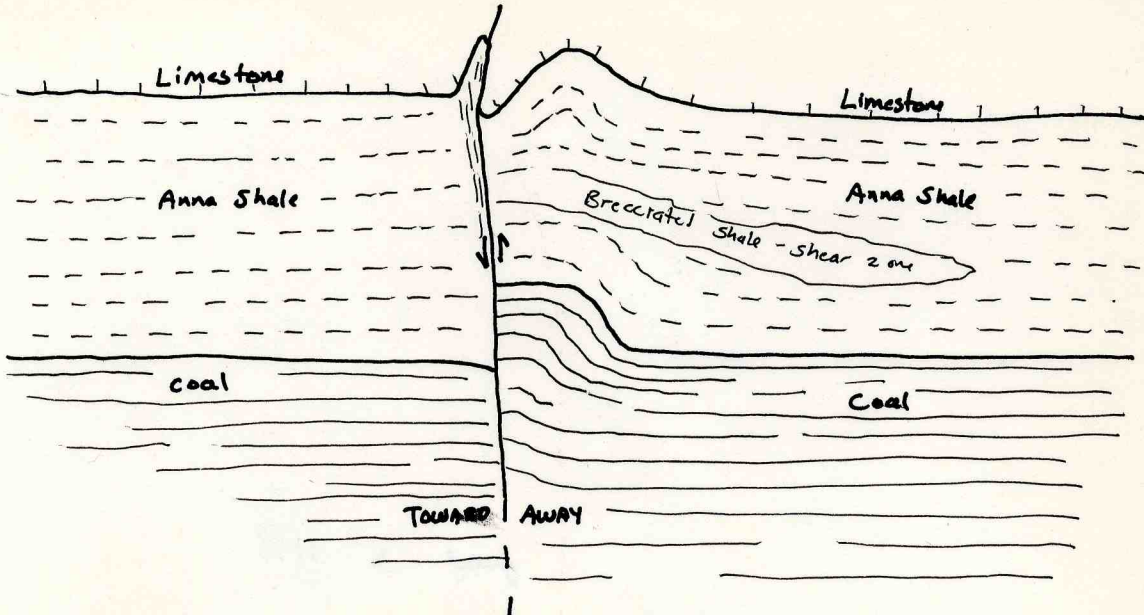
STOP 9- East Rib



S

Stop 9- West Rib

N



I did find a number of faults or slips with features indicating compactional or other soft-sedimentary origin. These faults showed:

Inconsistent strike and dip (few were NW-SE)
Low angle of dip
Mostly steepen and die out within coal
Clay or pyrite filling
False drag
Slickensides dip-slip only.

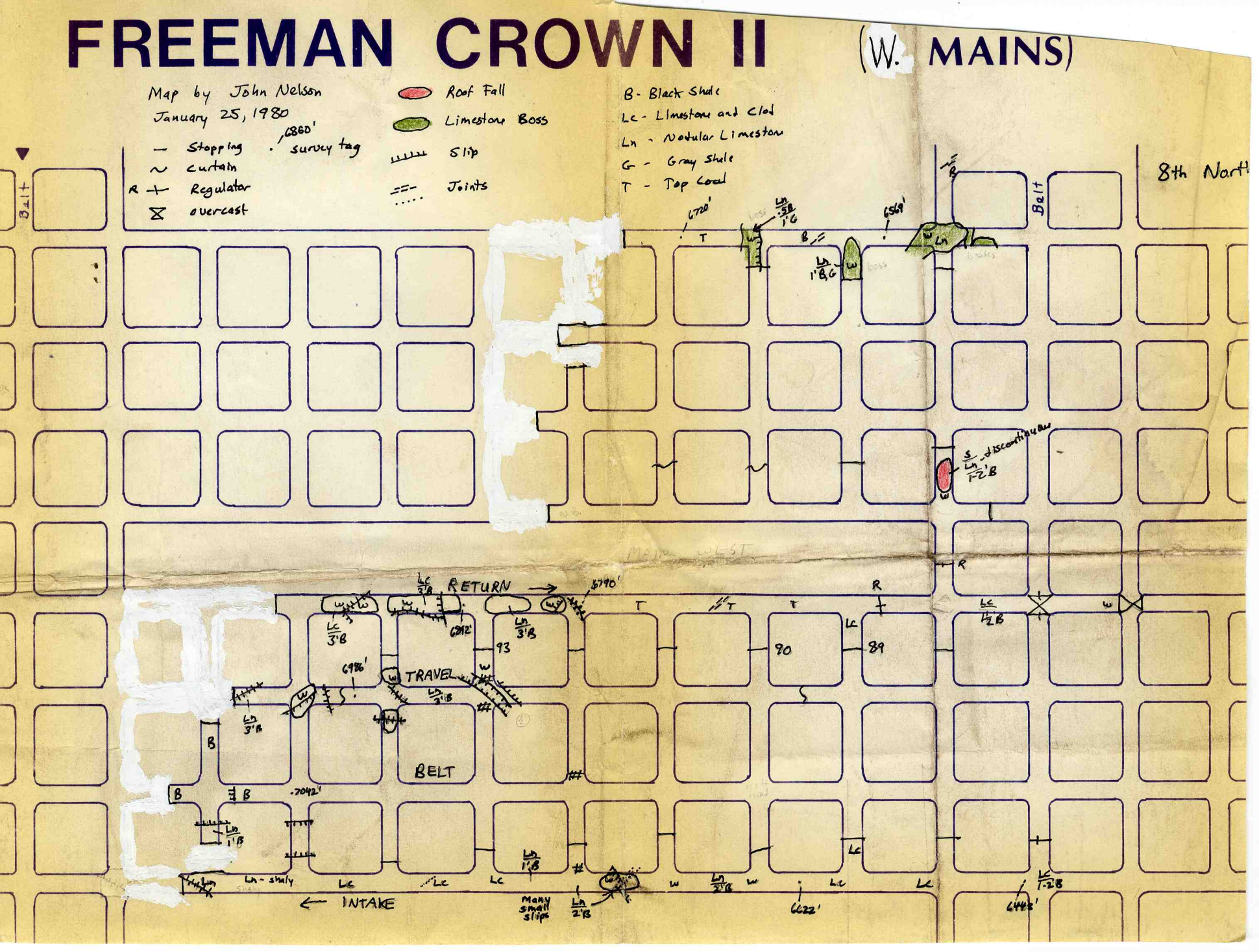
A few NE-SW striking joints were observed in limestone, and locally the Anna Shale shows two sets of joints, but no open fractures. No indications of strike-slip movement or any features other than the joints that could be related to the strike-slip fault.

The roof in this area was variable, with 0 to 3 feet of Anna Shale generally overlain by limestone with thick "clod" at the base. In places the limestone is thin and nodular. The coal appears to be everywhere of normal thickness (6 to 7 feet). On the 5th M. W. the underclay had been mined locally, but the coal was normal thickness and the Blue Band in its usual position as far as I could tell.

The low coal was reported to be mainly in the 1st through 4th M.W. We found the low coal to be extremely localized under large limestone "bosses" and where compactional faults had penetrated the floor, giving a false impression that the underclay was high and the coal pinching out. The most interesting features were seen along the belt entry to the 8th North Panel. Here there was locally as little as one foot of shale between the coal and the base of the Anvil Rock siltstone. Siltstone, sandstone and greenish clay were widely injected into the Anna Shale, and the top of the coal was disturbed with "white top". The contact of siltstone to underlying units was irregular, abrupt and gave the impression of being erosional. The exposures were excellent but did not show anything we have not seen elsewhere in the mine.

See Phil's notes for more details.

FREEMAN CROWN II (W. MAINS)



Mine Notes - Freeman Crown II - Macoupin County

Trip: Jan. 23-25, 1980 by Phil DeMaris and John Nelson

Coverage: 3rd. N. Panel mapping
E. Mains & 8th S. fault mapping
W. Mains mapping
Fatality site in 1st W.S. panel
Samples; Set "J" completed (to -17)
Photos from 3rd N. Panel

3rd N. Panel mapping

A. (See map A) At 26th c/c a fossilized Pelecypod was sampled (-J-10) from "clod"; fossils estab. that this was not reworked Anna. Fossil is on "down" side.

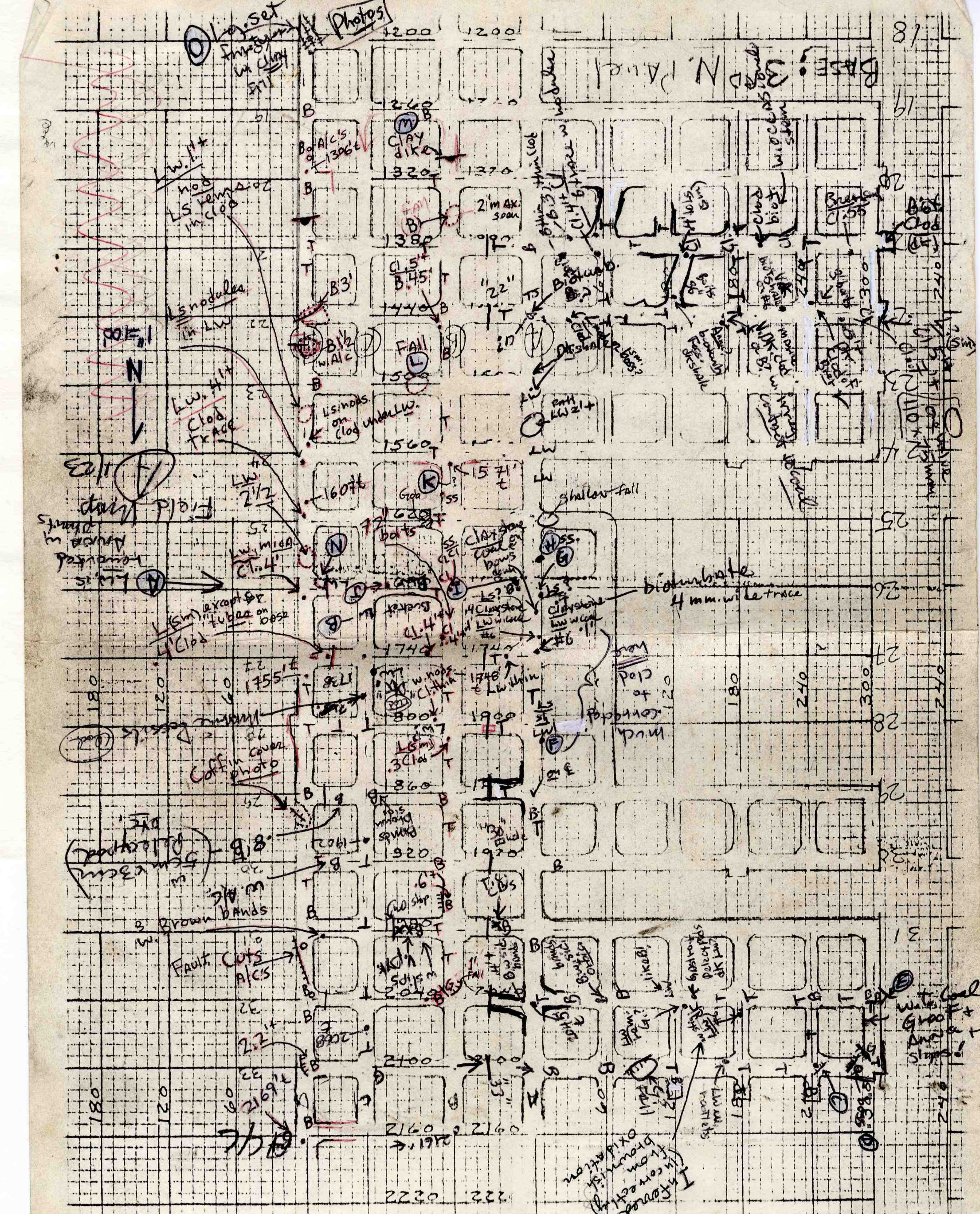
B. Previously mapped as Anna; now believed to be dark "clod" with calc. concs. which may be remnant Brereton nodules.

C. Mottled shale (Anna?) on coal; "white" is up. (-J-11) Prob. related to w.t. and 'bosses' to West.

D. Small exposure of a 'boss' with w.t. below. Anna roof just to E. with lots of slips. On N. rib oddly banded coal below top coal with 'white top'. Sampled, 'white' up (CII-J-12) what proved to be dolomitic mat'l interbanded in coal. Ranges of bands 0.3 to 0.9' below 'white topped" coal -- top of seam was not seen.

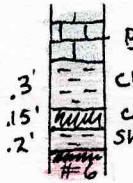
E. Anna roof, w.t.ed; prob. 'tube' traces related to Brereton above W.T.ed Anna.

