

UNITED STATES
DEPARTMENT OF THE INTERIOR
DI-6

APPROVED DECEMBER 1941

Book

2.

Cuttings

0 - 970
1040 - 1060
1075 - 1200
1775 - 1778 - ^{smut} from column?
2030 - 2130

CORE

- #9 - p. 4a, 5
- 10 - p. 5a, 6
- 11 - p. 8, 8a
- 12 - p. 12a, 13
- 13 - p. 14a, 15
- 14 - p. 16a, 17
- 15 - p. 20, 20a

Block E

F-1. Emuwatch, Site Area

June 1, 1982 (continued)

Block 2

F-1. Eniwetok, Salt Flats

June 6, 1952 (continued)

5:20 Drilled from 3440 - 3445
isolated harder spots
3445 - 3450 but still essentially
very soft.

7:05 Drilling stops entirely
Lunch at 3555 (5 min 5 min)

7:08 - 7:13 AM 3555 - 3560

6/1/52 - Sunday - 8 AM - 4 PM Radd

3560 - 3562 - 2' @ 1 min each

Shut down to work on pumps, etc. and
refill pits; start to resume
drilling at 11 AM - cuttings packed
in - pulled up; bit plugged, dropped
short length pipe inside drill pipe
and out of hole, lower part string
plugged; coll. bar cuttings (drill
colls packed)

All 4 collars packed, freed two, pulled
out to remove bit, put collars back in
hole and pumped clear.

2:15 PM Put on bit to go back in hole

see next
page

[Note on cuttings from plugged drill
collars 3562 & higher - mostly cross-bedded
and drilled.

Many forams, mostly small but some
larger, gast. sp. frag., small
brachiopods with brachia, frag. corals etc.
preservation not good - forams with
bits calcite cemented to shells, margins
incomplete, etc.]



4:05 Pulled down to 3560' ready to
begin drilling → started to
repair equipment (Wires)

5:10 Began drilling at 3565'

6:09 Reached 3650'; still very soft drilling.

6:40 Started pulling pipe.

8:35 Pipe out. Core barrel put on.

10:55 Core barrel at bottom of hole. Core
taken in about 5 min. Core barrel stuck
at bottom. Diller couldn't rotate pipe.
Remained sitting on top of core barrel until
11:00 when pumping was stopped to take
core.

11:00 Freed drill collar and started to pull pipe.
Pulling pipe - about 50 ft. Hole to 3655'.

June 2, 1952 - Midnight - ERNEST Russell

1:30 Pulling core out of hole.
Joints very difficult to break
- broke long cable wire.

2:30 AM

and a long-jaw pin
and a special rope
and a second long cable

4:00 AM - Core barrel up -
No core recovered -
checked with tool - Wants to
go right back + try for
another core - then time
with circulation.

Bill Spurgeon, after the last
sign of circulation as to whether
it would be necessary to
clean out to bottom of hole
with mud and rock bit
before making a core run or
whether the core barrel could
be run right back in with
a pit of mud for clearance, loss
and curing. It was finally
decided that the core barrel was
to go back in and hope the
mud would clean out ahead of
barrel sufficiently to take core.
(An alternative to core barrel was
suggested by Gus Pike. He thought
that more of the soft fraction
could be recovered by having a
special dual circulation pump
basket. The disadvantage of this
was that no more than 2 feet
recovery is possible and with
any kind of back more than that
could be retrieved with the core
barrel).

4.55. mixing mud for core run.
To end of shift.

June 7 - 1901 - 8AM - 4PM - Ladd

9.00 AM ± into hole with heavy mud & bit
11.00 start coring with circulation at 200' 3650
after circulating out 90' cuttings. (4)

Notes on Core #9 - 3655 - 3665'

Small unoriented pieces at top of core appear to be mainly coral.

First oriented section is 4" section of white, friable ls. made up. Two pieces from bottom of this sent to Cole and sample Q. Second oriented piece is 6" long.

Assemblage of forams and corals much like that recovered from plugged drill collars (3562' & higher). Forams mostly are present with orig. shell but rock is mainly a fragmentary ls.

Remainder of core consists of smaller pieces none of which are oriented. Part of moll. and all of corals appear as fossils. One large Pecten has orig. shell. Some of coral molds are encrusted with banded ls. This may be algal.

40

10/16/50

Core #9 - 3655 - 3665'
Examined out of hole - 10/16/50
Dredged below 3665' in core
from 3655 - 3665'

11:45 AM

→ CORRECT TAKING CORE AT 3660'
CONTINUED OUT OF HOLE — NOTE —
DUSTY, RECORDED SAMPLE IN CORE
FROM 3650 - 3660'

2:20 AM
cut 2
cut 49
3655-3665
(1st hole)

out of hole with some dust
3655-3665, recovering 3'3" (=33%)
of hard but friable, white, coral and
shell limestone just broken in several
pieces wrapped in paper

Time

- 5:30 FINISH RISE ON FEELING DOWN TO 3665'
- 6:27 DOWN TO 3665' - RECOVER WITH GLITCH ON RISE - RECOVER CORE
- 6:41 RECOVER CORE AT 3665'
- 7:15 AT 3695' VERY GOOD
- 7:22 AT 3752' SAME AS PREVIOUS SAMPLE - BUT NOT SOFT SAMPLE IS RECOVERED TO 3752' WITH 100% RECOVERY
- 7:58 TO 3700' RECOVER FOR SAMPLE & CLEAN AND RECOVER PREPARING TO CORE - THIS CORE OUT OF HOLE AT 11:00 AM TO 3660 CORE

June 3 - Time Mid = 8 AM

7:07:00 run slow hole
4 1/4" at 3763

Notes on Core #10 ~ 3763-3988.

