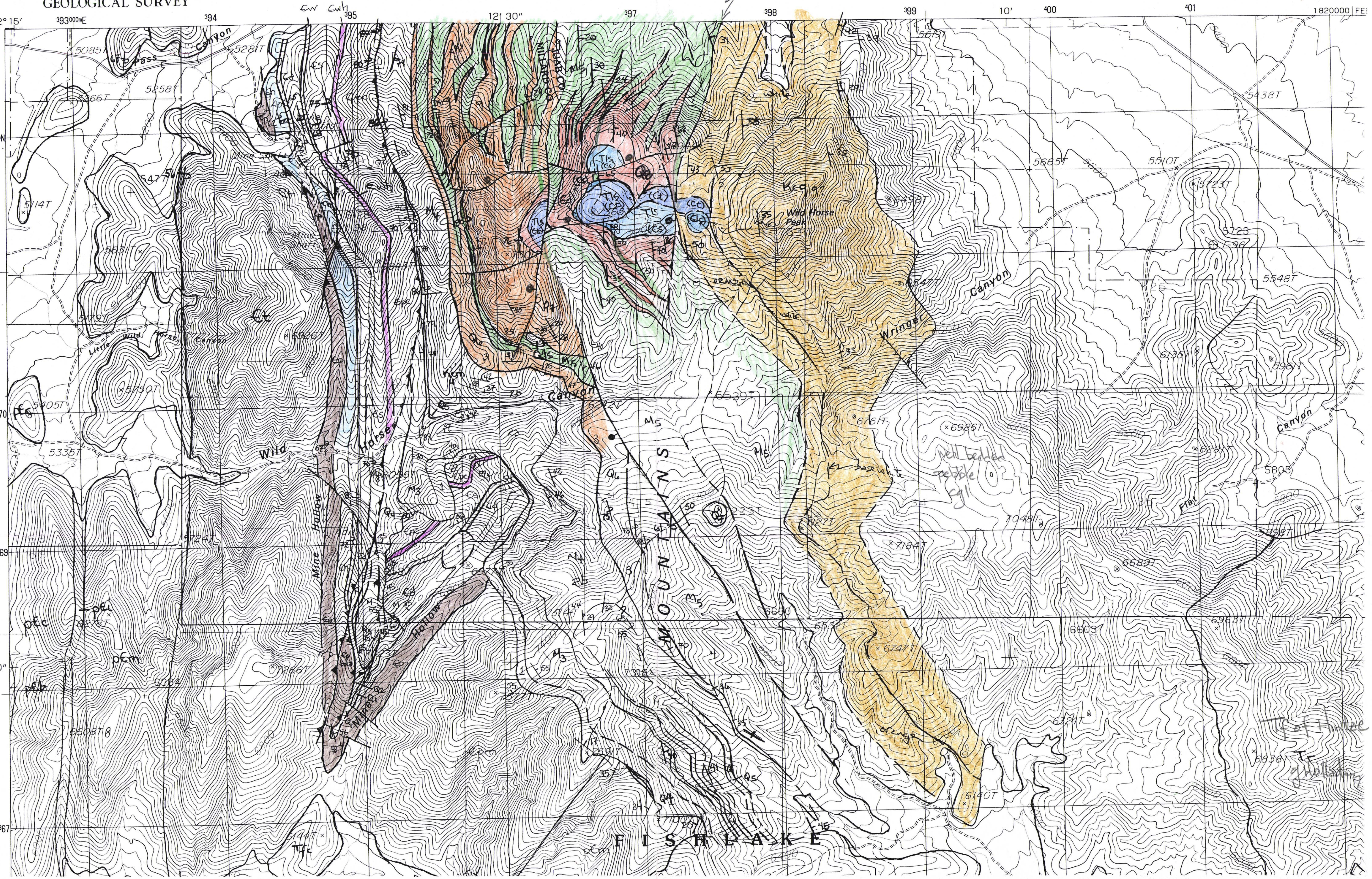
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Tim Lawton July 1997

