

GARRISON

6 Leg D

KANE KRUISE

939009

P-III

3/29 - 4/22/69

1969

#69005 105101
Geophysics (#3)
KANE 93009 leg.D
105101

NAV Ocean

Herb Eppert - Ch. Sci.

Jack Walker - 9310

Rusty Massengill - 9310

Frank - E.T.

Ernie Walters - E.T.

Bill Stevens - PST

Dave Rigor - Navig.

Sam Walker - Navig.

Bill Morton - 9310

Bob Bergantino - 9310

Tom Hammon - Ch. E.T.

Henry Philips E.T.

Henry ? E.T.

Jim Brown E.T.

Bill Johnson Navig.

Jerry ? Navig.

Teledyne

Roy Estrellas

Buddy Smith

Johnny Rowe

USGS

Me

Jack Lee (off at Tampa)

Went to Galveston on Monday 24 March 1969, arrived about 1600. Kane already docked, USGS crew had left for Houston so couldn't talk to them. Met with Miner Buell in evening. On Tues. held open house 1000-1700, logged 273 visitors. Met with Jan Heray in evening. On Wed. went to NASA Manned Spacecraft Center for meeting on proposed Puerto Rico remote sensing flights. Back to Galveston at 1330. Reports that sailing postponed until Sat., so returned to Corpus Christi with others in car. On Friday, call from Eppert that sailing scheduled for 1000 Sat. Left Corpus at 0648 Sat. 29 March via BN 224. Arr. Hou 0729, met by Teledyne people and drove to Galveston. Aboard Kane by 0900.

about 2300 (0510 Z).

My watch began 0600 Z (2400 L)

March 29, 1969

Aboard USNS KANE about 0900 local.

Satellite nav. not checking out very well, but gravimeter ready to go. Sailing time changed to 1300. Bill Jones (Jelidyne) came down and talked about gravity.

Although sat. nav. not working, decided to leave Galv. To see if local radio emissions interfering. Departed 1300. Sat. nav. reported working well when off shore.

Sailed south along $94^{\circ} 30' W$ until about 1830 local, slowed, streamed sparker cables, mag. and 2 hydrostreamers. Tuned up sparker and started first line about 1930 from position $28^{\circ} 19.5' W$, $94^{\circ} 26.0' W$, 27 fms. Jack Lee took first watch (noon to midnite). Blew a buss wire about 2300 (0510 Z).

My watch began 0600 Z (2400 L)

30 March

Sailed south at 8.5-9.0 kts. No satellite fixes successful during the night. Seismic OK. Running over "intruded" slope deposits, strongly folded, and thinly capped by bedded sediments. Up to 2.5 sec of usable data in basins between anticlines.

Arrived TP3-1 at 1130 L and turned to 272°. Shut down seismic for about 20 min. to change electrodes and switch leads. Records good - showing some very good slump structure (?) on a very low slope at mouth of Alaninos Canyon. Attained nearly 4 sec penetration there in about 4 sec. water. We are using 2 hydrostreamers, although no attempt has been made to arrange them in an array. I think they are roughly parallel and about 20 ft. apart.

The weather has been beautiful today, with almost no wind and only a low swell. At 2339 we reached TP 3-2 and turned to 168° . I didn't see much of the slope records on this leg (#1-2) but the shelf records are typical Texas shelf stuff, very good, with about 2.5-3.0 sec. of data. Shows faulting patterns over local doming, with synclines between domes, but no diapiric structures in shallow portion.

Have had a couple of mild explosions today and tonight when there is arcing in the OAT. Otherwise no difficulty.

31 March

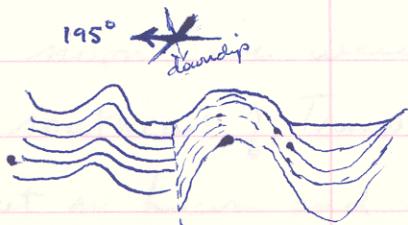
Arrived TP 3-2 just before 0000 L (2339L) 30 March. Running toward TP 3-3 all day. During my watch, until 1200, there were no Mex. Ridge structures. We went from Tex. shelf structure to a form of Tex. slope where it appeared that older, less well layered sed. were pushed up into a rough surface which ^{and fractured} intruded, and also was buried by younger, well bedded material.