F. Dark shale w. gastropod and strophomenid 35mm x 26mm; clod? Nelson sees clod & Ls. just to East; Coal-to-roof contact

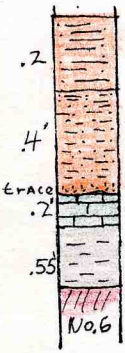


Photos
1200
1200
81
Clay dike
1320
1380
1440
B 3'
LS nodules in LW
Fall
1500
L.W. 4'+
Clod trace
1560
shallow fall
1620
Bioturbate
4 mm. wide trace
1740
1800
1860
Coffin cover photo
1920
Brown bands
Fault Cuts A/C's
2100
2160
2160
2220

is odd here; thought to be Lw.(?) with siderite nodules; is prob. "clod" with unusual contact. Coal at "x" sampled for palynology (-J-13); claystone above it to 0.4' th. has marine fossils & gradational contact to Ls. 3' roof bolts suggest thick Ls. (See April trip, note A.)



G. Marine claystone is present here below classic "Lawson" with lg. stem compressions. Lg. ls. nodules (Brere)left on 'clod'; Ss. trace caps one such nodule. The channel siltstone (also called "Lw.") is 0.6' min. with the basal portion weakly laminated and the upper 0.2' full of 3 cm. to 7 cm. wide pteridosperm petioles with a few bits of fern-like folliage. Longest petiole portion seen was 1½'.



H. Channel lag sampled (-J-14); grades upward to siltstone; roof is "clod" with Ls. remnants; orig. thought these were Anna concs. because of size & smoothness.

I. Large Sigillaria compression in t.c. under Anna roof; 26 cm. wide; 8.6' long as exposed, but part has fallen; may be longer (+ took 2 photos)

J. Remnant Brereton is 0.5' thick over 0.8" clod, tough; Brereton has weak fizz only. Trace of channel lag on Brereton, then 0.6" silty "Lw.", with fossilif., silty Lawson above that. Brer. and 'clod' are cut by some slips but Brer. is not knobby. Just

to the south there is thick 'clod' overlain by "Lw.", med. gray, with lots of leaves & stems.

K. Ls. nodules (Remn. Brer.) pressed into top coal - sizes up to a/c size (ca. 1½' diam.)! Roof is mostly "Lw." with prominent compressions over 'clod' locally.

L. Col.:

Lt. gray siltstone has penetrated what <u>appear</u> to be syeresis cracks in these Ls. nodules; nodules are distributed within the bands thus:

Brer. Ls. nodule with poss. siltstone infilling was sampled (-J-15).

M. Weak E-W clay dike; I suspect it could be channel related, but no Ss. was seen. Nelson has a major clay-dike going N-S on his side, so it is probably part of that sys.

N. Clod is spotty; overlain by dk. gray "Lw." with <u>Neuropteris</u> & med-sized <u>Pteridosperm</u> petioles - then "Lw" is downcut by lt. gray silty "Lw." w. traces of Ss.

O. Lg. set of fractures in Anna with clay fill; photo? (2 photos taken)

End day 1

<u>E. Mains & 8th S. fault mapping</u>

John Nelson & I have been progressively mapping the strike-slip fault system to the E.

(See Nelson's notes for more details)

P. We checked the stubbed face of the 8th South, unchanged from last (wet) visit. In on "C" entry - no active drips, but several 36" bolts (in Brer; all Anna fell during mining) are damp. On "D" entry no drips from prominent SW-NE fractures in Brer, and "rust stalactites" on bolts are dry.

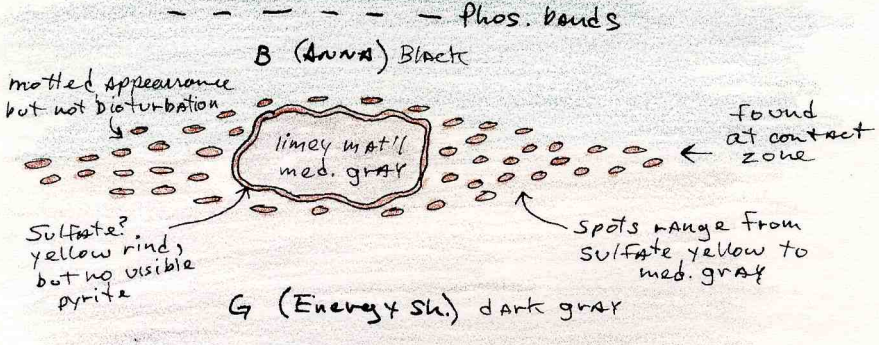
Q. No or very little change in total shale thickness to Ls. through an Energy shale pod area; no change to Base of Brereton seen. Reevaluate this site when roof stability work resumes.

R. Small strike-slip fault appears to turn a corner here - wide coal gouge zone on W. rib; none on E. rib; herringbone pattern of fractures in base of Brereton. Just to the N. in in the roof, the Brereton has open joints to 0.08' wide, some filled with Anna sh., striking NE-SW. On the E. rib, another wide coal breccia zone shows a displacement of the B.B., up 0.4' on South side. As on the other side much of coal retains it's bedding, but is intensely fractured on both sides of the actual fault plane; the f.pl. does cut the full seam. Here the B.B. also shows some plastic flow, being 1/8th inch at the f.pl. and thicker than normal 0.7' to 1.0' horizontally on both side; and still within the brecciated zone. Other clastic bands show true short radius folding; the B.B. shows a weak fold also.

S. Right-lateral fault with clear sub-horizontal movement; is down 0.4' to the W. at rib, with movement slightly oblique

to coal bedding. R. lateral fault is compatible with theory also, says John.

T. Very large "boss" area (about 40 x 20'); one exposure on S. rib shows knobby ls., 0.4'-0.6' thick, under ½' (visible) of lt. gray siltstone. Ls. to siltstone contact is flat. Coal below "boss" is "white-topped" as is the Anna. Odd features on the Energy/Anna contact look like Anna concs. somewhat but may be injected material; it has a fizz like the Brereton & seems porous. Sampled a piece (-J-16). Took a closer look; material does appear injected along Energy/Anna contact; in places there is is also "white-top" like material up to 0.8' thick at the same position. I sampled normal Brereton here for comparison (-J-17). Anna bedding is <u>not</u> disturbed above these features and thus lateral injection after partial lithification of Energy/Anna seem plausible; Sketch:



No. 6

5 such features were seen; area should be mapped to understand pattern of occurrence.

MAY have been "piping" assoc. w. deformation. P.T.D.

U. Knobby ls. roof on No.6; exposure shows physical movement of 'clod' material into t.c. bedding planes, surrounding the caol as small stringers, and lifting one prominent vitrain band. Some coal loss is visually suggested, but perhaps due to planar view. Coal is often mixed into the clod under Brer. roof; perhap the cause is deformational generally; certainly the deposition of vascular plant material (it appears to be vitrain) alternately with a claystone with an open marine fauna has its conceptual problems. Petrographic analysis of some of this coal isolated within the 'clod" should be run; sample -J-13 may be appropriate.

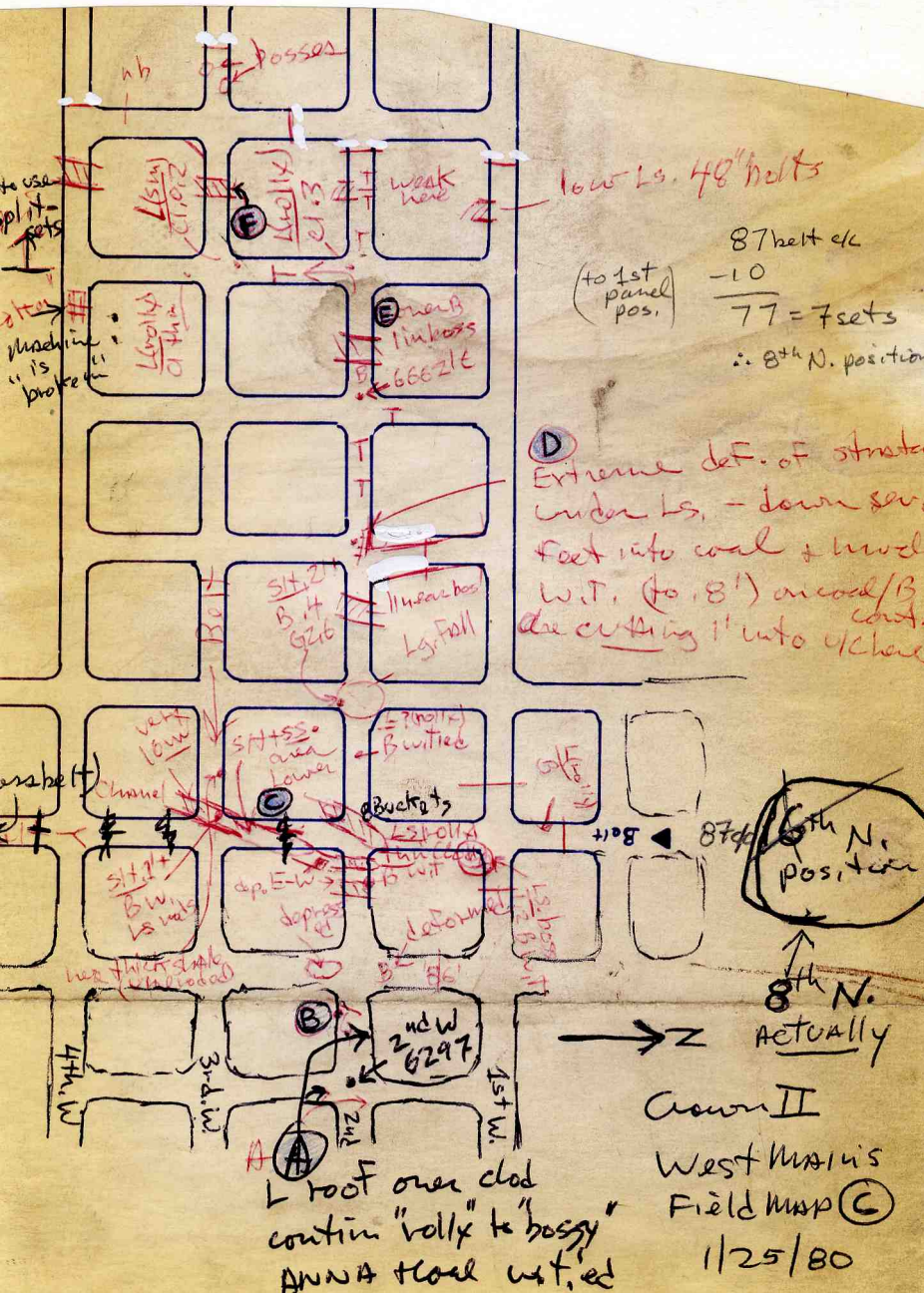
End day 2

W. Mains mapping

Dave Webb reports "low coal" in the face area of the 1st-4th W. Mains; F. Boss says the B.B."dives" in area (suggesting to me the non-deposition of the lower portion of the No.6 which sounded very interesting). On the 5th-8th W. roof problems related to "double slip" in roof with no displacement which strikes NNW-SSE; might this be related? Also on the 4th W. Main, "split sets" are being tested from about 6730' to the west up to the next panel position. The machine is a proto-type and is "down" today.

A. (See map C) Ls. roof here is continuously "rolly" to "bossy" with "white-topped" Anna as much as a foot thick. Slips effecting as low as the B.B. are common, and the clay on many many bedding planes, etc. would classify many of these features

Jan 23-5, '80
Map ©



as clay dikes (I reject the term "claydike-type fault"especially for field work because it further complicates and already complex descriptive situation and introduces an unfounded assumption as to genetic relationships between faults and clay dikes.) Not necessarily

HHD consider all nontectonic faults in coal seams as clay dike faults!

B. Thin Energy, Anna above thin and deformed, Ls. above that. Siltstone material is present.

C. Thick micaceous siltstone over traces of Anna; coal is depressed about 1½' here relative to 12' away; low seems to trend SSW-NNE, but more exposures are needed. Around corner to NE thick Anna remains (uneroded?) This suggests channel-like features, but only sheet-like siltstone has been seen so far.

D, Extreme deformation of strata under the Brereton Ls.; effects down several feet into coal, and there is much "W.T." (to 0.8'thick!) on the coal/Anna contact; the u/c/ has been thrust up here (on extensional faults?) and 1' was cut here.

with hindsight is prob. partly eroded + deformed in den channel clastics PJO 9/89

E. Base of 'boss' is about 1' below normal t.c. position; slip in coal below it propagated through a fusainized log (why a weak point?) and displaces the B.B. 0.3'.

F. Linear Ls. boss - weaker here than on the 4th. Underclay again pushed up on faults in the floor; this is the origin of the "thin coal" idea converyed to us; the "boss" to u/c interval was under 6' at two places. Coal bedding near top dips slightly under this boss. Area deserves more study.