7.5 MINUTE SER



called DeCelles 7 July 97
re: mapping in
Oak Creek Canyon

GEOLOGICAL SCIENCES

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27 June 1997

Dr. Lehi F. Hintze
Department of Geology
Brigham Young University
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Dear Lehi,

I've looked over your revisions of the open-file reports and they look great. I don't think that there is anything of substance that needs to be changed. I am sending a preliminary pencil version of the northern part of the Fool Creek Peak Quad, mainly because it addresses the major north-northwest faults that Holladay ran down the east side of the mountains. Whereas the section is rather intricately faulted along various trends (and I would not bet my life on the ones I have drawn), there are no normal faults with throws that exceed 80 meters or about 260 feet. There are several reasons that I think this, but I need to step back a bit to explain myself.

1. The ridge that runs east west from hill 7301, north of Wild Horse Canyon, to Wild Horse Peak is dominated by three bodies of quartzite-clast conglomerate: Kcq6 and 7, Kcq8, and Kcq9. I will probably end up lumping 6 and 7. Conglomerates 6 through 8 interfinger with dolomite-clast fluvial conglomerate; moreover, the quartzite tongues pinch out, commonly in short distances, sometimes within only a few hundred meters of the points at which they branch from massive quartzite clast conglomerate without interbeds of contrasting composition. Kcq8 is unconformable on Kcq7 in the former's westernmost outcrops, so the two are confidently assigned to separate lithosomes. Tongues of Kcq7 can be traced three miles northward into the Champlin Peak Quad, but these conglomerates dribble out pretty quickly to the south. Kcq9 (which I labelled as 8 on the Champlin Peak Quad I sent you this spring) is another matter: It rests on an erosional unconformity that causes it to change thickness and to rest on progressively older strata to the north. This conglomerate is continuous from Wide Canyon to the Sevier River at the northernmost extent of the range, and even beyond the Sevier River into outcrops that Higgns mapped as the northeastern extent of the conglomerate.

These conglomerates are pesky little rascals that responded to whatever topography or structure existed when they were deposited. This characteristic makes them a real headache to map. I think that conglomerates 6, 7, and 8 are composed of detritus transported northward along the axis of the Canyon Range syncline and deposited at the ramp in the upper plate of the Canyon

Range thrust, which is right at Wild Horse Canyon. They were confined by topography on their east flank, which explains why they die rapidly to the southeast. They interfinger with fluvial deposits, composed mostly of Devonian and Mississippian clasts, that were coming from the inner part of the thrust belt, probably the northern part of the House Range and Drum Mountains, which are stripped to Cambrian. On the other hand, the widespread conglomerate of Kcq9 represents widespread uplift of the frontal part of the Canyon Range plate, simultaneous folding of the Canyon Range Plate above thrusts in the Gilson Mountains, and uplift of Gautam's Canyon Range culmination.

To make a long story short, each conglomerate exposed along that ridge is a different conglomerate, and there is no need to duplicate one quartzite-clast conglomerate using normal faults. Holladay considered each of the quartzite-clast conglomerates to be the base of his middle member and postulated the faults to duplicate the base of the section. I suspect that the way that I have drawn Kcq6 just south of Wild Horse Canyon is not correct, and that this is a zone of interfingering with carbonate-clast conglomerates much like that to the north. I was not able to get into Wild Horse Canyon this summer, partly because of time, and partly because it washed out with the late spring rains on the completely burned over terrane.