The satellite navigator gave out nothing but "insufficient doppler" and "insufficient data" all night and about noon Herb decided to try to get it fixed. He called Ilodyne, who called Wash., but it was a holiday (Eisenhower's funeral) so we could get no help. It was then decided to keep running our

Track as planned, without satellite fixes, and maybe get spare parts in Tampa about a week from now.

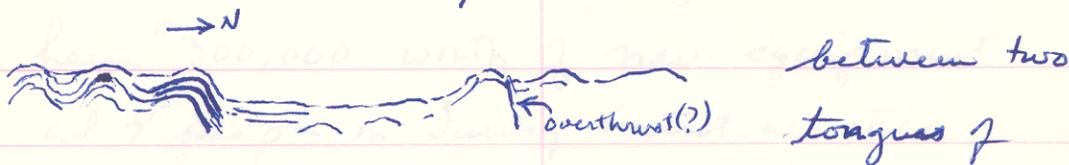
Gravity still working well and seis records are beautiful. Toward the end of the line near TP 3-3 it began to look like Mex ridges again. I didn't see them start, however this track should be of interest when we can see it all. At TP 3-3 there were buried versions of the ridges, and by 0600Z in depths of 1350 fm they were well developed, but buried by younger sed. Their tops made low bulges in the sea floor.

Note: Overthrusting (?) at 0900Z, 1 April 1969

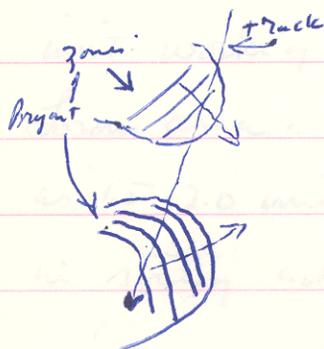


1 April

After 0000 L we ran across a topographically low area at about Lat 22° [around 1000Z] which represented Bryant's "fault zone" dividing his ridge zones. This area gave the impression of being a "normal" section.



basinward slipping fold belts. It may



be that no faulting exists here, but that rather the sed. are folded over two areas of salt which are migrating down hill and

being folded into ridges. Note however the deep disturbances in the low area.

By noon we were approaching TP 3-4 southeast of Tampico. We ^{slowly} stopped for about an hour and performed maintenance

on the sparker, then increased speed and began surveying across the Campeche Gulf on a course of $090^{\circ}T$. At midnight we were out on the tongue of abyssal plain which extends south into the Gulf of C. I didn't see our slope crossing.

It was remarked tonight that we have \$300,000 worth of nav. equipment and 4 people in Survey Control and still aren't sure where we are. The sat. nav. isn't working yet and were in the bad Loran area. Fixes are subject to as much as 1.5-2.0 miles error. Gravity still coming in strong and sea records good.

2 April

At 0730 Z on records note the change in sedimentation, or rather sedimentary tectonics where the gentle eastward sloping surface of the abyssal plain edge flattens. The slope, although almost non-existent



in true scale, is enough to cause some downhill slippage of the entire upper 0.4 sec of sed., made especially noticeable by the marked change at the point of flattening. Note also that lower sed. surfaces flatten farther west as the slope built out. Almost 4 sec. penet. here.

Crossed the abyssal tongue and came up on a large fault along which a slab of sed. seemed thrust up. This



feature (about 1200 Z) was the leading edge of a belt of

intruded and folded sed. It is very difficult to define the intrusive elements - They appear to be masses of older sed whose beds are badly crumpled and deformed.

In at least one place, however, the intrusive looked like it cut through these sediments (cf 1600Z). Near the western edge of Campeche Canyon, there appeared to be a large fault with possibly 2.5 sec displacement.