Fatality site in 1st W.S. Panel

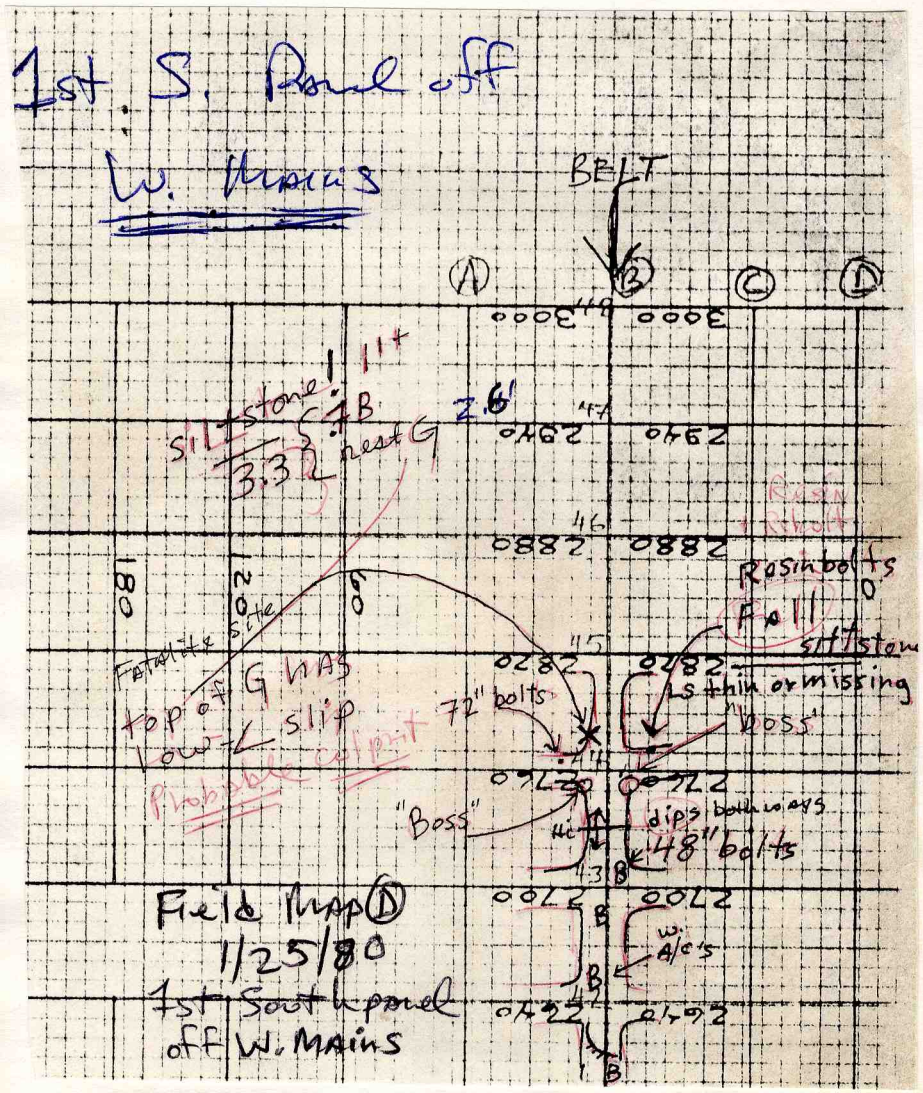
The roof fall which caused a fatality on June 13, 1979 was investigated. The immediate roof is Energy, and at the spot of the fall there is no Brereton present. The section there is 2.6' Energy, 0.7' Anna, and 1' plus siltstone. A low-angle slip at the top of the Energy is probably related to the fall, but we don't know how much fell previous to the attempt to bolt. Two Ls. bosses lie just to the south, making this typical problem roof found over thick Energy sh. areas.

Samples; Set "J" completed

CII-J-10	Site A.; Pelecypod from 'clod'
CII-J-11	Site C; Mottled shale on coal.
CII-J-12	Site D; Dolomitic coal;'white'up
CII-J-13	Site F; Coal in 'clod'
CII-J-14	Site H; A.R.Channel lag, 'white' down, with large pebbles.
CII-J-15	Site L.; Brer.Ls. nodule, w. possible siltstone infilling.
CII-J-16	Site T; Odd injected material, limey.
CII-J-17	Brererton Ls. from Site T.as a reference.

JAN 23-5, '80

MAP (D)



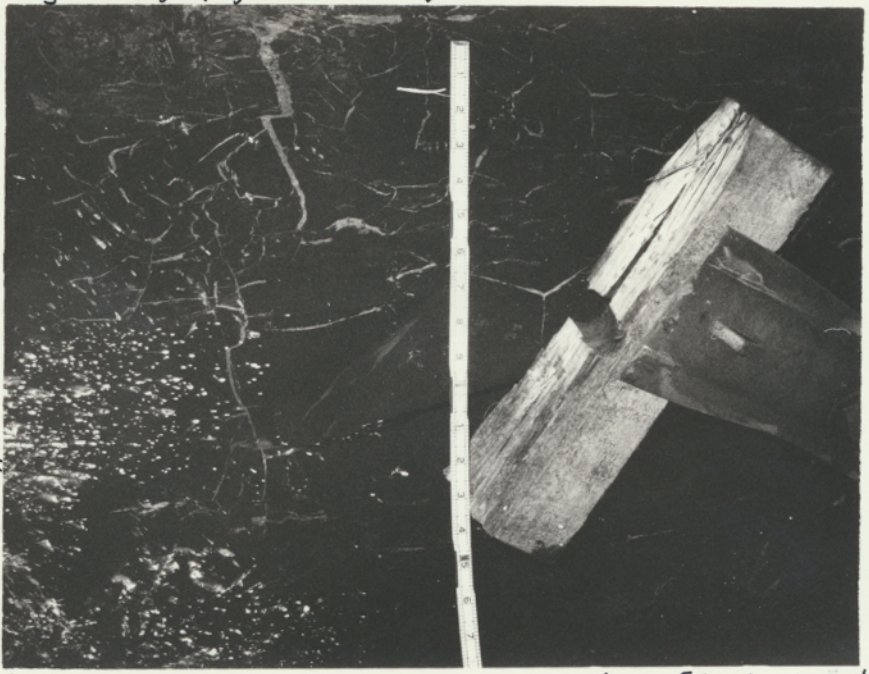
1/23/80 Crown II - site "I"; Sigillaria compression/impression in f.c. Neg. 2

1/23/80 Crown II - site "I"; Sigillaria in top coal Neg. 1

Neg. H 1/23/80 Crown III Ls. "boss" prob. @ 360' N. on "L" entry, 3rd N. panel

Neg 3. 1/23/80 Crown III - "Coffin cover" fall in ANNA 3rd N. @ 1880' N - "D" entry

Neg 7 ↑ slightly "light struck" ↓artifact



↗ Rock dust ↘

1/23/80 Crown II - Site "O" - Slightly oblique view of "white-topped"
Neg. 6

ANNA

Freeman United Coal Mining Company Crown II Mine
February 5-6, 1980
Notes by John Nelson on visit with Steve Danner.

Mapping strike-slip fault zone in Main East. See also notes of Feb. 29, 1979 and Jan. 24, 1980.

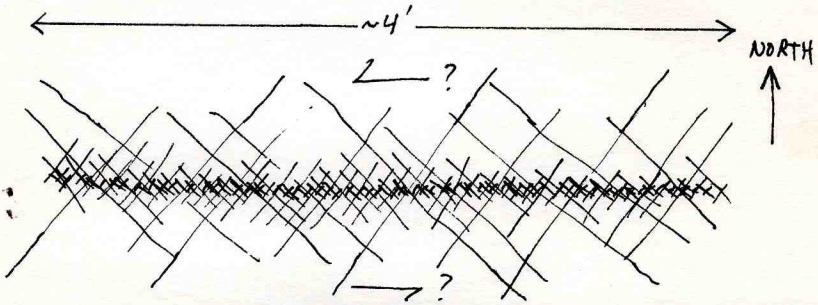
The 11th South Panel, now being stubbed in, is encountering water problems. The floor has several feet of mud and water in places. They are mining the Anna Shale, leaving 3-4 feet of bottom coal and recovering that later.

Not much water was observed dripping from the roof. Slight seepage was observed around roof bolts and locally along NE-trending fractures. A few fractures are slightly open but none have any discernable offset. NW-trending fractures and several low-angle slips with striations in dip direction were seen in "C" Entry. The Anna Shale was "kinking" slightly along the east rib. Similar slips and fractures were present in the 1st Main East just inby the 11th South. The slips do not appear to have any relation to strike-slip faulting.

In "A" Entry only minor seepage was noted around roof bolts and from tight NE-trending fractures. "B" entry was not accessible due to mud and moving equipment. We could not reach the face of any of the three entries.

The face boss told us that water comes about equally from the top and from the bottom. The coal was observed to be wet in many places, but no actual seepage could be seen. The roof bolter said that "gushers" of water are struck whenever bolts longer than 4 feet are used. This signifies that the limestone is about 4 feet thick and is overlain by water-bearing sandstone. One of the miners speculated that when the shale is mined out, this places additional stress of the limestone and allows the cracks to open up so water can get through.

On the 2nd Main East about 5½ crosscuts inby the 10th South an interesting pattern of fractures was observed in the roof, which is composed of Anna Shale. The fractures are sketched below:



This definitely appears to be the result of a wrenching stress, probably left-lateral, that was not quite strong enough to produce a through-going strike-slip fault. Along the central axis of the zone the shale is crushed, but no slickensides were noted. The fractures die out about a foot to either side, then normal jointing resumes.

Continue now mapping zone of strike-slip fractures as begun on Jan. 24. Stop numbers continue from that visit:

11.) Gas bubbling through standing water on floor along main strike-slip fault. Collected 2 one-quart mason jars of gas and submitted them to Wayne Meents for analysis, which was completed the same day (Feb. 7). The results:

Lab # C 3955

CO_2	0.39%
O_2	1.39%
N_2	30.29%
Methane	67.91%
Ethane	0.02%
	100.00

Analysis by chromatography

According to Wayne this composition is typical of oil-field gases and not of coal gas. This suggests that

the fractures extend to considerable depth, possibly into Mississippian rocks.

12.) Strike-slip fault here trends east-west through limestone showing little dip-slip. South of the fault the limestone shows orthogonal open fractures with especially wide separation along NE-trending cracks. A little water is still seeping near the main fault. NW-trending fractures generally are closed and are filled with gouge.

13.) Enormous roof fall along main strike-slip fault-fault itself is not visible but the limestone is seen to have broken along NE-trending fractures near the projected line of the fault. View in the fall is totally blocked, and cribs have been crushed in the next intersection to the west. The limestone appears to be about two feet thick here, and thicker to the west. The area is wet. This probably would not have fallen if the faults were not present.

14.) Main fault cuts through a limestone boss and definitely offsets it laterally. There seems to be about three feet of left-lateral offset, though this is difficult to measure because of poor exposures. The fault, as usual, consists of more than one plane of movement. The over-all strike-slip cannot be determined but is probably only a few feet. Note horizontal slickensides and mullion along fault surfaces.

15.) Fault truncates the edge of a pod of gray shale, which is pinching out toward the WSW. The shale immediately north of the fault is 1.45' thick and that south of the fault is about 1.1' thick. Thus a few feet of left-lateral offset probably has occured. The coal is downthrown 0.4' to the south and the fault surface has two or three sets of slickensides; one nearly horizontal and the other(s) inclined about 45 degrees to the northwest.

In general the Anna Shale becomes very thin above gray shale and around the margins of gray shale. The limestone overlaps the pods considerably but may become thin and nodular across their crests.

16.) Intensity of shearing is diminishing to west- no through-going strike-slip fault here. The Anna Shale is intensely fractured along the projected line of the fault. This line trends westward and meanders slightly. The shale is almost crushed and is "kinked" downward along the center of the line; joints are spaced a mm. or less apart. Both the NE- and NW- trending fractures are strongly developed. A number of discontinuous slickensided surfaces or zones of pulverized shale are seen, but they do not connect.

17.) Coal, shale, and limestone more strongly sheared here than at Stop 16. A series of shear planes curve WNW away from the main zone, and rapidly die out. The NE-trending fractures in places are very intense and blocks of shale or coal have been rotated or dropped down. The same is seen in the limestone. We cannot map a single through-going fault here.

18.) On Steve's map- roof fall with three feet of Anna Shale along shear zone. The shale has abundant wide open fractures with tilted or down-dropped blocks and also with shear planes that curve off toward the WNW. NE-trending fractures are numerous in the limestone. No through-going fault is seen. The coal and shale are again "kinked" downward along the line of most intense fracturing.

In crosscut north and west of Stop 18 several of the WNW-trending shears are seen. The Anna Shale is pulverized and the top coal is fractured, but the coal below the top foot or so of the seam definitely is not affected by these. More such zones are seen in the 9th Main East, farther west. The Anna Shale responds more to the deformation than does the coal.

19). Continuation of same zone. Here there is a true fault forming a narrow vertical graben along the west rib. The graben is filled with broken Anna Shale and coal. At the base of the limestone brecciation also is seen but the position of the fault is not clear. Fractures in the limestone seem to be healed, perhaps by percolating water. The WNW-striking fractures are very pronounced; the NE-trending fractures less so.