A white — friable fine-grained ls. — numerous smaller forams and much fine detrital material. Some corals are present (molds) but no larger forams; also red-like bodies of algal (?) origin; mollusk shells mostly as molds (one *Pecten* form with shell); pebble-like lumps app. structure as ls? — thin section; incl. spine (sample from near top sent to CUP — Spl. R)

5a

Core #10 started at 8 AM.
The core on beach

5-2-44 - Corals were collected
Time about 11:30 AM to 12:00

Leaving - started out 11:00 AM.
Tried to get some more

7:10 AM. Core pulled - 3 ft recovery
at 25' drilled - 12% recovery.
15 pieces oriented.

Paleo sample
Core #10
3963-
3988

6/3/52 8 AM - 4 PM^{7:00} Field - Site paleo
Boat into hole with 8" rock bit

ONR
Rept #6 →

10:23 AM BEGINNING TO DRILL AT 3755' AFTER
REMOVED - DRILLING BEGINS ONLY
LITTLE PROGRESS ON BIT - 10' IN TO
DRILLING BIT

10:27
DRILL DRILLING AT 4025' -
BEFORE 4015' - 4020' DRILLER
SAYS HE HAS SEVERAL THIN HARD
SPOTS (SOME SHOW IN LOGS)
DRILL - DRILL THROUGH
NUMBER OF SPOTS (SOME
ARE CALLED - BUT
ON LOG)

4035' - 4040' PROGRESS DRILLING
DRILLING

1256

AT 4051
FROVINSKY

Denise - Sample taken at

1253

To 4055, drilling slowly, one medium -

- 11:55 at 4051' DENISE CAMP - SMOOTH AS
RECORDED
- 12:35 To 4085, drilling slowly, one medium-
hard interval 4075-80 - 11 min. (see 5)
- 1:00 To 4109
- 1:50 4137' SAME OLD BUT SENSING
VERY LITTLE PRESSURE ON BIT - NO
RESISTANT BOUNDS AT THIS DEPT
- 2:07 4165'
- 2:36 4197' SAME DENISE AS RECORDED
- STOPPED TO REPAIR PUMP
AND THE BITS

Denise record shows 10 min to drill from
4075-4085 & 11 min from 4075-4080.
These drilling times might represent "flow"
out. All drilling on this bit (3985-4085)
shows a slightly longer time per 5' interval;
in the range here 5-3 to 6 min. generally.
This is a contrast to the 4000-4100
interval to the previous bit.

When another joint was added at 4145',
bit plugged & wire bit lost - working it
loose, it was down to 10' above at this depth
without any sign of 43' interval
as planned.

Total change at 4197 showed $3\frac{1}{2}^\circ$
rotation.
Total change at 4182 showed 4° (2)

1. 11. 1944 (PCT)

Bit being worked down at 100 ft. hole (4197) at 10:00 am. Bit then pulled to within 100 ft. of desired bit after pumping a bit of water into hole.

- 7:00 Water out at bit
- 7:15 Pipe out
- 7:30 Following hole bit in hole, 100 ft.
- 7:45 Bit in bottom but belly in on 100 ft. to 50' in hole - adding full joint to core
- 8:55 Bit in hole
- 9:15 Core cut from 4197' - 4222'. Approx. 12' cut of core cut at 10:00 am / 44. 22' cut at about 1/2 min. per.
- 10:00 Driven 500' pipe pulled at end of shift.

June 11, Midnight - 8 AM. Russell

12. 11. 1944. Core No. 11. 4197 - 4222 -

Recovered 11 ft 2 inches. or 44% of 25 ft core.

Core consists of 37 oriented pieces and a small proportion of smaller unoriented pieces and gravel. Material is a fairly well oriented, poorly sorted, sand to larger forams and smaller forams (with redlike algae?) (Litho-phyllina?), all well preserved. Contains a few mollusk

Core # 11
4197
(see over)

Notes on Core No 11 - 4177-4222'

white, friable, porous, even-grained ls
 consisting mostly of rod-like bodies measuring
 1-2 mm. in length (probably algal - Lithothamnium?)
 and forams (both larger and smaller types;
 smaller forms more abundant) and fine detritus
 - all loosely cemented into a "firm" (medium
 hard) rock. No evidence of solution or
 extensive recrystallization. Differs strikingly
 from section above in that corals are
 almost, if not completely absent. Echinoderm
 fragments - spines, etc. present but not
 abundant. Rods and flattened forams are not
 oriented with long axis horizontal but, instead,
 lie at all angles - a mass of interlocked fragments