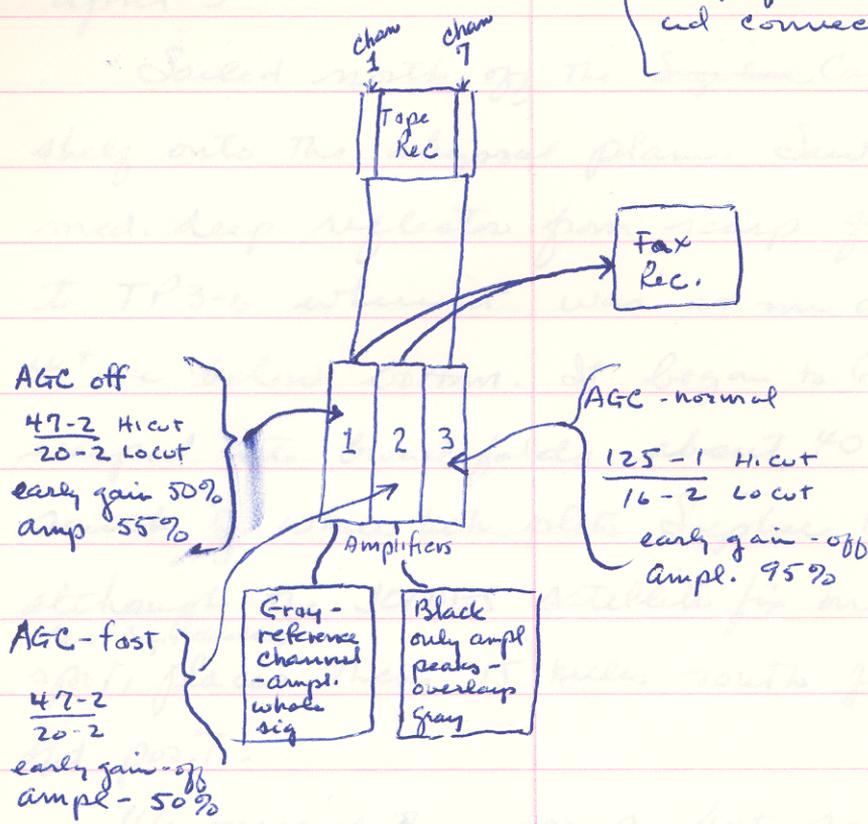


This was at the point where a

6 fm shoal was reported, but not confirmed and hot water was also reported. Our smallest depth was around 1100 fms.

Passed over the canyon and up the Campeche Bank where at 1840 (50 minutes after TP 3-5) we shut down for maintenance. Replaced tips and electrodes. Down for 1:50 hrs.

Amplifier settings
and connections



AGC off
47-2 Hi cut
20-2 Lo cut
early gain 50%
amp 55%

AGC-normal
125-1 Hi cut
16-2 Lo cut
early gain-off
amp. 95%

AGC-fast
47-2
20-2
early gain-off
amp-50%

Gray-reference channel - ampl. whole sig

Black only ampl peaks - overlaps Gray

April 3

Sailed north off the ~~Sigsbee~~ Campeche shelf onto the abyssal plain. Saw a med. deep reflector from scarp face to TP3-6 where it was as much as 4' sec below bottom. It began to be warped into broad folds about 40 miles south of where Uch plots Sigsbee knolls although the JODIES satellite fix on that spot, places them 15 miles south of the old posit.

We missed the outcrop, but saw several buried folds and one "knoll" which barely broke surface. At 1300L turned toward TP3-7 on Campeche Bank and followed same deep reflector back to scarp.

Jim's still arcing in the OAT and fires two or three shots during every watch just to keep one awake. Still no reliable sat. fixes. Got some grav. anomalies around knolls. Ray worked all night on Tape deck - adjusting speed etc. OK now.

April 4

Sailed back up on to the Campeche Bank on a SSE heading, then ran over shelf beds all night. Got several grav. & mag. kicks, but no variations in seismic to match. I don't think seismic penetrates much more than 1 sec. in those limestone beds. It was a bad night on watch - the OAT electrodes kept fouling, and I changed #3 three times in three hours. Just about daylight, #1 began arcing, and after 5 or 6 loud bangs I shut it down until Jack got up around 0900L and sprayed it. Ray finally fixed the recorder (tape) and went to bed around 0600L.