20.) Very large roof fall, cleaned and re-bolted, in fracture zone. The section exposed includes:

Base of Bankston Fork Limestone
10 feet of siltstone or fine-grained sandstone, thickly bedded
Less than 1 foot of nodular-bedded limestone
About 1 foot of Anna Shale
2 to 4 feet of gray shale
Top of coal.

The sandstone shows orthoganal fractures with the NE-set more pronounced. Huge blocks have broken out along these fractures. On the east rib a true fault is present at the shale-coal contact, producing a graben filled with gouge. The structure resembles a clay dike, but clearly is not one. On the west rib is a vertical fracture which becomes inclined in the coal and has faint horizontal mullion.

We have run out of time but have not traced the fracture zone to its termination.

ILLINOIS STATE GEOLOGICAL SURVEY
NATURAL RESOURCES BLDG.
URBANA, ILL., 61801

SAMP. NO. : 60117 1 TEL. (217)-344-1481 LAB. NO.: G 3955
REQUEST NO.: 16404 COUNTY: MACOUPIN

REPORT OF GAS ANALYSIS

LOCATION: - - - SEC.24 TWP. 12N RNG. 6W 720'S 130'W NE COR

SAMPLING DATE: 2/05/80 ANALYSIS DATE: 2/07/80 REQUESTED BY: WFM

OPERATOR, FARM OR LEASE:
FREEMAN UNITED COAL MINING CO. CROWN #2 - GAS SEEPING THRU WATER ON FLOOR OF MINE ALONG FRACTURES - COLLECTED BY JOHN NELSON

FORMATION: PENN GAS VOLUME: 4" SEVERAL MINS

PRODUCING ZONE DEPTH: 330'- ', '- ', '- ',

RESULTS OF ANALYSIS

BTU/CU.FT. @ 760 MM.& 60 DEG. F:

GROSS - - - 687

NET - - - - 618

SPECIFIC GRAVITY:

CALCULATED - .69

GAS CHROMATOGRAPHY

CO2- - - - -	.39%
O2 - - - - -	1.39
CO - - - - -	
H2 - - - - -	
N2 - - - - -	30.29
METHANE- - -	67.91
ETHANE - - -	.02
ETHYLENE - -	
PROPANE- - -	NONE
PROPYLENE- -	
I-BUTANE - -	NONE
N-BUTANE - -	NONE
BUTYLENE - -	
I-PENTANE- -	NONE
N-PENTANE- -	NONE
HEXANE AND HIGHER - -	NONE
HELIUM - - -	
ARGON- - - -	
TOTAL -	100.00%

METHOD:

REMARKS

DATE REPORTED ANALYTICAL SECTION

MONTGOMERY 27-12N-5W

ILLINOIS STATE GEOLOGICAL SURVEY
NATURAL RESOURCES BLDG.
URBANA, ILL., 61801

SAMP. NO. : 60135 1 TEL. (217)-344-1481 LAB. NO. : G 3887
REQUEST NO. : 16267 COUNTY: MONTGOMERY

REPORT OF GAS ANALYSIS

LOCATION: - - -NE SEC. 27 TWP. 12N RNG. 5W 375'S 430'E NW COR

SAMPLING DATE: 8/30/79 ANALYSIS DATE: 8/31/79 REQUESTED BY: WFM

OPERATOR, FARM OR LEASE: WELL INTO MINE
GERALD STIEREN#1STIEREN FARMS AFTER FLOWING MASON JAR

FORMATION: MINE GAS(COAL) GAS VOLUME: 2700 CU FT 2-1/2PSI

PRODUCING ZONE DEPTH: 362'- ', '- ', '- ',

RESULTS OF ANALYSIS

BTU/CU.FT. @ 760 MM.& 60 DEG. F:

GROSS - - - 652

NET - - - - 586

SPECIFIC GRAVITY:

CALCULATED - .73

GAS CHROMATOGRAPHY

CO2	4.44%
O2	.48
CO	
H2	
N2	30.80
METHANE	64.04
ETHANE	.22
ETHYLENE	
PROPANE	.02
PROPYLENE	
I-BUTANE	NONE
N-BUTANE	NONE
BUTYLENE	
I-PENTANE	NONE
N-PENTANE	NONE
HEXANE AND HIGHER	NONE
HELIUM	
ARGON	
TOTAL	100.00%

METHOD:

REMARKS

DATE REPORTED 9/4 ANALYTICAL SECTION

MONTGOMERY 34-12N-5W

ILLINOIS STATE GEOLOGICAL SURVEY
NATURAL RESOURCES BLDG.
URBANA, ILL., 61801
TEL. (217)-344-1481

SAMP. NO. : 60135 1
REQUEST NO.: 15674

LAB. NO.: G 3583
COUNTY: MONTGOMERY

REPORT OF GAS ANALYSIS

LOCATION: - - - SEC.34 TWP. 12N RNG. 5W 1500'W 800'N SE COR

SAMPLING DATE: 6/30/77 ANALYSIS DATE: 7/05/77 REQUESTED BY: WFM

OPERATOR, FARM OR LEASE: FREEMAN UNITED COAL MINING CO. CROWN #1MINE

GAS FROM ELE CABLE PIPE AT WORK SHOP
MASON JAR

FORMATION: COAL MINE GAS GAS VOLUME: 4"HG PRESSURE

PRODUCING ZONE DEPTH: 355'- ', '- ', '- ',

RESULTS OF ANALYSIS

BTU/CU.FT. @ 760 MM.& 60 DEG. F:

GROSS - - - 467

NET - - - - 419

SPECIFIC GRAVITY:

CALCULATED - .81

GAS CHROMATOGRAPHY

CO2	5.89%
O2	.81
CO	
H2	
N2	47.47
METHANE	45.42
ETHANE	.39
ETHYLENE	
PROPANE	.02
PROPYLENE	
I-BUTANE	NONE
N-BUTANE	NONE
BUTYLENE	
I-PENTANE	NONE
N-PENTANE	NONE
HEXANE AND HIGHER	NONE
HELIUM	
ARGON	
TOTAL	100.00%

METHOD: GAS

REMARKS:

DATE REPORTED: ANALYTICAL SECTION:

Mine Notes - Freeman Crown II - Macoupin County

Trip: April 23-4, 1980 by Phil DeMaris (alone)

Coverage: 3rd N. Panel Mapping
3rd W.S. Panel visit incl. "Sub-Bankston(?)" coal
3rd N. Panel con't inc. dolomitic coal area
Samples; Set K (-1 to -11)

3rd N. Panel

Bill Burkes' assistant "Kenny" gave me a ride to 2700' N., so I went to the N. end of the panel for a measurement & desc.

Map:

B
~~5.25'~~ 5.08
2.55' BB 0.10'
u/c Total is ~~7.90'~~ 7.73

Simple Desc. from fresh corner (dusted and chipped):

		Anna, ½' minimum th.
-69½	cm.	Dull & Bright-bnd, clairain
5½	cm.	Durain w. vit.streaks & ½cm.vit. (dull clarain)
22	cm.	Dull-bnd clarain w. fusain
½	cm.	Shale (laterally a durain)
37½	cm.	Dull and Br.-bnd clarain w. 8mm. vitrain bnd.
1	cm.	Pyritic band - shale? also
19	cm.	Dull-bnd clarain
2½	cm.	Shale, lt.gray w. grad. lower contact (Blue Band)
2	cm.	Br-bnd, clarain
½	cm.	Shale, w. coal stringers
65	cm.	Dull-bnd. clarain, w. rare 4-8mm vitrain bands; th. pyr. bnd.@40cm.
1	cm.	Pyritized fusain (?) band
9½	cm.	Br-bnd clarain
		Underclay

Measurement error of 4-5 cm. above B.B. could not be located; 5.25' above is incorrect; apparently measured to next shale below BB., 4½ cm. lower. P.J.D. 12/81

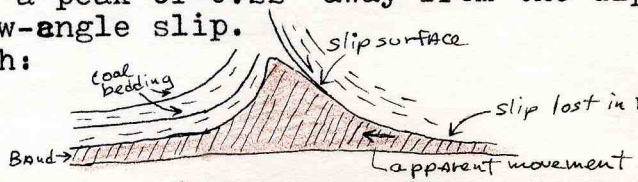
A. (See field map A) Difficult exposures; prob. sm. ls. boss/nodule? just to N., but here is thick "clod", 0.6' plus ,with gastropods and brachs, but with pebble-like nodules at base. Top of coal is mixed up & disturbed in appearrance. Considered possibility that this was channel fill mat'l with little or no Anvil Rock deposition; considered this unlikely (See last trip, mote F.) because bosses/ remnant nodules are prob. Brereton; could not sample the boss because it was too pyritic. Samples of pebble-like nodules in "clod"? (-K-1) and a ls. nodule (Remn. Brer.?)(-K-2) Field decision was that this is "clod" w. prob. deformational contact to No. 6.

B. Slickensided Anna? (considered if upper coal) whows over erosional truncation of Energy shale; no evidence of siltstone/ss. of Anvil Rock Ss.. Floor Heave is 1' max. here with 2" fissures running down much of the center of the entry; buckeled up at center.

C. NW pillar corner; I sampled impressive durain 2.2' from est. top of seam; "yellow" and clarain are "up"; site is very near an Energy roof area. (-K-3) note thick durain at N. end of panel at sim position (p.1) PJD 3/82

D. 40' N. of "C"; interesting in seam deformation generated around a thick shale/durain band which is 2.9' below roof. Band is 0.06' thick normally but is squeezed here to a peak of 0.22' away from the dip of a low-angle slip.

Sketch:



Marker durain 0.85' above deformed band is (bone)

W. ROOMS
Field MAP A
4/23/80
3rd N. PANel

undisturbed. Material in the peak is "pelletized", esp. near the fault. The band elsewhere does not seem to have pellet structure; perhaps produced during deformation? Sample of shale (-K-4).

E.

Ls.	3'	fall to Brereton Ls.;
'clod'	0.4'	Clod is bioturbate;
B	3/4'	Base of Brer. has
G	2' ave.	strong E-W fractures with central 'graben'

dropped about ½' relative to sides. Some visible large fossils on base of Brere , inc. a prob. Echinoderm - crinoid theca?

Lunch; then to c.c. 31

F. White-topped Anna under a small boss; white-top isn't to coal yet; The boss is limestone, and is at most 1' below normal position.

G. Top coal has large slips w. 'white-top' or Energy in them; prob. Energy roof above. Three small coal balls seen in top coal sampled (-K-5A,B,C,); 'yellow' up.

H. Here a thick shale or durain (has vitrain stringers), 0.35' thick, lies near top of seam. Relation to dolomitic coal uncertain; did not see at G. area. Begins 0.60' below (?error) prominent pyritic shale(?) band. Note: this is apparently another shale/durain channelet in the top coal; same one seen on other side of this pillar (to NNE) and again further north on the June 3-5 trip./

I. Dolomitic coal is very spotty here; it Thickens up and thins locally over a few feet. Sampled a piece with coal at the

(-K-6)

base from the W. rib. Material does occur within certain stratigraphic limits, however. Here it is w/in the top 2' of the coal only; I have spot checked during todays' mapping and the only place I have found this material is in the general vicinity of this site; here at I. there is a prom. seam bench .05' below.

This (dolomitic coal) material is quite brown and granular; the material also appears to preserve the form of some wood material; can it generate coal balls (of vascular mat'l?) The fact that shale/durain bands are also well-developed in this area suggests that high water/ ponded conditions may have been more common here than elsewhere over time. Sampling tomorrow.

End day 1

3rd W.S. Panel visit

Dave Webb wanted me to take a look at roof in the panel. Spoke to John Collins, a face boss with geologic interest; told him he would receive future publications.

In the panel, a mention made of "sticky clay" problem, but unsure of context. We looked at a large roof fall one c.c. past the 897' tag, "C" entry. There is a Brer. "boss" just to the east; roof seq. is 2-3' Energy sh. rather bioturbated contact to 3/4' Anna shale, 1' Brer., and a minimum of 8' of light-colored siltstone. A possible ls. (boss?) in c.c.to the west. Section worried about cracks in siltstone (further falls); 6' glue bolts in top of fall indicate "No rock". Locally the base of the Brereton is rolling. NOTE: This was my second real visit to the west side of the mine; it confirmed the possibility that Brereton Ls. development may not be as good

as on the east side of the mine. Establishing this scientifically may still be beyond possibility because we have little data on the full thickness of the Brer. If minimum (i.e. partial) thicknesses could be used we may be able to evaluate the situation using a gridded random sample (overcast positions?). Certainly we know places on the E. side with 5' to 8' of Brer. , and a number of places where 3-4' has been cut or shot down with more remaining above. We could supliment our data with roof bolt data; it again does not reveal thicknesses of the thickest Ls., unless we can get a few holes extended into the siltstone (which is wet, of course!!)