Samples to Cole - 6/4/52

- S - from top piece of core
- T - " 1/2" below top of core
- U - " 1/4" " " " "
- V - " 1/8" " " " "
- W - " bottom of core



white and porous, but mostly
 identical to section above
 present. The algal rods are horizontal,
 but others are more or less upright, parallel
 to the long axis of the rods. But some

make this method unreliable
for absolute determination of
hardness it has nevertheless
been possible to check the results
from time to time with other
and somewhat different methods and has
been found to reflect with
reasonable consistency the
true relative hardness. However,
on the basis of drilling time
records and rate of penetration
of the core barrel at the greater
depths (2000' and beyond) it was
found, prior to actual recovery
of core 11 that because the
drill penetrated the rock so
easily (hard and smooth) that
core ~~is~~ very soft (rock at
the interval (4192-4220) and
core recovery would be negligible.
The core recovered proved this
assumption false. Recovery was
44% and the rock is "fairly hard".
From this, in fact, ^{it is} a tendency
to under estimate the hardness
of the last two cores (9 & 10) before
actual recovery. In the case
of core 11, at least, there are two
possible explanations for this
(as a combination of the two). 1) The
greater length of the drill pipe and
its greater weight would have a

is daily
recovery
validity

Tendency to dampen the effect
of further weathering
detected in the upper part of the
section, possibly still shallow
and broken, and the occasional
occurrence of large fragments of
material in the hole (and
small fragments here might have
the dampening effect also).

3) Being a sand, even though
fairly well cemented, this rock
is probably much easier to
drill (shows faster drilling rate)
than rocks of equal hardness
which had much denser portions
of coal.

(Perhaps the word 'degree of
cementation', rather than 'hardness'
is a more accurate description
of the characteristic for which
an interpretation has been
attempted)

1.30 AM Because 1) The hole showed
no approaching the postulated
level and 2) Core II is a
unique rock type (suggesting
near and further changes in
lithology) it has been decided
to drill only to just over
before recovering core
level again.

2:25 In section of survey 401
in hole with drill bits

4:15 - On bottom - 4:20
Feeling very comfortable
Make connection at 4:27.

[Handwritten signature]

5:10 - 4:30. With 4:27

Decided to run one more
point before coming back
for the rest of the work
in that hole. While away
from getting paper instead
of getting ready to even
supplementing hardness
of test core. The best
has no other description
in drilling characteristics
A - want a bit of this
very large piece but
can't find it. Please
if we miss II because
of this.

5:45 - 4:30 2. Under reported
a very gradual hardness which
held up well to the end

Notes on Core #12 ~ 4316-4341'

Top 5" consists of 2 oriented pieces of highly fossiliferous ls. (Sample W from upper piece to core (4316-2) that may be dolomitic. The rock is porous, fairly hard but friable. It seems to be made up almost entirely of forams (larger and smaller) and fine detritus.

Third oriented piece is 5" long and shows a gradation from the porous rock desc. above to hard, dense, cavernous to a dolomite. The dolomite appears to be completely recrystallized and cavities (up to 1/2" across) are lined with xls. - with a translucent, ^hconoidal appearance.

There is a total of 2'2" of hard dolomite (this almost certainly is the harder layer recorded by Dutton at 4320-42'). Some of cavities are 1" - these may have been formed originally by contraction of matrix & shells but no recognizable fossil remains; also are a number of reasonable shells.

Below the dolomite two oriented pieces are white, porous and friable but without very fine, show only very slight eff. with acid. (4321-2)

Below it 1-2" soft sand with smaller forams and minute calcite xls - reacts visibly with acid.

Followed by 3 1/2 inch oriented piece foss ls. that is moderately hard but friable and may be dolomitic. Next 3 1/2 inch soft + broken (one piece with *Pellatispiria* (Eocene) sent to Cole as sample X) with hard fragments dolomitic ls with forams in xl. matrix.

Last 6" broken but oriented - similar to hard pieces in interval above, with *Pellatispiria* fossils. (124)

of the heavy grey at 4316, (P. ...)

white, porous and friable. Sub with ...
 show only very slight ...
 Below ...
 minute ...
 moderately hard but friable ...
 most ... soft + broken (one piece with
P. latispina (Eocene) sent to ... as sample X)
 with hard fragments dolomitic ls with fossils in
 matrix
 best ... but ... similar to hard
 pieces in ... above; with *P. latispina*
 dolomitic, X, ... (12)

at ...
 ...
 ...
 ...

June 4 ~ Wed. ~ 8 AM - 4 PM Field

- 7:75 AM - have circulated on bottom (4316')
 since 6:45 AM; pull up to service rig and
 refill pits.

- 8:00 AM coming out of hole to ...
 - 10:10 AM into hole with diamond bbl
 - 12:20 PM shut ... - 25 - finish
 - 1:20 PM ... - 22 - 2 1/2 + 3
 - 2:00 PM ...

4:12
 4:31
 (3000 ...)

Recover 2' of ls (6") grading into hard
 ...
 (recovery 32%)

4:45 PM
 Starting to run pipe into hole at 4 PM.
 6:50 Pipe in hole & started ...
 7:15 Hole ... & drilling started. Reached
 8:25 4706' at 8:25. Drilling from 4341' to 4906'
 included Kelly down after adding.

two joints of pipe. Water then pumped
into hole & circulated for 2 hours. When
pipe got near bottom of hole, 120' of
cuttings had settled.