We made TP3-7 at 1230L, but arranged for two intermed. TPs which would take us north off the shelf across a mapped (BC chart) canyon to TP3-7A then east and back on the shelf

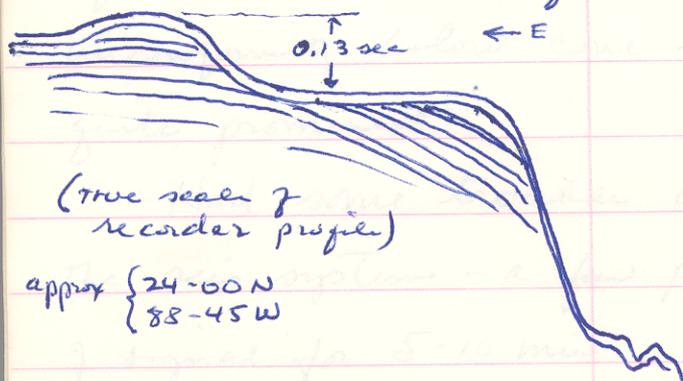
to TP3-7B, and across another canyon. We made TP3-7A at 0245 Z (2045 L) and by midnite have come back up the slope & onto the shelf. Haven't seen any canyons on this leg, but hear they saw $\frac{1}{2}$ of a canyon on the north bound leg (apparently seis crapped out in the middle) - anyway nothing spectacular.

We now have an ETA Tampa of 0600 L, 7 Apr. (Monday). We're trying to order some trigger electrodes and some rear carbon electrodes to pick up there. We need these badly, especially the former. But today was apparently another holiday ashore and we couldn't get the order off - nobody home at Teledyne. We speak to Teledyne at 1000 every day and sometimes 1300 by single side band. This is really our only practical communication since the Navy messages take days to get action. Couldn't have operated w/o 5513 & Teledyne

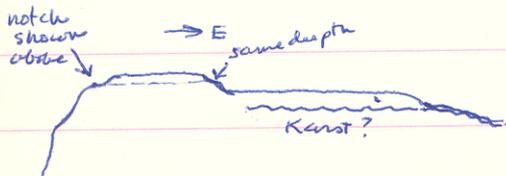
16

5 April

On edge of Campeche shelf at midnight. Saw a beautiful example of wave-cut terrace at 130 fms at 0615Z, about 1.5 miles wide. That depth makes it look good for fairly rapid subsidence recently. It would be worthwhile to accumulate all the Navy's Campeche shelf crossings and try to come up with some correlations of such features.



The top of the Camp. Shelf gave a strange "butte" shape, then along strike for several hours we passed over a subsurface refl.



at 0.2 below surf. which may be what Kurst looks like in a profile.

On the east side we came down on a terrace at 240 fms which looked like the Karst surface bent downward and thinly buried. I didn't see us go down the slope as I went off to bed.

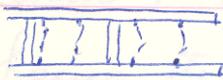
When I came back on tonight we were out in the middle of the Miss. cone, watching a deep ref. (2.3 sub) come up toward the Fla. scarp. There are intermittent reflectors below it, but this one is the unconformity below cone reds, and is quite prominent.

Had some trouble with sync. on the seis system - a few periods of disintegration of signal for 5-10 min., but it hasn't done it since about 1000 L. [Incidentally, we changed L to EST tonight]

6 April

Came on up the Florida Escarpment without ever seeing any sign of diapiric movement, although there appeared to be a strong reef-like roll-over at the first flattening of slope. After we got on the shelf itself, our records were very poor, being mainly a series of multiples and almost no data between. I shut down some capa. banks, but this just shortened up the total width of printing (time of ringing).

After lunch, we slowed, pulled in one streamer and two arcer cables, drilled holes in the other two arcers

to allow more arcs and  higher frequency ~~noise~~ sound, and used only 1 capacitor (4K) per cable and one cable at a time. Then using the high resolution amplifier, we

tried again, none of the filter settings really helped much - we still got multiples and no data to speak of between. By this time we were in about 35 fms. We finally secured this sparker as it was useless to go on. I'm sure that this limestone shelf takes special treatment.