We walked out the travelway; at the junction of the travelway and the 11th Main West there was a cribbed fall with the following sequence: Thick Anna, a couple feet of Brereton, a gray shale/siltstone?, and a coal a couple feet thick, topped by a prb. carbonaceous shale; all within 12' of the top of the #6. This may be the "sub-Bankston" (J.A.S. notes this is an informal name) mentioned in R.I. 217, which is encountered rarely; on e-logs? John Nelson thought the Jamestown could be locally developed, but has not see it at Crown II. Russ Peppers does not have a palynology of the 'sub-Bankston", but could have a maceration of a coal in roughly the same position; I checked Macoupin Co. only. Therefor this coal should be sampled, if possible, and compared to the channel-fill coal and a Jamestown sample (nearby ?- Hillsboro area?)

3rd N. Panel con't, inc. "dolomitic coal"

We crossed the belt, and came up the

return ("A") entry. Saw "Lw." in a fall near 24th c.c.; fall occured/enlarged since mapping; described:

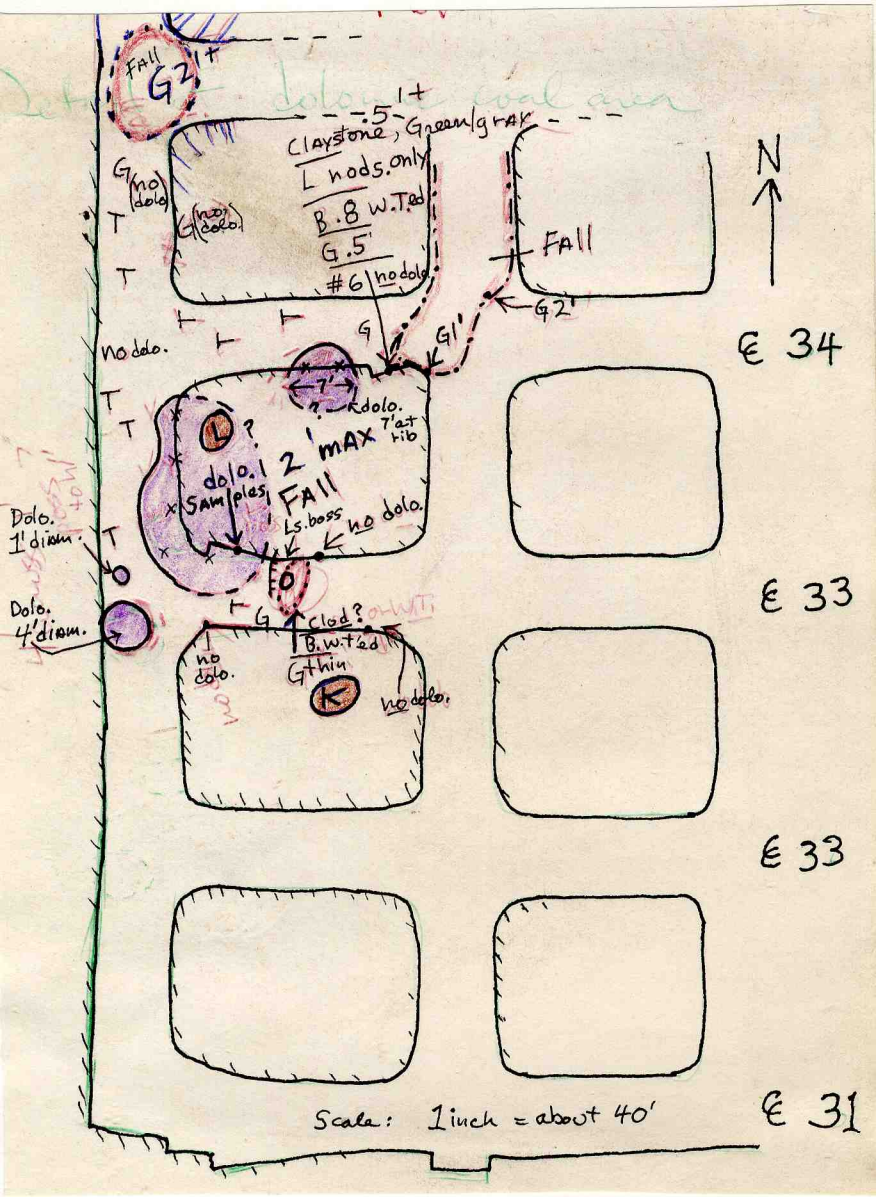
J. This shale looks and scratches like Energy; abundant plant compressions _ establish it as "Lawson" _/NOTE; We have continued to use "Lw." for this unit (esp. John Nelson) but since it seems to be restricted to the channel, and in the channel is clearly a finer-grained facies of the Ss., I now consider it to be a facies of the Anvil Rock Sandstone. The relationship of this facies and the more widespread, but discontinuous sheet-phase siltstone/ss. is still unclear to me; whether "Lawson" should be applied to either of these is clearly open to discussion also./ The siltstone here has large stems, mostly coalified compressions; fern-like folliage is common here. Desc. from W. rib:

"Lw" 1½' min. seen
Ss. 0.1'(lens only, pyritic)
Clod 0.4'(bioturbate; when uncertain)
No. 6

Stems to ¼' wide are seen here, coalified on bedding planes. Large Pteridosperm petiole was sampled (-K-7A). I now feel comfortable that this material is not cordaites leaves. These petioles have also been seen in the (on the) base of the unnamed coal. Another confirming feature was in seeing several petioles in 3D (shale infilled); these were not sampleable. Also collected some Cf. Neuropteris material (-K-7B,C).

K. (See map B) Ls. 'boss' in white-topped top coal area; much W.T. in Anna where exposed; much deformation below 'boss'. Presence of 'boss' may indicate we are beyond

4/23-4/80
Map B


FALL
G2
-.5'
Claystone, Green/gray
L nods. only
B. 8 W.Tod
G.5'
#6 no dolo
(no) dolo
(no) dolo
FALL
G2'
G1'
N
E 34
no dolo.
7'
? dolo.
7' at rib
MAX
dolo. 2'
Samples
FALL
Ls. boss
no dolo.
Dolo. 1' diam.
Dolo. 4' diam.
E 33
clod?
B. w.t'ed
G thin
no dolo.
no dolo.
E 33
Scale: 1 inch = about 40'
E 31

the limit of effective erosion by the A.R.Ch.

L. Dolomitic coal sample site. The best development of material is over a stratigraphic range of 0.7' with the bottom contact (base of interval B, as sampled) at 3.60' above the top of the B.B. (here it is a "twin" set of bands; also sampled (-K-10).

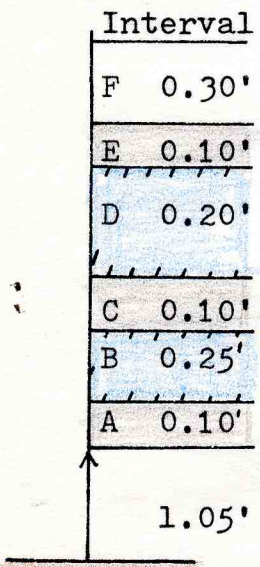
General desc.:

	Roof not seen; believed to be Energy shale close above
64 cm.	Br.Bnd. coal w. 2 dolo. coal bands near top; some "white top" at extreme 6-8 cm.
3 cm.	Shale/durain w. thin pyr. lenses
22 cm.	Dull-bnd. coal with a few 3-4mm vitrain bands; another thin durain 6 cm. down
1 cm.	Thick durain
33 cm.	Coal, dull-bdn, w. a few bright bands (as 22 cm. interval, above)
2 cm.	Prom. Durain with pyrite lenses
17 cm.	Dull-bd, coal, w. a few 2-3mm. vitrain bands;
4 cm.	Blue band-"benched" bottom band thin & pyritic; Br.bnd coal in between it and normal upper band.
65 cm.	Coal, dull bnd, w. prominent durain down 12½ cm.
	under-clay

Totals; 142 cm.(4.66') above B.B.(not quite to roof)
4 cm.(0.13') "Blue band"
65 cm.(2.13') below
211 cm (6.92')

Even estimating height to roof, this is a thinner than normal section for the mine.

Sketch of samples:



Samples: Intervals A through E, inclusive are CII-K-9 A through E, respectively. These samples are intended for palynological and petrographic study of the depositional enviroment of the "dolomitic coal" which appears to be a simultaneous deposition of plant and algal test material. A separate piece of interval D for block mounting was sampled, "yellow" up, as (-K-11).

More mapping needed to the North; sampling proved more time consuming than expected.

Samples; Set K (-1 to -11)

CII-K-1	Site A.	Sm. pebble-like conc. in "clod"
CII-K-2	Site A.	Ls. nodule in 'clod'

CII-K-3 Site C.	Thick "durain;" yellow paint and clarain 'up'.
CII-K-4 Site D.	Shale w. pellet structure
CII-K-5 Site G. A,B,C	3coal balls, pyritic, from top 1' of seam; yellow up. Sent K-5A for C-isotopes 2/82
CII-K-6 Site I.	Dolomitic coal, pyritic; bright coal at base.
End day 1 samples	
CII-K-7A,B,C Site J.	Compressions in "Lw." sh. incl. Pteridosperm & Neuropteris material
CII-K-8 Site K.	Grab sample of dolomitic coal; intended for grinding for ash % test.
CII-K-9 A to E Site L.	Set of 5 Palynology & Petrography samples of dolo. coal & "normal" coal.
CII-K-10 Site L. Coal between bands for Palynology - MAC. 2658 coal is 12-14 mm thick w. gradational contact to base of "normal" band.	Block mount of "Blue band" split band; yellow paint and more shaley band are "up". Sample has broken just below pyr. lower bnd. That plane shows a coalified Stigmaria compression
CII-K-11 Site L.	Block mount of upper dolo. band; "yellow" is up.

1 of 2

Freeman United C.M.C. Crown II Mine
Macoupin County June 4, 1980

Notes by Steve Danner on mine visit with Suzanne Russell, Phil DeMaris, and Paul Sivon. Accompanied by Dave Webb, asst. to the superintendent at Crown II.

Purpose of visit: to collect two column and two face channel samples; to collect two sets of grab samples of pyritic coal; to map roof lithologies.

Column and Channel Sample Site A: NE¼ NE¼ Sec. 19, T.2N, R. 5W, or 11,770' east on 9th East Main. (Sample # C 21085)

Roof Shale:(Energy) .2 to 0.4' thick; med to dark gray; smooth, hard, laminated; sharp contact with the Brereton ls. above and mod sharp contact with the coal below; contains some Chondrites (form genus).

1.43' Coal: N.B.B., vitrain generally less than 0.01' thick, some bands slightly thicker than 0.02'; cleat well developed; calcite and pyrite on cleats.

0.01' Pyrite: hard and discontinuous.

0.13' Coal: S.B.C., vitrain is laminated, attrital coal is mod dull to dull; some calcite on cleats.

1.25' Coal:N.B.B., generally fine-banded; attrital coal is fine-grained and midlusterous to mod bright; much calcite and some kaolinite on well developed cleats; pyrite and calcite in small vertical fractures.

0.04' Fusain: hard and mineralized with thin vitrain stringers; variable thickness and discontinuous.

0.98'	Coal: N.B.B., vitrain bands up to 0.02' thick, but thicknesses are rather variable; muck laminated banding; calcite on cleats; intermittent pyrite lenses up to 0.05' thick.
0.05'	Shale: med gray, mod soft, clayey, some thin fusain lenses; contains disseminated pyrite and pyrite stringers. (excluded from sample)
1.90'	Coal: N.B.B., variable vitrain bands up to 0.01' thick; similar to above; several discontinuous fusain laminations.
0.03'	Shale: (Blue Band) brownish-gray, mod soft, smooth; variable thickness, tapers to a thin pyrite lense, several feet away it thickens to 0.08'. (excluded frm sample)
0.10'	Coal: thick vitrain bands up to 0.05' thick; similar to above.
0.03'	Pyrite: hard and lenticular.
0.69'	Coal: N.B.B., similar to above; vitrain banding variable, up to 0.02' thick; contains laminations of mineralized fusain.
0.02'	Shale: brownish-gray, mod hard, pyritized, discontinuous.
0.18'	Coal: N.B.B., vitrain bands up to 0.03' thick; poor cleat development; some pyrite and calcite on cleats and in small vertical fractures.
0.01'	Pyrite: hard and discontinuous.
1.00'	Coal: N.B.B., vitrain banding of variable thicknesses; generally thin banded; less calcite and pyrite than above.
0.01'	Coal: D.B.C., dark gray, fine grained, laminated
0.49'	Coal: N.B.B., similar to next to last unit.
Floor	Claystone: light to med gray, mottled, soft, smooth, slickensided; no visible carbonaceous debris.

Total thickness: 8.35'

H-T Ash (Moist. Free) 11.3%
Total S. (Dry + Ash Free) 5.1%

Freeman Crown II

June 5, 1980

Column and Channel Sample Site F: SE¼SW¼NW¼SW¼ Sec.13, T.2N, R.6W, or 1510' north of C entry of 3rd North Panel. (sample # C21084)

Roof: Shale: (Anna) at least 1.0' thick, overlain by Anvil Rock S.S.; shale is grayish-black, mod hard to hard, smooth, laminated bedding, carbonaceous; mod sharp contact with coal.