10:30 (Approx.) Started to pull pipe.

Drilling at interval 4395 - 4406' (during
which no very hard zones, but did show
some variation - from 2 inches to lower
end).

June 2, 1950. Wednesday. Very cloudy

11 - 30 AM. Time to pull pipe,
but on each barrel, but hole
on each barrel -

2:00 PM - Pipe still stuck
down - 1/2 light cement
fluid pouring off frequent
blows - 1/2 foot of hole,
- showing in part of
string, it goes in all holes -
3) Not serious but good to know.

3:15 PM. Have stopped. It is
going to go whether they let
down or pull back out of the
hole. After working in
around, danger of having con-
crete - which by cuttings
could be dangerous to free hole.

4:00 PM. (approx) - get on it

Foram-algal (?) detls.

Notes on Core #13 in 4406-4431

White, dolomitic, foraminiferal ls. with many short rod-like bodies that are probably algal, with fine detritus. Larger forams include type with inflated central area and wide wavy border (note marked spec. in 2nd oriented piece from top).

Molds of gast + coral present in small unoriented, denser piece (2nd from bottom).

Bottom piece is 5" oriented section with numerous forams and molds of coral and strongly ribbed polycypods, mold of gast, etc (note marked mold of ribbed cupulid). This part of core hard and cavernous.

Part of top piece sent to Calc as sample Y
(6/5/52)

on bottom of core to
circulate for 10 minutes before
using. Bill Springer was
mainly interested in the

16/5/52

to bottom of hole to
circulate for 10 minutes before
using. Still 5 pumps and
nearly "flooded" of hole
substructure by electric
shock during the efforts
for the hole.

4.20 AM, Core drilled. Dne 3-foot
interval and then 1-foot intervals
drilled at 1 ft per minute. Rest
drilled at 2 ft per minute.
TOTAL 4406 = 3'

Core #13
4406-4431
1215 AM

7.00 AM. Reamed 1 foot
5 oriented pieces of recording
logs. Reamed without log
along the interval. Two intervals
drilled to add - 10 minutes

JUNE 5 ~ THURS ~ 8 AM - 4 PM ~ Field

Working on drilling line and brakes
10:45 AM - start into hole with rock bit. Bit hit
200' casing at bottom - had to be raised
to a level to be raised.

5:00 Drilling at 4:30 started.

8:00 AM - 11:30 AM

Drilling at beginning of shift. Drilled
to 4500 at 4:57. Then mixed part of
and (105 bags Topjet 423 bags Empormax).

Started to pour concrete at about 7:30.
8:15 Started to pull pipe. Total inserted.

Duration of run at 1000 depth was 10 min
 a time for the run. The hole was 10 ft deep
 and was found to be in clear by 200 ft.
 Hole closed by derrick stand to be
 2500 ft.

Total reading - 2 1/4" in diameter at
 2500 ft.

11:00

Eye out of hole

11:10

Core bit put in barrel & began to
 run pipe at hole.

June 6. Midnight - 8:00 AM

12:40 AM, Core barrel on bottom.
 Circulation of mud was
 in very poor condition. Success
 Core barrel went to bottom
 meeting no resistance from
 accumulated cuttings whatever.

1:15 - Core drilled in 14 1/2 minutes
 as follows

4500 - 4505	at 1/2 min per ft
* 4505 - 4507	" 1 " "
4507 - 4508	" 1/2 " "
* 4508 - 4513	" 1 " "
4513 - 4516	" 3/4 " "
* 4516 - 4520	" 1 " "
4520 - 4521	" 1/2 " "
* 4521 - 4524	" 1 " "
4524 - 4525	" 1/2 " "

* bit set for core.

Add notes on Core # 14 - 4525 - 17525'

Larger forams from bottom of top piece sent to Cole as sample AA- 6/6/52. These forams are scattered through many parts of the core but more in abundance. Small oyster (in vial) from 16th oriented piece from top fragment of Platan from 17th - little in shell.

Sent sample BB from 13 oriented piece from top to Cole 6/6/52 - has large forams and small globular type.

Both Eocene b - B.B has few discolymids - Cole 6/19/52

16a

Core # 14
-4525

4.25 AM

Recovered 79 pieces oriented
Core, G.F. = 37% recovery

CORE #14
4500-4525
(5' section)

4.25 AM

Recovered 79 pieces oriented
core. 8 Ft = 37% recovery.
All but ~~the~~ bottom 6 inches
a fine grained dolomitic
sandstone. Last six inches
a soft - whiter coarsened dolomite
in a ~~clayey~~ silty matrix.

Dense clumps or globules of
creamy white dolomite in clotted.
Five pebbles (all less than 1 inch
diam) of green dolomite with
many white, (effervescent
in acid) smaller, fragmentary
pebbles to core immediately
next to 5 ft.

Notes on core

Four distinct lithologic types
are recognized in 8 ft of core.