We ran gravity, magnetics in the 3.5 all night, up to TP 3-9 and then headed in for Tampa.

7 April.

Arrived Tampa about 0900 L. Magnavox man on dock at Naval Reserve Center. It apparently took only a few hours to repair the satellite navigator, but we have to lay over another day so a sufficient number of passes over the satellite can be checked.

8 April - In Tampa all day.

9 April - Left Tampa at 0700. Because of our lack of success with reflection records on the shallow shelf coming in, we didn't start sparking until 1800L on the way out - at a depth of about 40 fms. By midnight we were around the break at the shelf edge.

10 April - Sailed across the Florida Shelf and down the slope; at 0900Z we came out on the narrow plain between Fla. and Yucatan at a depth of about 1800⁺ fms. This surface was somewhat deeper near the escarpment, but was gently domed near the ~~axis~~ eastern edge. It then sloped downward toward Yucatan to about 1850 fms near the beginning of the Yucatan slope. A deep (115 sec) reflector was traced from the Fla. slope.

beneath the plain and over to Yucatan. It was undulatory in the east, developed several buried peaks with .3 or .4 sec relief, and finally erupted as a topo. prominence at 1900Z, exactly in the mouth of Catouche Tongue. Below this reflector there was no data.

I missed seeing the Catouche slope come up as we were up to 200 fms when I got up. At that time, however, a reflector about .5 subsurface was the lower limit of data, with bedded units above it. By 0600Z (0200; 4/11 Local) this limiting reflector had come up to the surface at 80 fms and we had practically zero penetration.

Satellite gear working well, no apparent gravity or magnetic kicks. Shut down 2035-2205 to switch leads & electrodes. Weather was rainy & windy at beginning of day, but clear & hot by the end.

11 April -

Turned SE at TP3-10 at 0800Z and ran off the eastern shelf of Yucatan approximately in the straits. The hard, reflective, limy(?) bottom gave way to a more penetrable bedded sequence overlying a rough "basement" reflector similar to that farther north. At the shelf edge was some delta-like off lapping. The slope was not very steep at the angle we crossed, and the basement reflector came to the surface in several places.

Since we were off my Uchupi map, I wasn't too clear about what we were crossing, and the geology didn't stick with me very well. We had a very strong head current all the way and 130 turns which normally gets us around 9.5-10.0 knots, only got 8 or even less. We turned

east across the strait about 1300 L (CST) and saw a couple of intrusive plugs emerge thru the sed. I doubt that they are salt because of their rather large relief and sharp profiles. Probably volcanics.

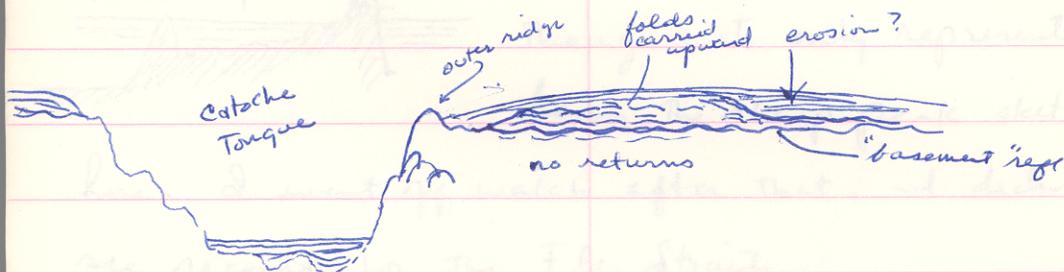
At 2130 Z we turned NNW at TP3-12 on a leg which will take us back across Catoche Tongue and the lower Yucatan slope.

Tips are getting shorter, but we plan to stop at TP3-13 to change. That will be 0500 L tomorrow. The gap adjuster on Bank 4 came loose and in adjusting the electrode it shorted out on me. Its sure good to have 4 banks, so when you lose one you're not out of business.