0.10' Coal: N.B.B., vitrain-rich; banding is indistinct; attrital coal is moderately bright; well developed cleat; much pyrite on cleat.

0.01' Fusain: mod hard and discontinuous.

1.44' Coal: N.B.B., average vitrain thickness less than 0.01'; attrital coal is midlusterous in the top 2/3 of unit and mod bright in lower 1/3; dull band approx. 0.02' thick just at base of unit; blocky cleat at top of unit, becomes smaller and less well developed downward; abundant cleat pyrite in upper part, less pyrite downward.

0.02' Shale: med gray, friable, soft and silty, variable thickness and discontinuous.

0.85' Coal: N.B.B., mod bright attrital; banding generally less than 0.01'; mod cleat development; calcite on cleats; no visible pyrite; fusain lenses up to 0.03' thick.

0.08' Shale: lenticular, med gray, mod hard, variable thickness; discontinuous; faulted with as much as 0.22' displacement (fault is isolated to this unit, the one above and the next two below); some vitrain stringers; no visible fusain, calcite, or pyrite.

0.23' Coal: N.B.B., vitrain banding less than 0.01' thick; attrital midlusterous; 0.05' thick shaley pyritic lense; calcite on cleats and pyrite in fractures.

0.08' Fusain: soft, variable thickness, fairly continuous.

1.71' Coal: N.B.B., vitrain banding of variable thickness, up to 0.015' thick; attrital coal is moderately dull to dull; poor cleat development; several pyrite lenses; several thick fusain lenses; calcite on cleats.

0.08' Fusain and Shale: fusain is brownish-gray and soft; shale is hard and of variable thickness; bounded by vitrain stringers less than 0.01' thick; intermittently continuous.

0.61' Coal: N.B.B., ave. vitrain banding is approx. 0.01' thick; attrital coal is mod bright; poor to mod cleat development with some calcite; contains a shale and pyrite band; some pyrite in fracture fillings.

0.10' Shale: (Blue Band) med gray, mod hard; pyritized laterally; smooth; contains several thin vitrain stringers. (excluded from sample)

0.16' Coal: DBC, few thin vitrain laminations; calcite on cleat and small pyrite lenses.

2.13' Coal: N.B.B., vitrain banding less than 0.01' thick; attrital is mod bright; poor cleat development; some calcite and very little pyrite on cleat; some thin pyrite lenses and pyrite fracture fillings; several thin fusain bands.

Floor Claystone: med to dark gray, mod hard, smooth, slightly carbonaceous and slickensided; friable; contains finely disseminated pyrite.

Total thickness: 7.60'

H-T Ash (Moist. free) 13.1%
Total S. (Dry + Ash free) 4.4%

Mine Notes - Freeman Crown II - Macoupin County

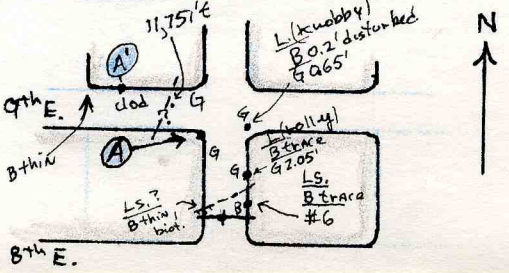
Trip: June 4-5, 1980 by Phil DeMaris, Steve Danner, Paul Sivon (U.ofI.) and Suzanne Russell (ex-Survey, now Penn State). See also notes by Danner.

Coverage: Far E. Mains sampling
3rd N. Panel mapping & sampling
Samples; Set K completed (to -K-15) and others

Far E. Mains sampling(vic. 14th panel position)

Suzanne Russell is collecting block samples of the whole seam at two sites; a fresh face was sought for several reasons including other sampling for S isotopes in coal. Steve Danner is taking parallel face channel samples at the same sites.

A. At 11,770' E. on the 9th East we found a good face channel/block column site. Roof is thin Energy, with Brer. above; No Anna present. Energy chosen to avoid possible coal loss at top under Anna/Brereton roof similar to Old Ben No. 24 situation. Paul Sivon notes Chondrites as infaunal element in Energy which is here 0.2-0.4' thick. I took a set of 3 samples for Linda Chapman/ Tom Anderson for Sulfur isotope analysis (CII-K-12a,b,c) which are top 0.4', 0.4' immediately above B.B., and basal 0.3' of seam, with prominent, thick vitrain band. Sketch map of area:



6/4-5/80

Map A

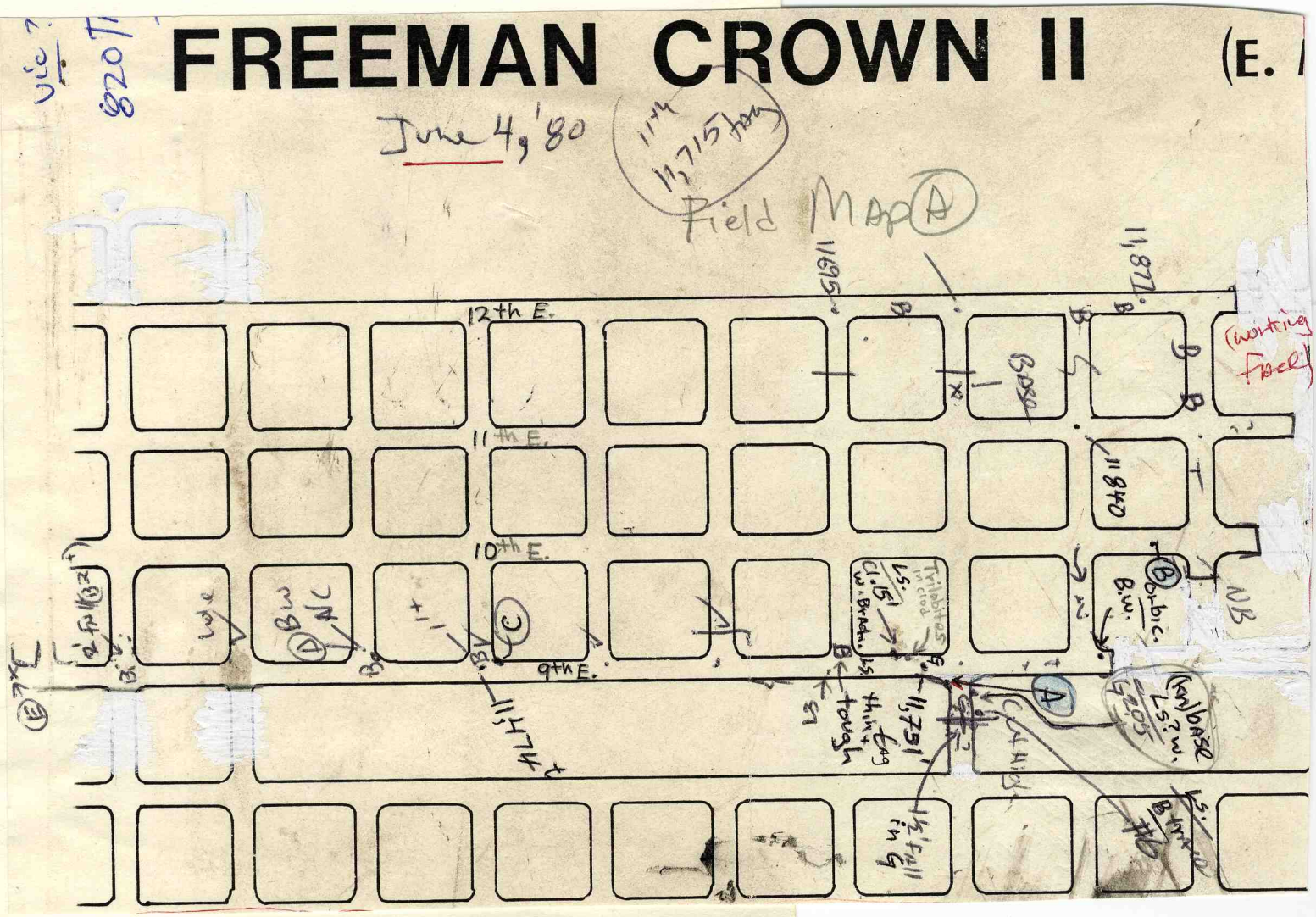
FREEMAN CROWN II

(E.

June 4, '80

11'4
11,715 stay

Field Map (A)



B. Anna w. prominent Orbiculoidea, just above pyritic coal/Anna contact. Compression of lg. stem 0.08' above contact; Anna also burrowed slightly.

C. No. 6/Anna contact sampled (-K-13); a block mount for petrography & possible DOM use planned.

D. not written

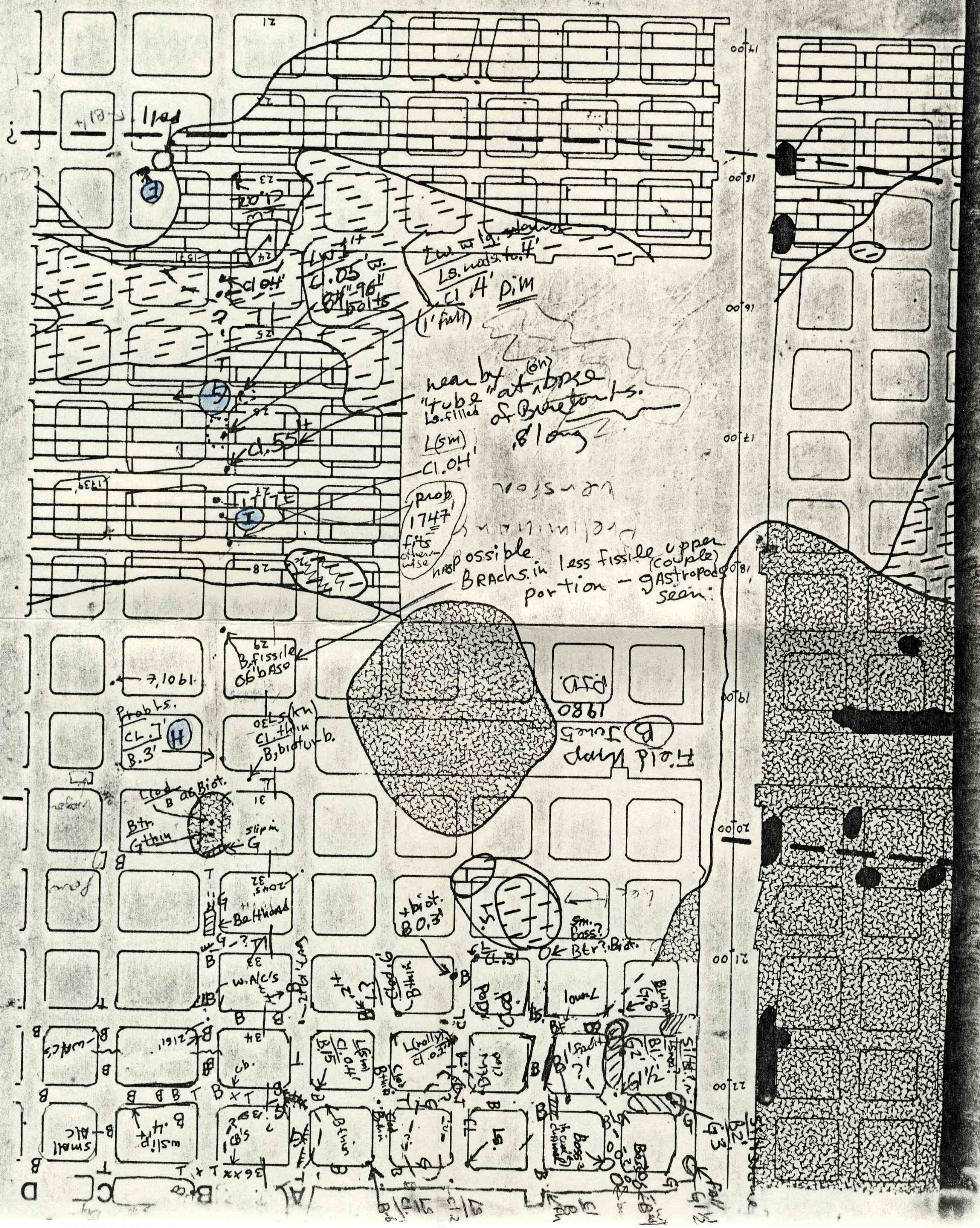
E. Ls. roof (11,097' tag is to E.) with interlaminated contact to No.6; coal stringers lie w. bedding & no deformational agent seen. Block mount & possible DOM planned (-K-14)

A'. (see sketch map) Returned to sampling area. About 30' W. of site A on N. rib, Paul spotted a Trilobite in thin clod of Brereton Ls. Sampled one full and one partial pygidium; 'clod' is clearly a marine bottom mud. Clod is 0.15' thick here, and clod and top of No. 6 interfinger locally, perhaps from bioturbation. Saw a brach., a Pectin, and poss. branchiopod also in the 'clod'.