2. The surface of quartzite clast conglomerates along the ridge is bevelled and overlain by landslide deposits, probably of Tertiary age. I have colored these in blues on the map. These are meter to tens of meter scale blocks of Tintic, Dome and Swasey. Blocks are angular, fractured, and remarkably uniform in lithology within a given domain. These are talus or rock-avalanche deposits; I initially thought they were part of the Canyon Range Conglomerate, but despite extensive searching, I could not find that they root into the stratigraphy. Instead they rest on a subhorizontal surface on underlying conglomerate. This surface permits an estimate of offset on the existing faults that cut it. Two of Holladay's faults do cut it, but the most offset I could establish is about 80 m, as I mentioned earlier. I think it is perilous to run faults off through the conglomerate unless there is pretty good evidence for offset. I suspect I will attempt to make Kcq7 interfinger southward with dolomite-clast conglomerate, at about the point I stopped coloring conglomerates 6 and 7.

I mapped the top of conglomerate 9 at a point where massive conglomerate becomes finer-grained, well bedded, and weathers reddish brown. This can be traced easily from the microwave tower north of Wild Horse Peak south to Wringer Canyon. I did it by air photo south to Wide Canyon. This contact is very close to what you have mapped as the base of the North Horn, which seems like a good identification to me. The changes in outcrop width of conglomerate 9 are due in part to extensive dip slope exposures on the east side of Wild Horse Peak.

I went back to look at my "Pogonip" and found the trilobite fragments you mentioned in the intraformational conglomerate. The heads have very long genal spines. I think you are right that some kind of a tear fault is needed to terminate these limestones straight down from the peak of Swasey Limestone. I

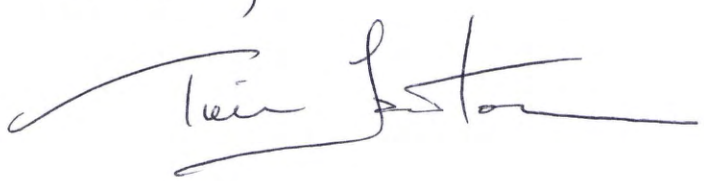
drew it on red on the enclosed map copy. Fortunately, it's not in Millard County. It is a different fault from the one that dips westward and trends from Wood Canyon and around the base of the twin peaks in Howell and Swasey Limestone. I still bring that one back to the southwest (with a west dip) and connect it to what I think is a thrust that emplaces Cu over Canyon Range Conglomerate. I have examined this contact in many places between Pass and Wild Horse Canyons. It is a linear contact that transects bedding quite abruptly in the conglomerate, much more so than if the relationship were depositional onlap onto the Cambrian. The true unconformity is marked by much irregularity caused by little paleovalleys and is mantled by boulders of dolomite north of Pass Canyon. You will see the fault interpretation on the enclosed map. If I had lots of time, I would try to map all of the little thrusts and reverse faults in the Paleozoic that resulted as the Canyon Range syncline tightened during formation of the duplex beneath the Canyon Range thrust. Not really my field though.