Weather continues beautiful. Yucatan Straits were like glass today when we crossed from Carib. back to Gulf. "

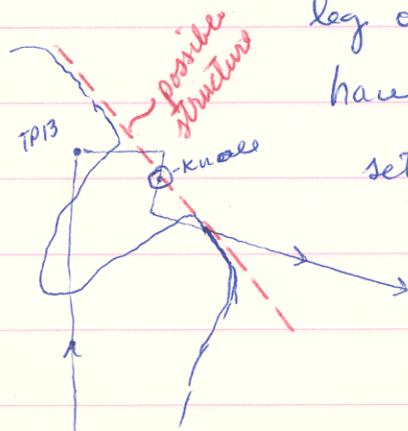
12 April.

About 0000 L, we were crossing the eastern lobe which bounds the Catoche Tongue.

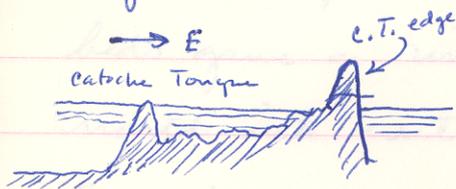


Stopped at ~~4500~~ 0430 L & changed tips; down until 0615 L. Started firing again approximately at TP3-13.

Ran across Catoche Tongue in easterly direction and made a dog leg to cross the mouth and look for structure. The first leg out, headed 090 may not have gone far enough to settle the question, but the south bound leg recrossed a knoll-like feature which had been crossed previously, located in the mouth.



This time it showed considerable subbottom development, and gave a posit. gravity and a mag. kick. We almost missed the other



edge of Catoche Tongue though; its only representation being the sharp peak sketched

here. I went off watch after that, and didn't see records for the Fla. Straits.

At TP 3-14, we ~~crossed~~ turned North and crossed (at 0400Z) a hill - I don't know whether this is Jordans Knoll or not. Then a small part of the flat-lying beds, before we started up the Fla. shelf.

Still nice weather.

April 13.

Crossed on to the south Florida shelf. Not very spectacular, as the limestone (?) beds gave a ringing record. We ran north into water < 30 fms, then turned ENE ~~for~~ about 3-4 hours. The next leg was south bound, past the easternmost Dry Tortugas, and off the shelf. I didn't see any of this except the deeper part near TP3-17. At this point a sed. cover about .75 thick overlay an undulating, rough basement ~~ref.~~. The sed. were slumped into a terrace at about 600 fms with intricate faulting and tilt blocks. Compare this with Uchuyis' terrace in this area.

Sat. nav. not working very well - only 2-3 decent fixes per day. Sure not worth the price.

April 14 -

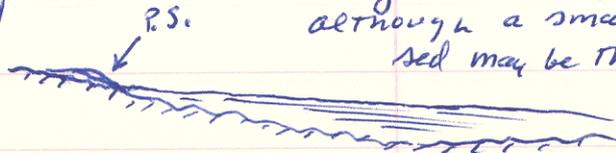
at 0440 Z, turned NE at TP3-17 in middle of Fla. Straits. at that point, a sed. section of more than .5 thickness overlies a rough basement reflector which dips gently south. The sediments were

formed into a broad flat terrace at 600 fms by a large slump fault as at left. Several minor slumps were

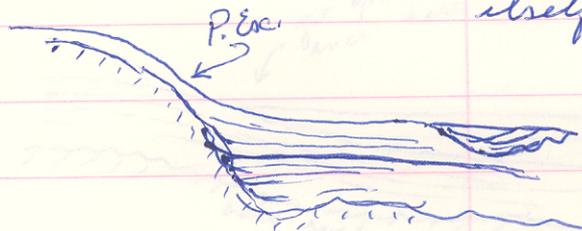


apparent in the block, and also upslope from the principal fault. Farther upslope the deeper reflector flattened at 2.0 sec (sub sea), into a buried terrace. However around 0900 Z, this reflector began to slope upward to the north at a greater rate than the sed. surface, and around 1015 Z

it appeared to emerge as the Fourtales Scarp, although a small outbuilding of sed may be the scarp itself.