End day 1

3rd N. Panel mapping & sampling

F. Site for channel & column; Anna roof chosen as most common roof. That we are under A.R.Ch. should not effect macerals; it may effect geochemistry even though thin Anna and "clod" were uneroded. Paul Sivon looked at "clod" fauna again and found many


Lw w lg. nodules
Ls. nods to .4'
cl .4' Dim
(1' fall)
Cl .05' B .04"-.06" bolts
nearby (on) "tube" at base of Breton Ls.
Ls. filled
.8' long
Cl .55'
Cl .04'
prob 1747' fits otherwise
Possible Brachs. in less fissile upper portion – gastropods (couple) seen
B fissile
Prob Ls.
CL .1'
B .3'
B, biotur. b.
slip in
Be thread
w. Alc's
+biot.
B 0.3'
sm. Boss?
Btr? Biot.
small Alc
w slip
B .4'

gastropods, a large spirifer, and definite branchiopods.

G. "Clod" is 0.2-0.5' with micaceous siltstone above; some thin Ss. laminae seen. In crosscut to E., nice Lycopod for DiMichele to identify (not Sigillaria). (Lepidodendron sp.)

H. Nice winged spirifer mold cast in Brer. 'clod' . Paul says prob. Neospirifer sp.

I. Two pyritic coal balls in top coal were seen and sampled. (-K-15)

Summary of fall exposures; Lg. fall at 34th c.c. in the west rooms showed only a couple Ls. nodules between the siltstone and the shale below; the contact was irregular and light-toned (bioturbate?); The siltstone itself appeared to be planar bedded, and fell in large hunks in some places. Note that Ls. bosses occured only a short distance to the NE and S.

Samples; Set K completed & others

CII-K-12 A,B,C,	Site A.; coal samples for S isotope work by L. Chapman
not #ed	Site A'.; Trilobites in Brer. "clod" - to Survey collection via Mikulic.
CII-K-13	Site C.; Anna/No.6 contact for block mount. 11,480' E. on 9th E. Main
CII-K-14	Site E.; No. 6/"clod" contact; set in plastic & sliced for petrographic analysis; Mixing

vic 11,100'E on 9th E. Main

CII-K-15 A,B, Site I. appears to be from bioturbation. Sample pulled apart somewhat due to casting problem. (Isotope sample also) - top of #6 - ; 2 small, pyritic, coal balls from top coal. May not be pealable.

For sample results, see:

Face channel at A. - - CZ1085 (8.35' of No 6 under Energy roof)

Face channel at F. - - CZ1084 (7.60' of No 6 under Anna roof)

Other samples - - CZ1350 (CII-F-7) (7.90' of No 6 under Brett Anne Pockets roof)

Mine Notes - Freeman Crown II - Macoupin County

Trip; June 26-27, 1980 by Phil DeMaris and Brian Popp (U.ofI.)

Coverage; Introduction
3rd N. Panel mapping
Samples; Set "L" begun (to -6)

Introduction

Brian Popp is along today to check the Brereton for marine fossils with original calcite/aragonite for diagenesis study. I had hoped I could finish rough-mapping the channel areas of the 3rd N., but this was not fully mined yet. Pectins from the Energy sh. were sampled, and more compressions from the channel-fill sediments were collected.

3rd N. Panel mapping

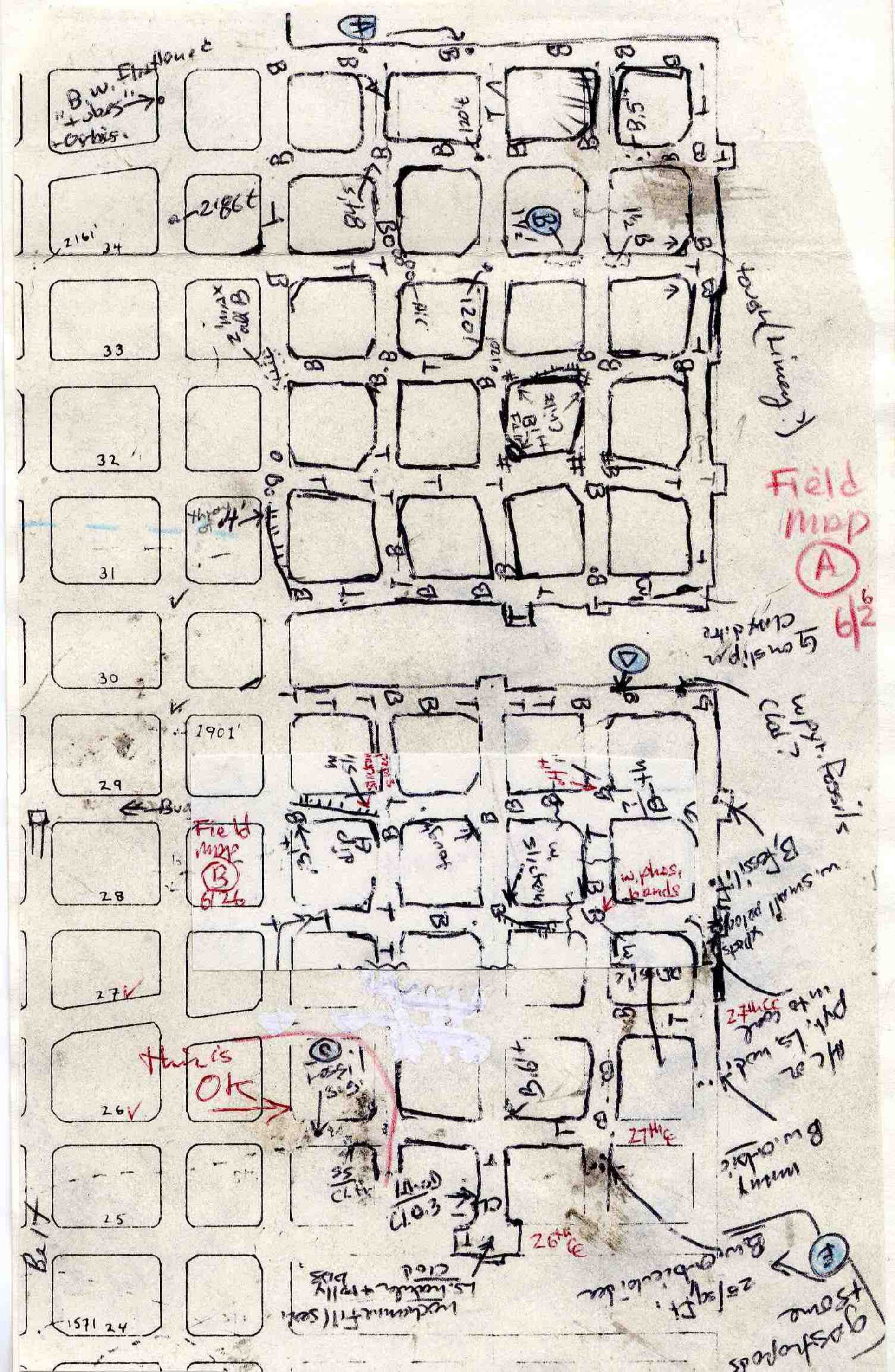
Phil Ott (Jr. at Rolla-Mining Eng.) escorted us today, See map A.

A. Possible spined Brachiopod, 3 cm. across (one of several) from 0.5' above Anna/No. 6 contact. Probable Pelecypods of similar size also in Anna; only spined one sampled. (-L-2)

may be a Cephalopod

B. Weakly developed Anna concretions at 0.5' to 0.8' above contact at repetitive position. Brian takes a sample for isotope work (C and O isotopes is his thesis work).

C. Sigillaria compression with nice leaf cushions. Nice piece collected by Gary "Sam" Houston; but more is in roof. This piece is 30 cm. long & 13 cm. wide; the cushion rows are 8½ mm. apart (for 11 rows); the piece I took is definitely identifiable. (-L-3)


Field map
A
Field map
B
6/26
Here is OK
2161'
2186t
1901'
1571
34
33
32
31
30
29
28
27
26
25
24
w. phos. bands
27th cc
26th cc

(C. con't) I sampled remnants of Brer. over clod 0.4' thick here; sample shows bioturbation also (-L-4); some nodules are pressed into clod.

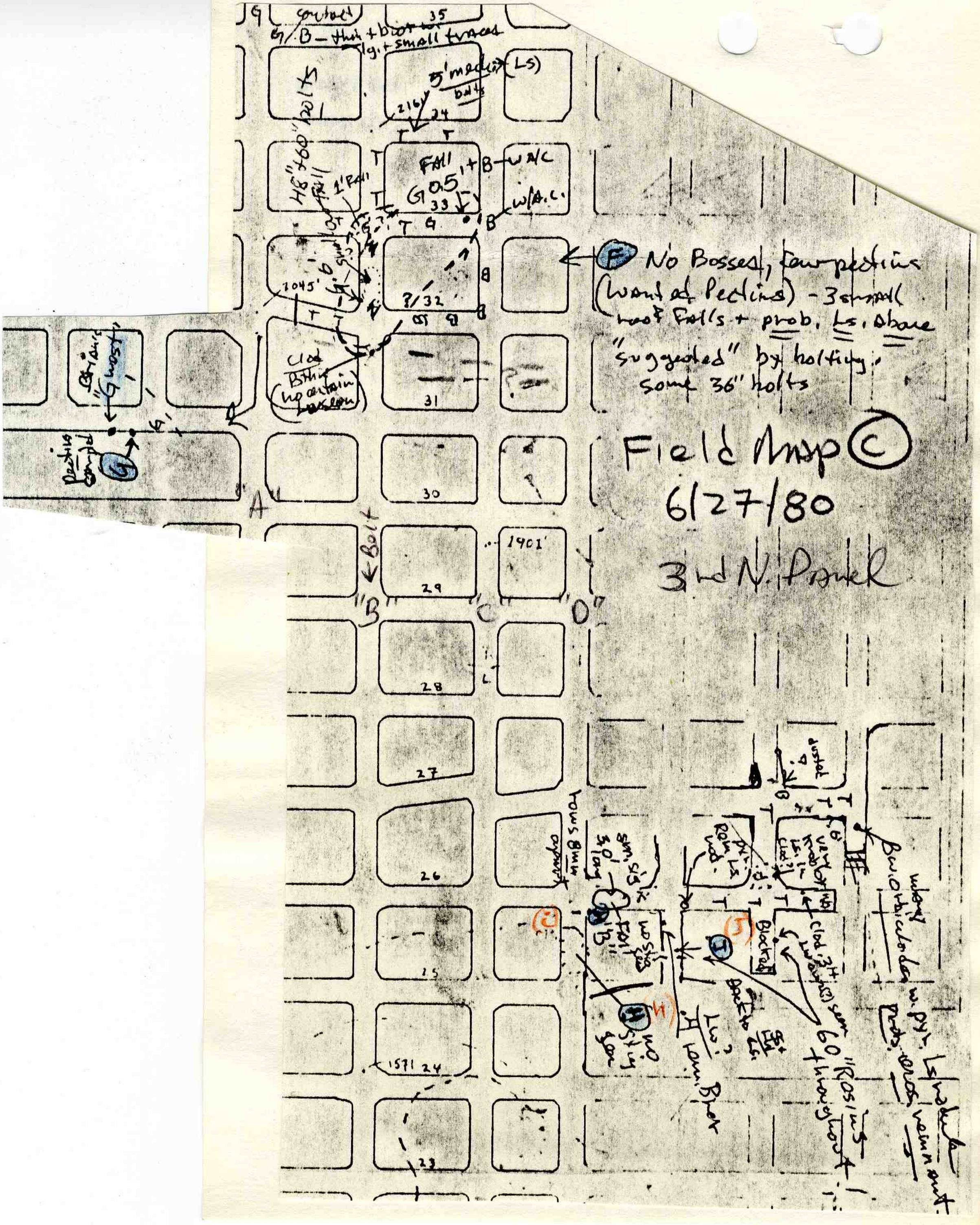
Examined channel-fill material in some detail. Small 'pockets' of ss. lie on "clod", while siltstone predominates. This "Lw." has several large portions of Sigillaria stems; one 4' long and at least a foot wide (Sample) These two large hunks of bark may have had only short transport because they are in good condition and have the same size leaf cushions; they may part of the same large tree. One other S. piece seen 8' away; is 4' long, 4" wide and also has the same leaf cushion size. The predominant compression here Pteridosperm petiole mat'l. One piece 2.3' long seen; over a dozen seen in total. One large N. Schuchzeri (sp!) & some Neuropteris pinna seen. Basal portion of siltstone is more fossiliferous; it has a rolling contact (erosional) to largely decalcified Brereton. The fossils in the Brereton are very pyritic, but Brian found some calcite in a large Brach. shell.

Also found some large Lepidodendron leaf-cushions on a large piece of shale cut from the roof 0.3' into "lw"; yellow paint is up. (-L-5)

D. Ls. nodule (prob. Brer.) with open fractures over thin Anna. Poor exposure; best guess is Ls. remnants on Anna after erosion; could also be a small boss.