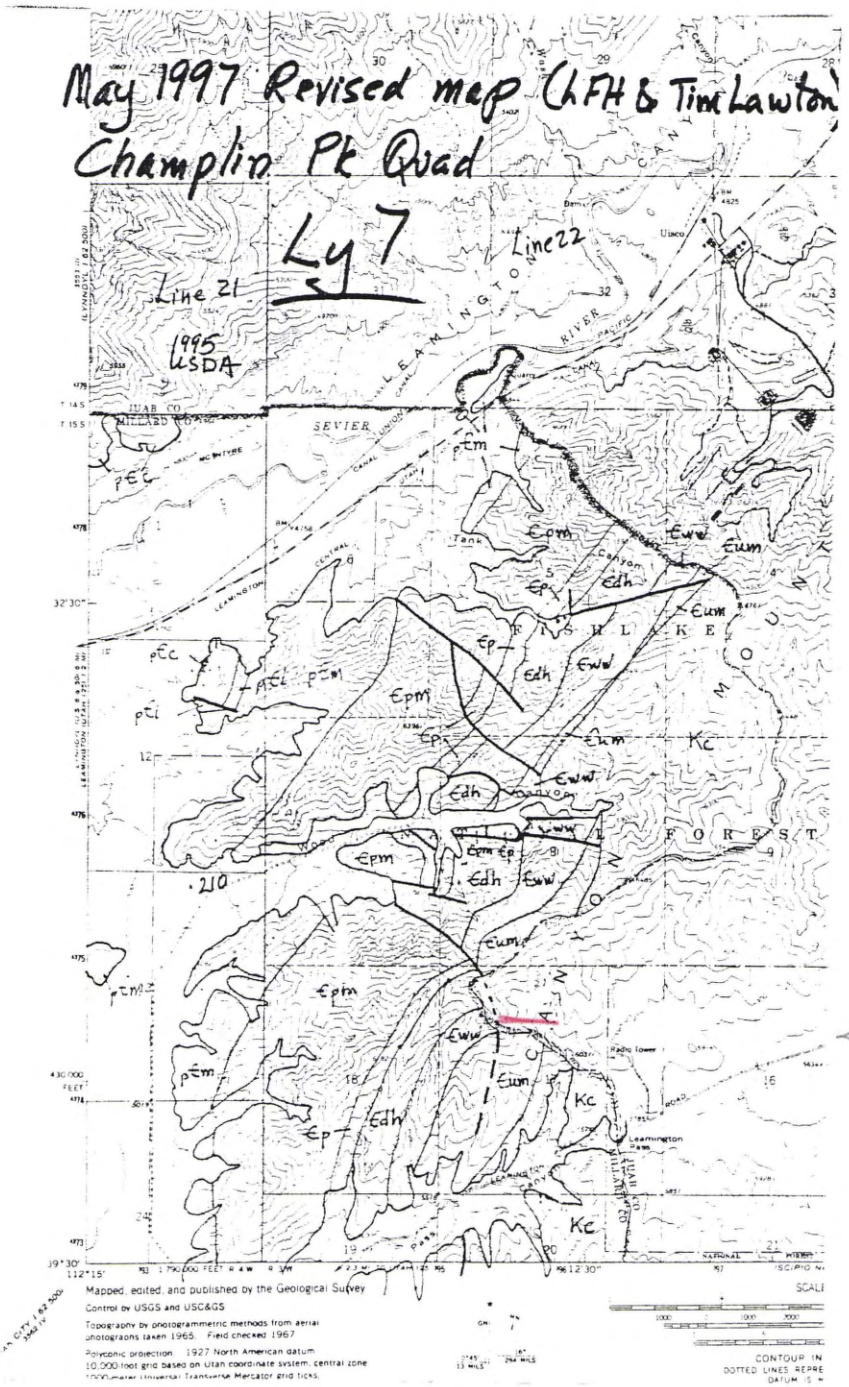
I have one further comment on the map, and this is something you might want to contact Pete DeCelles or Brian Currie about. They run their field camp in Oak Creek for a week and map up near the head of the canyon. I visited with the briefly last week and we chatted about various issues. Those guys decided to put the unit at the head of Little Oak Canyon presently identified as Cove Fort in the Pocatello, and they recognize the Blackrock Canyon south of the summit, as Holladay did. Obviously, this influences one's interpretation of where the Canyon Range thrust is, and how much or little ramping takes place from west to east under the range. I mention this because you wrote that you had put all upper plate rocks into the Caddy Canyon there. Do you regard the limestone up the trail south of the summit as a facies of the Caddy or a lower plate Devonian lithology? I have just seen it once, and I was mainly looking at the view.

That's about it for the map-specific part of the letter. Now I would like to ask a favor. This fall I will assemble my package for promotion to full professor and I need to produce a list of references who are willing to comment on my qualifications for promotion. The Promotion and Tenure Committee prefers individuals who are not necessarily collaborators, but rather who are able to evaluate my work and my impact if any on the science in general. I would appreciate it if you would be willing to write a letter on my behalf, because you are familiar with some of my work and its place in the regional literature on Utah. If you do agree to write, my department head will provide you with my CV and copies of reprints to help guide your comments. I should add in advance, in case it influences your decision, that the letters do not necessarily remain confidential. I do not really care to see them, but I suppose I might want to if I were denied promotion. Thanks for your consideration of this request.