1) Mostly 7 1/2 feet is a fine
grained dolomitic sandstone. Much
of it is recrystallized. Minuscule
L-shaped (or T) crystals, very
clear crystalline grains with
no crystal face apparent, some
smaller, some ^{or + real} recrystallized. Minuscule shell with
surface placement of Artaria
At the bottom was found Artaria
Limestone to 5000 ft

Two larger items
Vertebrate bone fragment (P) ✓
(1st piece lower mandible) [to be used for] ✓
The 2nd oriented piece of bone
from bottom in the lowest
example of the lithology in type
in bottom surface of this piece
are indications of what is
described as the 3rd lithological
type recognized in the core.

of fragments
15

2) Except on one oriented piece
of bone recovered from bit
of core barrel having
the 3rd lithology in type, the
rest is made of thin
concrete of small angular
pieces, the largest of which
is 3 inches across, and about
1/2 pound of fairly rounded
& smooth white, very
fine, possibly cemented or held
together by a mass of silt-size "pale"
clay (possibly pebbles) of
hard stone, (granite is
so indicated in some of
the larger pieces).

Many small, porous, sea urchin
fragments. Stout stained bristle green
crust piece

3) Mixed with the material described

From Camp ...
...

under a stone were five
pieces of a coral type of rock.
The largest was pulled out on one
side corner, its diameter about
1/2 inch. Many smaller ones
found, mostly quadrangular,
a few larger, found in a
matrix of stone greenish to yellow
gray color. Some crystals, always a
few, to minute number
of bright green (illuminated??)

The one best piece recovered
from ... Well cemented
coral rubble, Maldivian forams.
corals (small or mold)

2:30 AM - back in hole with
rod bit. To dawn 4:30 - 4:35
intermed. To core 4:35 - 4:50
unsuccessful attempt.

June 6 - Fri - 8 AM - 4 PM - Ladd

8:00 AM - started out of hole, having returned
to bottom of last core run - 4:50
10:00 - into hole with 2 core bit
12:15 - partially plugged with bit - pull up 2
stands and circulate
12:45 - start out of hole to get bit
2:45 - out of hole

cut in diamond barrel sheared off and
dropped into hole with spring - a fishing job
to do - without proper junk basket -

4/24/53 -

Drill 2000 ft down to one level. Then
run in a 6 1/2" Hughes DSC bit & drilled
2' of hole from 4525' to 4528'. Found
no evidence of one barrel spring & cut
at bottom of hole. Pipe pulled from hole
(removed). All pipe out of hole. Decision
made to run in core barrel again and
try to take a core, inasmuch as the junk
basket is to have left the hole, perhaps
with a core if it is embedded in wall
of hole in the well at the hole.

Drill 1000 ft to 4500 ft. Recovered

11 - 2 1/2" - Recovering slurry
core barrel. - On bottom
circulating at 2:25 AM.
Core 4528-25

~~4525-25~~

Core 15
4525
4525
(see next)

5.30 AM. Core drilled 25 ft in
25 min. Rate changed from 2 1/2
min per ft to 1 1/2 min to foot.
Recovery 2 1/2 feet = 10%
2 circled pieces = 3 1/2" and 4"
Per formation.

Additional notes on Core #15

4528-4553'

Only ~~one~~ ^{two} pieces oriented - total length in box = 2' 1"

Top piece a 2" rounded fragment of detritic ls. with numerous forams - both large and small in a matrix of detritus, some pieces of which appear well rounded. This piece is porous but not cavernous. Note one section (2 forams) stained gray & green. Smaller forams red, 2nd but sections of larger type appear well preserved. A small for. dol. ls. see also dark plate

Pieces below are coralliferous and definitely more cavernous, algal-like abundant, forams comparatively rare. Traces of dark stain, shells of moll. abundant (both internal & external - gast. + poly - some can prob. be identified; ech. spines, crab claw (marked - correct piece) Siphonoid cast in one smaller piece; gray & green staining on smaller pieces

Impure matrix

(20a)

Working down core but with only rock bit with 10' interval instructions to drill either 1) 300 feet if

20a

Going back in hole with 1/2
inch bit with the following instructions
to drill either 1) 300 feet if
soft all the way, or 2) until
rock becomes definitely hard.

Note on core

Driller said, rock was being
pulled out, but it had dulled
as though it was fairly hard or
expected to be hard. It was
disappointed at getting only soft & Egyptian
rock for that, but the rock is
composed of the rock in hand.
The whole is so coarse and bubbly
that it looks as if it were
and was washed away.

Description of core - Top & bottom

2-12"

Light unconsolidated mass
ranging from 1/4" to 1/2" diam
plus a number of small (1/4" diam
and less) fragments.

2) The whole mass is a fine
chemical sediment, probably identical
to the great mass of the
principal part of the 17.

Very fine and soft.

(See above)

JUNE 7 - Sat - 8 AM - 4 PM - Ladd

- going into hole with 8 3/4 inch bit to 4523
at 25 min start drilling -

- see time record - with 5000 lbs
on bit making average 5' in 3 min

12:20 PM to 4630' - hardening up a little
(2' streak between 4625-30 feet 6 min -
total 9 min for 5 intervals)

1:20 - distinctly harder (4630-45 in
15 min. and 4645-4648 in 10 min
will set up to 9,000 lbs) - decide to
core - circulate until ~~2:00~~ 1:45 PM

correction
- One length
overlooked
- T.D. = 4619'

= 66' below
last core

[- Had 120' cuttings when rock bit was
put to 4553 but driller had no difficulty
getting down + believes we can take
core with out putting mud in hole]

- 3:15 - shut down to repair brakes.