E. Gastropods and dense Orbiculoidea in the Anna shale. Pyritized Orbic. shells are 25 or more per square foot. A pyritized ls. nodule or a/c also noted here.

End day 1; sometime on day 1 I took a Brereton Ls. sample (-L-1), prob. in 3rd. N.



Field Map (C)
6/27/80
3rd N. Panel
No Bosses, few pecking (want of pecking) - 3 small roof falls + prob. Ls. above "suggested" by bolting. Some 36" bolts
35
33
32
31
30
29
28
27
26
25
24
23
"B"
"C"
"D"
A
Bolt
Fall
1' Fall
1045'
1401'
1571
Clod
F
G
H
J

F. Checked Energy roof area for pectins; none found. No "bosses" either; 3 small roof falls examined; prob. Ls. above suggested by 36" roof bolts; thickest Energy seen was 1'.

G. Pectins in the G (Energy sh.), from 0.2' to 0.4' above the contact; West arrows on base; to be studied for evidence of currents; Brian takes some 12' to West; similarly marked ; called G west, but should be grouped as one sample due to size. (-L-6)

H. Fall with max. height 2'; cannot see "Lw" on coal , i.e. there is always either Ls. nodules in clod or clod present. Minimum 0.4' thick under fill sediments (correct map!). Pteridosperm petioles are the most common plant fossil in the fill mat'l. Many are 4½-5cm. wide; basal flair seen on two cases; widest one seen was 9 cm near flair at base.

I. Brian takes coal for L. Chapman; 4 spots from full seam: top, down 2', just below B.B. and bottom. Site chosen because it might show geochemical changes due to A.R.C.

J. Shallow fall with "Lw" over thin Brer. with pyritized fossils. In "Lw" there are many Pterido petioles; widest one seen was 14 cm. , finely "ruled" and 0.8' long (Bill DiMichele says too wide; prob. a stem. Some fern-like folliage seen; one row of Sigillaria leaf cushions seen. Ss is present, is very micaeous, and is on the No. 6 , 10' south of site I. Brian describes it: Ss. poorly bedded, irreg. laminated, fines rapidly upward. Has weak channel development; lateral shifting is common. A single fern-like compound leaf

was seen to cross bedding, i.e. was filled in around in the ss./siltstome sequence about 20' south of I. Ss./siltstone on Brere. by the next crosscut position. Compound leaf evidence suggests rapid sedimentation of ss./ siltstone sequence.

K. Brian sampled Brere. know or nodule with shells between 12th and 13th C/C on the travelway over 0.95' Anna.

L. Brian takes 2 ls. samples in a pre-bolted overcast over belt; since partly dismantled on 7th E. Entry, 1 c/c/ W. of 3rd Panel belt. About 4' of nodular bedded Brere. can be seen here; good photo.

Samples; Set L completed

CII-L-1 Piece of nodular Brereton with cracks and vugs with dolomite(?) infilling. Perhaps taken at 9th c/c W. side(travwy) from nod. in siltstone over 1'G,1'B.

CII-L-2 Site A.; Spined Brach(?) from Anna shl. 0.5' above contact; fossil prob. to base

CII-L-3 Site C.; Nice Sigillaria compression from channel-fill mat'l. (to DiMichele)

CII-L-4 Site C.; Basal rem. of Brereton w. pyritized fossils; nice bivalve.

CII-L-5 Site C.; Large Lepidodendron leaf cushions; yellow is "up". DiMichele identifies L. aculeatum; common shale flora component.

CII-L-6 Site G & G West; Pectins from Energy sh. a to h from G, i to n (no 1) from G west.

July - Dec.'80

Mine Notes - Freeman Crown II - Macoupin County

Trip: July 31, 1980 by Phil DeMaris

Coverage: 3rd N. Panel mapping/sampling
Samples; Set "L" con't
Photos of selected samples; as an Addendum

3rd N. Panel

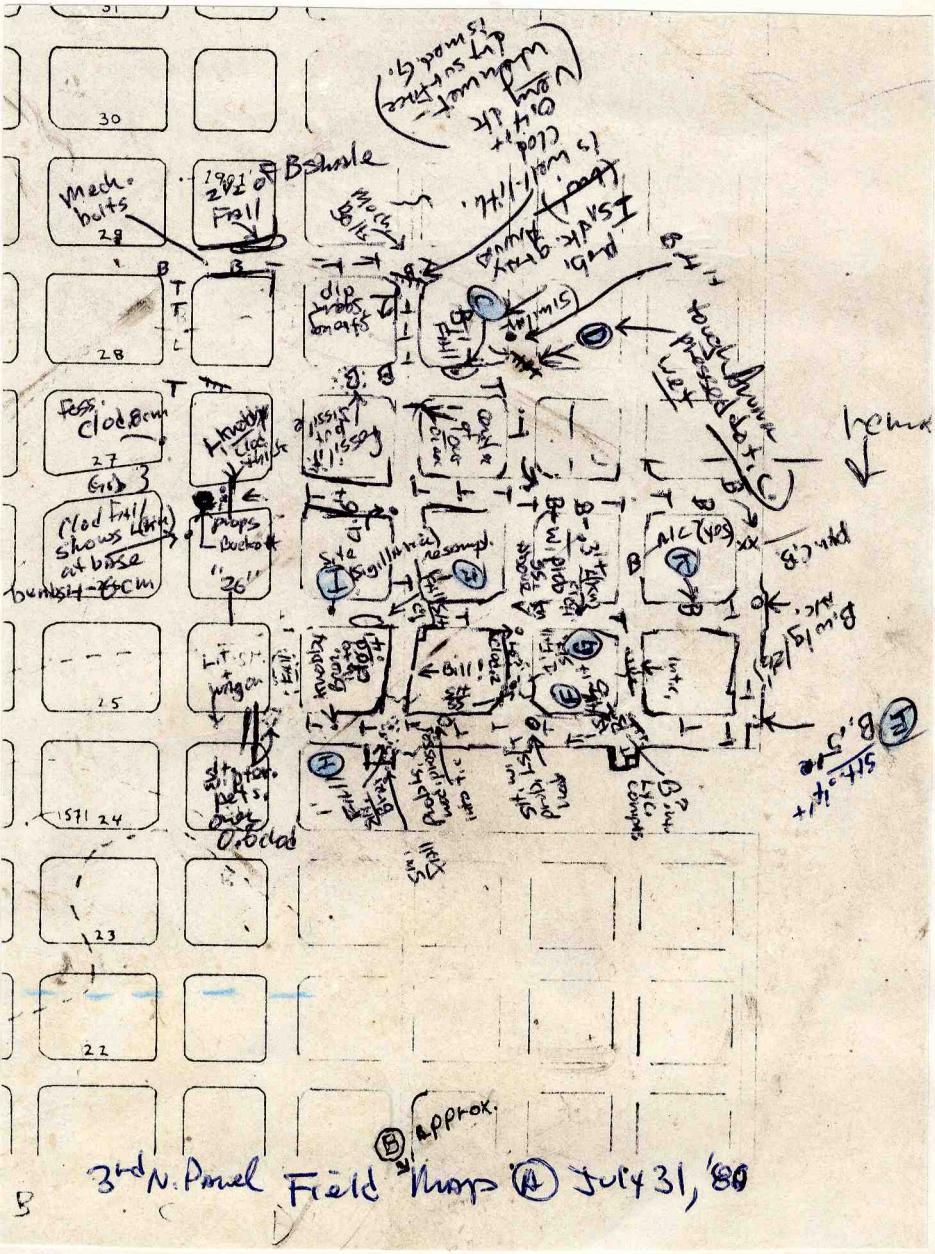
A. (Not on map) On 12th E. Main, 2½ c/c past the 12th N. Main position, I sampled the coal between the Blue Band and a 1 cm. durain band 6½ cm. below. Coal taken to check the palynology; T.L.Phillips' hypothesis that coal deposited between "twin" bands may represent a dry period. Upper couple cm. of the coal is locally shaley (dull)! sample is slightly so also. (-L-7)

On the 11th E. just south of 2nd panel, a pre-bolted overcast shows that the whole Brereton is nodular bedded, being composed of 0.3-0.4' nodular beds.

B. First look at problem roof on S. side of channel at one room in (E.) at 21st c/c position (being driven south). It looked like a limestone boss, but was Ss. on the NW flank; was pressed through fairly thick Anna to the top of the coal. Sampled sm. piece of "boss" material(-L-12).

C. Fall shows 1' Anna, dk. gray and fossiliferous. Fresh fall so, fossils are in good shape & are well pyritized here. I collected a representative groups, all below 0.7' above the contact. This shale also shows numerous plant impressions, which are not coalified; the amount of this mat'l apparently has been underestimated previously. Pyrite dollars are also present. Impressions

7/31/80 MAP A.



3rd N. Panel Field Map (A) July 31, '80

of u/i stems up to 4cm. X 30 cm. were seen in the Anna; some of this material is carbonized as a thin film; coal traces have been seen well into the Anna.

D. Slip; Anna pressed into top coal; extra wet. Channel influence?

E. Shallow fall; uneroded Anna shows a high density of Orbiculoidea on a bedding plane 2 cm. into Anna. Anna thickness here is 0.3-0.5' with micaceous Ss. immediately above. Counted 35 Orbiculoidea in an 8 cm. (diam.) circle on one bedding pl. Size range 2½ mm. to 6 mm. diam. with 4½-5 mm. omes being modal. In the channel-fill ss./siltstone, I see another large Sigillaria comp. which is 10 cm. wide, and a min. of 110 cm in lenght with close-spaced scars. It sits transverse to channel & is seen to be a sand filled log. Glue bolts used here suggest that limestone is 5' or more up. Smaller u/i, but finely veined axes are present; several 4-6 cm. wide Pterido petioles seen. Piece of ss. at Anna contact, white to top. (-L-9)

W. rib exposure show Pteridо. petioles again dominant; several 2' long pieces seen; one piece Calamites seen and some fern-like foliage also seen; the petioles range in full width from 4 cm. to 7 cm; two wide-flared bases(?) also seen (prob. pterido.) Here the siltstone is on the Anna (0.5' thick), with off-white Ss. lenses in spotty distrib. on the contact, under the siltstone. Base of Ss. is pyritic; pyritic preservation may account for the large number of preserved orbiculoidea noted above; i.e. the animals typically may be present, but the impressions/traces are not pyritized & thus effectively lost. Max. height in fall only 0.8' here.

F. Small fall at corner; siltstone here has many disassoc. pinnules and portions of pinna. Possible leaf(?) 4 cm. wide & finely-veined, more so than typical petioles. 6 samples were taken (-L-10), incl. prob Pecopteris pinna tip. DiMichele believes "leaf" mat'l above is also Pteridosperm material.

G. Siltstone over 36 except for a 6" diam. Ls. nodule. Prob. large branching Pteridó stem in roof, and more "leaf"-like material in roof, but not sampled.

H. Contorted ls. lenses in 0.4' "clod", overlain by siltstone. Fresh Pterido. petiole, 7 cm. at widest & 110 cm. long. Sample later? (Note: repetition of measure 110 cm. underground (± 2 cm., prob.) is biased by exposures which lie between bolts which are on a rough 4' grid; thus in a fall seeing the same bedding plane for long distances is uncommon.)

I. Sampled Sigillaria again (same compression as -L-3, which DiMichele has); specimen is partly siltst. filled, and is in excellent shape (see photos). This sample is -L-11.

J. "clod" 0.2' ; occasional small (Ls.?) nodule on contact to siltstone with Ss. lenses. Silstone here is not especially fossiliferous on some bedding planes; others have a lot of petiole mat'l from 4-6 cm. wide ; fall is 1' max.

K. Anna is 0.4' to 0.3' under light gray siltstone; bottom portion (slt.) is sparcely fossiliferous. Prob. ls. nods. locally.

I couldn't finish mapping on this trip, so I spent more time sample collecting. Known ss. exposures are as far S. as the 21st room position, where the ss. loadcast/boss? is 1 c/c in at planned intersection. (Site B.)

Samples; Set "L"(to -L-11)

CII-L-7A		Site A; Coal between Blue Band and prom. durain 6½ cm. below. Mpcoration #2659
CII-L-7B		Site B.; Sm. piece of 'boss' or ss. load cast.
CII-L-10a to f		Site F.; Fossil plants from A.R.C. Siltstone
(out of order)	a.	prob. Pecopteris pinna tip
	b.	u.i pinna tip
	c.	branching of Pterido.(?) branch
	d.	finely ribbed leaf(?) 42 mm. wide with 28-32 ribs per inch.
	e.	finely ribbed leaf(?) partial width; 28-30 ribs per inch.
	f.	u/i semi-circular compression; only 90° of it sampled.
CII-L-8a to		Pyritized fossils in Anna sh.; Site C.
CII-L-9		Site E.; Oriented carb. ss.
CII-L-11		Site I.; Sigillaria resampled; same log as -L-3; measured(ave.) 8.4 mm. between rows of cushions and 9.7 mm.between ligule pits.

Photos of some samples follow, over.