Ran up to TP3-18 and turned SE for
Cay Sal. Recrossed Bourtales Escarpment and
saw much old cutting & fill. The Escarp.



itself has a structural
genesis, but
has been
much shaped

by later sea level erosion.

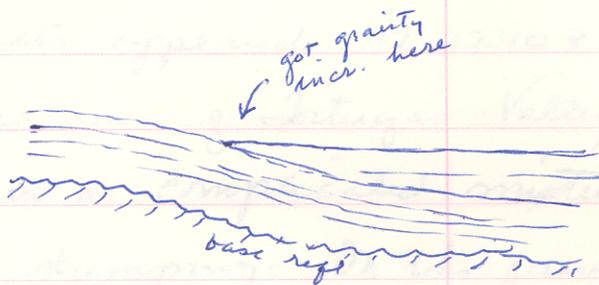
After I went off watch, we ran
up to Cay Sal bank, just a mile or two
off the SW-most island (TP19A). Couldn't
tell much about the structure there.

at 2010 Z turned west for the straight
run back down the Florida Straits.

at 0000 were running over
about a 1 sec thickness of sed. overlying
rough base refl. at 3.0 subsea.

15 April

Down The Straits we crossed what first looked like an outcrop. However



due to its size, etc., it appears to be associated with the

large slump area around TP3-17.

Navigation in The Straits has been worse than at any time on the cruise.

The satellite gear only gives out 2-3 fixes a day and Soran A is very erratic. The

2nd Mate tells me the bridge has some pretty good control on certain lines (visual near the Keep) - I hope it gets into the smooth plot.

Until 1230 Z we were crossing a gently arched area with a smooth surface where .7-.8 sec of evenly bedded sed overlay

a rough surface at around 2.0 sec. at 1200 this surface sloped slightly down to the west and a couple of small normal faults appeared. at 1240z we crossed the axis of Portugas Valley, which looked like a complicated mixture of erosion and slumping. On the previous smooth surface the several small Agassiz valleys were erosional.

at 1630z we dropped off a scarp and immediately began to pick up a thicker section of sed, although it wasn't the abyssal pl. sed. When I went to bed at 1400L, we had missed the large knoll at TP3-14. about 150 miles south.

Navigation on these legs in the Fla Straits has been abysmal. It's the worst yet, but hopefully they can smooth it up a bit later. tracked sediments which

Made TP3-20 at 0300z and at 0440z crossed a very nice knoll - intrusive.

April 16

Started a long run up the Mississippi Cone at 8300 Z (TP3-20). The bottom has been flat from start to 1500 Z, but has shoaled about 100 fms at a constant rate. While this surface dips south, we have followed a series of deep reflectors dipping north from 6.5 sec at 0700 Z to about 7.3 sec at 1300 Z where it was lost. However reflectors above the deeper one were still dipping N at 1500 Z.

April 17

In the area about 150 miles south of the Chandeleur Is. began seeing piercement structures, some of which break the surface. These structures later gave way to folded and intruded sediments which

looked like something between Texas slope
and Bryants Bridges.

at 1350Z, Herb came in and said the
Capt. believed he might be having a
heart attack, and that the ship was
calling for a helicopter pick up. We
immediately secured the sparker and
started pulling in the gear. at 1450Z
we got underway at full speed for
South Pass.

at 1600 a Coast Guard helicopter
met the ship and picked up the Capt. We
ran back to TP 3-21 (28-31.4, 89-01.1) and
by 1115 had the gear over and started
the next leg on a heading of 056.

I didn't see the rest of the run, but
when I came on at midnight (0600Z) we
were in flat-lying shelf sands, with some
fracturing, steep angle variety.

April 18

We ran into a local storm about 0300 L with lots of wind and some rain. However, having turned at TP 22 about that time, were heading into it and it's not so rough.

The geology isn't much on this line but even at that I've had no time to look at it because Banks 3 & 4 have kept me right at them all night. By 0600 L I've changed both electrodes twice and made further adjustments several times. Sure spoils the looks of the record.

Finally got Ray up about 0815 L and he straightened out the electrodes - some front ones replaced. We are having most of our trouble with trigger electrodes - the ones refaced just don't last.