4:15 PM PCT

By shut down for repairs.

3:15 Started to pull pipe left in hole.

3:15 Completed pulling pipe. Then put core
annular bit on + started running pipe into
hole. Running pipe at normal shift to

from 8 - 12:00 - 8:00 - 12:00

at 8:00 AM when bottom + started coming
- at 4619'

6.38. Still working
 Shut down the engine
 because of fuel line leak
 but continued with other engine
 (engine now in overhaul).

June 5 - Sunday 8:00 AM - 4:00 PM Ladd

- Drilling at rate of 1" in 30 min.
- 8:50 - in hole - unable to rotate
- 9:10 - blow safety valve on pump
- 9:25 - able to rotate - but only momentarily
- 11:00 ± loosened for short time - tightened again

46.19	- 20	14
	21	27
	22	31
	23	30
	24	27
	25	28
	26	31
	27	31
	28	33
	29	25
	30	20

26-27-28-29-30

ONR
 Rept. 7

- shut down at noon to refill pits
- 1:10 PM - blow safety valve on pump again
- pulling with 140,000 lbs. max. pressure of air
- 3 PM - can raise 3' - Springs clipped
 this air pipe stretch (2-3" per 1000)
 - blow out - sub (2-3) - (still doesn't)

make 5'!) classed bottom of pipe not moving. — [Pike claims 1' per 1000 pipe stretch] — Jan sub is not functioning.

May be extremely cavernous interval immediately above impervious basalt (if no zone of iustaceous mat. is present), all of our water may be going into this zone and not lifting new (+old) cuttings to higher levels.

Ladd's guess —

Core #15 - 4528 - 4553

Top basalt 4610 - or slightly higher

- Core #16 - 4619 - 4630 = 11'

4619

4553

66' lost interval. { 57' dol ls?
9' basalt?

16

Return

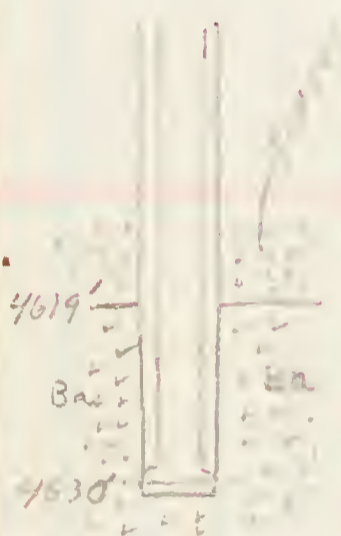
This shift should be called velocity shift. At beginning of shift, still trying to test stick out, core barrels, and for drill collar by

Scratching the pipe could not be done by letting it whirl over. Rotation of bit apparently impossible; when tried, Kelly would wind up about 2 turns, motors cough too stop & Kelly would unwind. This was not tried often for fear of loosening pipe connections.

6:55 ± Started mixing mud with the somewhat desperate hope that it might loosen & carry out the cuttings from bottom of hole. To this time sea water was being pumped successfully into the hole - no return of water naturally, but at least it was going down 4' away from the bottom of the hole. At around 8:30 PM the mud was pumped into the hole with little hope or enthusiasm except that shown by the drillers who again tried to stretch & joggling the pipe within the rather limited range. Opinions were divided on whether or not the jaws were jamming. But soon after the mud was pumped into the hole, it was discovered that although the mud had failed to loosen the cuttings, it had managed to seal off the last exit for drilling fluid of any kind. No water could no longer be pumped into the hole! Drillers like to have circulation, of course, and they considered the situation at this point unfortunate & definitely undesirable.

The best theory advanced (and perhaps the only one) for complete loss of circulation was suggested by Dr. Ladd, who proposed that the zone directly above the last drilled rock (lastly, presumably) was either cemented

110 200 2000
20 4 200000
2000 20000



on an effort for the cuttings. The hard work was done & will not take long. Hence the mud simply sealed off the porous rock, above which was a mass of cuttings which contained the burst. This would indicate a porous zone above 4619'.

At about the same time as the mud was sealing the hole, and while the derrick alternately put up to 140,000 lbs. tension on the rope & then dropped the pipe, one of the guys which came loose during the derrick in being prevented by once told a thousand who were watching proceedings from a semi-reclining position in the new record the "sitting stand jump" is 10'. This difficulty was caused by the clamps on the dead-end cable working loose. This supports the Russell theory that a load 140,000 lbs. are being pulled on this rig, & the watchers should be at a distance beyond the reach of a falling, 96' derrick.

The last reported incident brought some comment about similar possibilities on a drilling job over water.

All hands participated in repair of the cable, after which, and with virtually no fanfare, the crew prepared to "shoot the pipe & back away." By the end of the shift, a cable was being wound on a drum at the drawworks & shot wire & other dynamic equipment was being unpacked.