I guess thats enough for now. I hope that this information is of use to you.

Best Regards,





← little tea fault

4 Mar 96 Postcard
Thanks for maps
Hope to cross paths next Summer

GEOLOGICAL SCIENCES

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28 February 1996

Dr. Lehi F. Hintze
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Dear Lehi,

Thank you for the kind words about the manuscript that I sent. Sometimes as I plod along with my low-tech research, I worry whether or not the effort is worthwhile. Your positive feedback means alot. I appreciate your close reading of the map; I will fix the things you noted for the final version. In going through the labels on the enclosed maps I noticed a couple of other labeling glitches on the figure, which I will also fix.

If I had a choice between the unit identifications by your students or on your open file reports, I used your nomenclature with the exception of Prospect Mountain and Ophir, where I used the terms Tintic and Pioche. Where Millard mapped Sevy Dolomite on the east side of the Canyon Mountains, you used Guilmette Formation, a convention that I followed. I simply have not seen the Paleozoic section in enough places yet to be much of an authority on it. I did spend a significant amount of time in the syncline at Wild Horse Canyon attempting to work out the structure so that I can make a down plunge section of the fold. That is why I tinkered with the Paleozoic units there. The northward plunge lessens from the Paleozoic and up through the conglomerate section showing that, not only did the syncline form during conglomerate deposition, but also the ramp developed sequentially. The conglomerate mapping is pretty tight in Wild Horse Canyon and from Little Oak to the ridge north of Cow Canyon, but you must realize that there are places on the map where the relationships remain a little conjectural. I really should spend more time in the vicinity of Wide Canyon Spring (a nice place to camp), where the conglomerate structure is quite complicated. Long gentle dip slopes which are difficult to map alternate with abrupt steep monoclines that I think represent fault-tip folds. Wild Horse Peak is another problematic location. In order to get the contacts right, they must be walked, and I have not had the time to do that everywhere. As you can see, projecting attitudes works for only a limited distance because of the folding. It is easy to confuse the various quartzite units because they are lithologically very similar. It has been an enlightening study for me as I've attempted to come up with criteria for mapping the conglomerate.

This summer, I hope to carry the mapping north to the Sevier River. There is another set of progressive unconformities near the old quarry in the Tintic that

records the uplift of the Canyon Plate above the Nebo thrust. These are quite high stratigraphically in the Canyon Range Conglomerate. I think this event postdates most of the story that I have told in the manuscript, and probably took place during the deposition of Scholle's unit B (M6 on my map).

I plan to be up in Utah in July, perhaps into the first week of August. I will be dividing my time between the Canyon Mountains and a little in the San Pitch Mountains to see what Sprinkel and Weiss have done in the Chriss Canyon quad. Maybe even a little Castlegate work. If you want to come out again to look at the Canyon Range or the Pahvants, I would be happy to meet you.

Here are the copies of my field sheets. Call me at (505) 646-4910 if you have questions on these or have trouble reading some of the labels. The Pz in Q7 north of Wild Horse Canyon consists of Tintic Quartzite overlain directly by middle Cambrian limestone. The strata are semicoherent, but pervasively fractured. The Pz in C1 north of Little Oak Canyon is brecciated dark gray limestone that may be Pogonip. I'd love to show you that exposure to get your idea on which unit it represents. It's easy to get to. These represent rock avalanche deposits or slide blocks that were emplaced onto the alluvial fan by breaking away on slopes where bedding paralleled the slope. I think the one in Little Oak Canyon was derived from the footwall ramp, which is why the identity of rock is important. The ones in Wild Horse Canyon came off the west limb of the syncline.

Hope things are well with you and the family.

Best Regards,

Tim

Tim Lawton