During all this mess, we crossed De Soto Canyon at about Lat $29^{\circ} 20' N$.

At a casual glance, I couldn't see anything very exciting - no reef, no big deep changes. But maybe later study will improve on this.

News came in thru Jelodyne that the Captain's cardiogram was "negative" and he's doing O.K.

The sun came out, but we have some big swells coming out of the southwest and the boat's rocking more than it has the whole cruise.

19 April.

Just dropping off in De Soto Canyon after TP3-23 on a SE course when I came on at 0600 Z (midnite local). At 0730 Z got a good reef (or intrusion?) at 3.5 sec sub-sea (top of reef). There is a good change of sed. from one side to the other across the canyon here, and the east side is clearly Fla. shelf.

From 0700Z until 1500Z we ran on evenly bedded slope sed. with no incidents. at 1500 we ran back off the scarp and saw the reef^(?) once more, with top this time at 2.2 seconds subse. Went down to abyssal plain depths immediately (4.2 - 4.4 sec). The scarp reflector very plain here at 4.8 - 4.9 sss. It is hummocky, if not intrinsic.

Recorder began losing its cool again at 1700Z. Loses sync, then recovers. No chance to fix unless it goes out completely & missed remainder of record while off watch. Made TP #3-25 at 2325Z, after which made last Fla. Scarp crossing

April 20, 1969

When I came on watch at midnight, we were on the last Miss. Cone crossing. Everything looks pretty much the same as on other crossings, except that the deepest reflector is deeper than on the crossings south of here. There are several reflectors and I'm sure they can be correlated at our ^{line} crossings, and they should tell something interesting about subsidence in the Shelf.

Just before 1600Z the deepest reflectors started to rise, indicating the approach to the Guatemala Penn. at 1700Z, Al, the radio man, began his regular transmission which for some reason completely threw off the sync. in our recorder and the record was totally washed out. When he stopped, about 20 minutes later,

we were up on the scarp and had missed the whole edge of the basin. The same thing happened yesterday at 1700 Z (1100 L), but fortunately we weren't in a critical area. Tomorrow, we will be approaching the Sigbee Scarps and will probably lose that. I guess it's one more of the hazards of not having sufficient control of field ops. - we should have re-run the section, but didn't.

We made TP3-26 at 2245 Z and turned north on the last long crossing leg. Got a good scarp crossing then, and surely the steepest scarp yet.

Bank #1 has been pounding all day, off and on, and I'm sure the tip, if it's there at all, is about shot. However there's not much chance will stop to change it now. Our time is running out fast.

21 April

On the Sigsbee Plain when I came on.
Bunk #1 still pounding. We're getting
about 4 sec. penetration.

The bottom rose gradually but
steadily to about 1000 fms at noon
(1800Z). The expected 1700Z wipe out
didn't occur - I don't know why. Probably
because there is nothing of interest in
the record. We are crossing the approx
area of the Sigsbee Scarp where it seems
to be buried, according to Uchi's contours.
Haven't seen it by noon.

Had three good pops out of the
Zis spt back on the starboard side
of the fantail. Evidently something arced
in the connections. Hasn't happened again.

Channel Jumper is building up in everyone.
Should be bad tonight.

22 April -

at 1900 L last nite they shut down Bank #1 which certainly must have lost its tip along the way days ago. Four hours later #3 was shut off for the same reason. At 1700^{21 apr} we turned at TP 3-29, our last TP.

So when I came in we were firing 2 banks, headed toward Southwest Pass of the Miss. River, and slowed to 4 kts because we are so far ahead of schedule. We were already across the Miss Trough but the record is terrible. Slowing down and cutting out 2 banks (especially the former I guess) changed everything and we picked up a lot of high frequency noise.

This is just about the end now. We will probably shut down in 2-3 hours and everyone is just going through the motions. I guess its time, too.

Est totals

935'	of Master seis.
298'	12 KHz
2976'	3.5 KHz
<u>775'</u>	stop-start seis
4984	

minus about 8% for down
time (400')

About 4500' of records

based on 62 total days
or 1488 hours