All during the day, & hip-sticking was a

rest out rather remote possibility. The last
 calamity of the night was the information
 that only one core barrel came with the
 rig and the, alas, lay $\pm 605'$ (to $\pm 600'$)
 directly down - soon to have its thin, steel
 thread of contact severed. Unless the core
 barrel could be recovered ^{by} washing down and
 fishing, the saga of F-1 might be ended
 with victory in our grasp, but without ability
 to bring it to us.

we P 1 P 2 No
 we we we we

11:29 The little snag - consistency it was dis-
 covered at the end of the night that the clutch
 on the sand-line cross was finger to the south.
 Opinions differ on the cause of this mal function,
 but not of the effect. No matter - as far as
 this chronicle is concerned, it's a coat-to-
 Newcastle deal.

June 9, 1957, No. night - 1:00 AM Russell

Entire shift spent in repairing
 clutch.

June 9 ~ 8 AM - 4 PM Luedy

Rigging shot line; in twisting prior to
 firing, broke at 2500' \pm ; strings shot placed
 126' off bottom - failed to loosen;
 prepare to set second 186' above bottom.

4630
44.75

137

4630
44.34

197

4630
43.79

257

4630
40.62

581

4630
37.60

780

4630
37.50

780

2 PM. 11/24/94

Water shut off part way to shut
pipe loose. 4 changes tried:

- 1) 44.79'
- 2) 44.34' min. fixed

4 P.M. - 11:30 P.M.

Russell shot & spent trying to shoot
pipe loose. 4 charges failed:

- 1) 4435'
- 2) 4438' mis-fired
- 3) 4377'
- 4) 4069' mis-fired

None of above were successful.

11:30 P.M. - 5 A.M.

Russell sleeping - hole being
shot - over & over again. See
drilling report & summary below.

JUNE 10

8 A.M. - 9:30 P.M.

Still shooting!

4 P.M. - 11:30 P.M.

Still shooting!

9:05 P.M. Shot hole at 3450' successfully.

Summary of shots:

- 1) 4437' - 151' from bottom - fired
- 2) 4438' - 191' " " - did not fire
- 3) 4378' - 251' " " - fired
- ~~4) 4071' - 581' " " - did not fire~~
- 4) 4070' - 560' " " - fired
- 5) 3760' - 870' " " - did not fire
- 6) 3760' - 870' " " - fired
- 7) 3750' - 880' " " - fired & freed
pipe.

Notes on cuttings - (cont.)

650-710 - Similar to last but very rich in well preserved corals and mollusks and some smaller forams. Moll. fauna mostly gast. (Strombus, Cerithium, Phis, Vermatulus, Polinoid, Turbo (opercula), etc.) suggesting intertidal or shallow lagoon conditions; many shells worn - resembling those concentrated in pockets on reef flats by hermit crabs) - pelecyp. incl. Arca, venoid, Cardium, chama, etc.

small selection
corals from
each 10' G.
well.

680-690 particularly rich in Strombus & other moll.

Butth
Weakly cemented limestone consisting of well preserved fragments of coral and shells in matrix of fine detritus

690-780 similar to last; large moll. less abundant and more fragmentary; some of samples (e.g. 770-780) have well-rounded coral pebbles

800-810 - similar to last

few corals
in wells

810-820 corals and moll. similar to above, with pieces of gray carb. clay and lignitic material.

820-830 - like last but carb
frag. rare - prob. only continuation

830-840 - coral and shells; coral
broken and rounded (up to 1 1/2");
many frag. large pelicy.

Carthage
wells

- shells (richest sample yet)
and small frag coral, many worn
brown, lenticular forams in smallest
fraction

840-850 similar to last - with small
amt. gray carb. clay

850-860 - coral and shells

Carthage Wells

860-870

870-880

Carthage Wells

880-890

890-900

900-910

910-920

920-930

930-940

940-950

950-960

960-970

No essential change

1040-1050

of white limestone

Fine, calcareous, consisting of small fragments
of coral, Halimeda, thin-shelled pelicy, and micro-
gast, Forams are numerous + varied.

1050-1060 - white coralliferous ls - Fauna of coral & shell fragments quite different from last - many brown fragments in fine fraction prob from above [This sample and last look suspiciously young - both are small and were collected just after we regained circulation]

1060-1080 - no cuttings

1080-1090 - white ls - similar to 1050-60 -

1090-1100 - white coral fragments mixed with sharp fragments cream-colored, dense limestone, shell fragments rare, few pieces yellow calcite. - still looks much like mat. from near top of hole

1100-1110 - white, tan - and cream colored ls. Higher percentage of tan & cream colored fragments than above. gastropod molds, micro mollusks. Marginopora, coiled foram with long axis (Alveolina?) in vial. Red foram Homotrema?

Many worn, smooth fragments also many sharp edged ones.

1110-1120 - Generally similar to above - Some red fragments are Tubipora others Homotrema, Echinid spines, micro mollusks with - Original shells, calcite xls, Textularia Rare mollusk molds, Calceolaria Other small forams. Broken Halmieda (D)

1170-1130 - No change -

1130-1140 - Similar to last 30 ft
except that there is a higher
percentage of angular dense,
~~buff~~ cream colored ls fragments.

1140-1160 - Fine fragments of cream
colored + white ls, similar to
above - Except sharp angular
dense ls fragments quite
rare + fragments with chalybe
appearance in abundance.

1160-1170 - No change

1170-1180 - Fine cuttings, mostly
fragments with chalybe appearance.
Practically no sharp edged
dense fragments. Trams and
coral fragments most numerous
of recognizable organic
remains but ~~there~~ even there
relatively few. Practically
none of the more molluscs,
molds red fragments as common
in samples from 1100 - 1140.

1180-1190 - Similar to above - Rare
but well preserved omotremia

1140-1200 - Mottled, shaly, appearing
fine fragments - Micro-mollusks
reappear. Many small forams.

1200-1210 - Similar to above - seems
whiter. Calcium in good
preservation.

1210-1220 - No change - from 1200-1220

1230-1240 - No change -

1975-1978 - Mottled, cream colored
ls. fragments. Much
contamination from cement
for casing.

2020-2030 - Tan ls. Many
well preserved coral fragments,
forams, mollusk shells. Few
dense ls. fragments -

I believe this to be principally
contamination in the hole.
Note that core is hard
dense ls. with few fossils -
that from 2020 to 2130 the
cuttings are all uniformly
hard & white - & lack fossils.

2130-2130 - Sharp angular cuttings
white dense crystalline ls.

little or no recognizable
organic remains.

Sent Samples CC and DD
from core # 15 - 4528' - 4553
to WS Cole for age determination.
Both samples are unoriented pieces,
about 1 1/2" diam, ~~to~~ from immediately
above the bottom-most piece of
oriented core.

Copper nitrate staining
method for distinguishing
Dolomite from Calcite

Copper nitrate is the salt of a strong acid and a weak base; consequently its aqueous solutions show pH values considerably less than 7. That is, they act as a weak acid, and do etch Calcite much more rapidly (cold) than Dolomite. Copper is adsorbed on the etched surface of the Calcite, but not on the Dolomite. This gives the Calcite a light blue-green color, whereas the Dolomite remains (practically) uncolored.

Treatment of the sample with a strong solution of ammonium hydroxide heightens the contrast very greatly; the Calcite becomes a deep uniform blue, while the Dolomite is still lightly colored, or not at all.

For best results the specimen should be compact and well polished. For such a specimen the following procedure gives the best results:

Solutions used:

(1) Molar solution of copper nitrate. Prepared by adding 188 g $Cu(NO_3)_2 \cdot 3H_2O$ or 255 g $Cu(NO_3)_2$ or 332 g $Cu(NO_3)_2 \cdot 6H_2O$ to 1000 g of water.

(2) Strong solution of HNO_3 (as is normal).

Technique of test.

The specimen is immersed in the nitrate solution in such a way that the polished surface is not against the bottom of the vessel. This can be done in a petrie dish, or similar container, with one corner, or edge, of the specimen resting on a small glass plate, rock chip or wooden wedge. If the specimen is thin enough to permit it, it is best to cover the dish to prevent evaporation. Care should be taken that no air bubbles adhere to the surface.

Exposure should be for
time to six hours at room
temperature with a well
polished surface not too
high in calcite. The lower
the polish and the less
dense the material the
more rapidly will the
dolomite grains etch and
adsorb the copper, and the
less sure the distinction
between them and calcite
grains becomes. For such
surfaces and materials, and
for specimens high in
calcite, an etching time
considerably less than
four hours may be re-
quired. - It is difficult to
give rules for the times
required for such material,
for a given specimen the
time must be based on
1) appearance of the surface
after shorter etching time
2) the way the material looks
of the (polished) surface takes
up the $\text{Cu}(\text{NO}_3)_2$ solution.
3) previous experience with
similar material, etc.
4) the specimen is such
that a time match is

than two hours is required to impart sufficient etching to the calcite, then it may not be possible to make a positive distinction between calcite and dolomite on that material.

When the specimen is removed from the nitrate solution it is immersed without washing and before drying in the NH_4OH . A few seconds is enough; more will do no harm. The specimen is then washed and rubbed to remove the excess precipitate, before drying. It is important not to rub a specimen, or wash it violently before it is immersed in the NH_4OH , because the light green stain acquired in the $\text{Cu}(\text{NO}_3)_2$ solution will come off easily.

For further details of this test, and other staining tests, see

Rodgers, John: Distinction between Calcite and Dolomite on Polished Surfaces, Am. Jour. Sci., vol. 238, pp. 788 - 798, 1940. (See p. 39 for results)

Results:

Three core samples from site Flora were tested in the field, with the results recorded below, no facilities were available for giving a real polish to the specimens, but a satisfactory semi-polish was imparted as follows:

a) A plane surface was obtained by using a machined steel plate and a file. The specimen was rubbed on the plate and the high spots became colored black; these spots were then filed down until the black color was removed. The process was continued until the surface became uniformly dark on rubbing on the plate.

b) The coating was filed off, gently and evenly and then the surface was rubbed further by rubbing it rapidly with fine sandpaper.

supported by a wooden
blocks. In the sand grains
some of the paper the
area of contact was
checked and by rubbing
for several minutes on
the almost smooth
sandpaper surface of a
pencil could be given to
compact specimens so
that a definite
area visible by reflected
light. In fact at all could
be obtained on granular
soft surface by the method

Revised from Case no.

