

SCHNITKER / J-G
JOHNSON

TR-100

UNIVERSITY OF RHODE ISLAND
Graduate School of Oceanography

KINGSTON, R. I.
Narragansett Bay Campus

ASAF ASHRAF

Core Laboratory
Graduate School of Oceanography
University of Rhode Island

CRUISE REPORT
TR-100 (CHARLIE)
26 June - 15 July 1971
R/V TRIDENT

SCHEDULE

The R/V TRIDENT spent 19 days conducting marine geological-geophysical investigations in the North Atlantic Ocean. The prime target of this cruise was the Gibbs (Charlie) Fracture Zone which offsets the Mid-Atlantic and Reykjanes Ridge at 53°N. Sediment cores were collected in transit from the Flemish Cap off Newfoundland to the Gibbs Fracture Zone. Three dredge stations were made on the southern section of the Reykjanes Ridge below 60°N. In addition, bathymetric and magnetic data were collected along the entire ship's track from a point E. of Boston to Iceland.

1315 hrs.	26 June 1971	Depart Narragansett
0000 "	27 June 1971	Arrive Boston for radio receiver replacement.
0400 "	27 June 1971	Depart Boston with new receiver.
1000 "	15 July 1971	Arrive Reykjavik, Iceland

SCIENTIFIC PARTY

David G. Johnson	URI	co-chief scientist (Schilling sponsored)	USA
Dr. Detmar Schnitker	Univ. of Maine	co-chief scientist	Germany
Thomas H. Johnston	URI	geochemistry	USA
Kip Barkley	URI	ocean engineer	USA
Richard Plumb	Wesleyan Univ.	geophysicist	USA
James L. Cullen	Wesleyan Univ.	geologist	USA
Elsa Froberg	URI	biologist	USA
Dorothy Hansen	URI	technician	USA
Mark Weishan	URI	marine technician	USA
Jeff Parker	URI	marine technician	USA

SHIP'S COMPANY

Terry Hansen, master	Herman E. Beard, second cook
Robert W. Reusswig, chief mate	Omar J. Palardy, AB seaman
Paul J. Bresun, second mate	Michael Santarsieae, AB seaman
Kenneth Roy Du Friend, bos'n	Frederick F. Russell, AB seaman
David D. Morgan, radio officer	Barry McGuire, ordinary seaman
Theo. J. Gelinas, chief engineer	Anthony Russo, ordinary seaman
Theo. Rebelowski, first assistant engr.	Neal E. Hovey, oiler
Theo. A. Surette, second assistant engr.	Thomas Rosebach, oiler
John M. Ball, steward	Edward J. Midgett, oiler

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OPERATIONS

Two programs were conducted on cruise TR-100. Sediment coring operations were conducted by and for Dr. Detmar Schnitker, University of Maine. Rock dredging operations were conducted by David G. Johnson for Dr. Jean-Guy Schilling, URI.

CORING OPERATIONS (Dr. Detmar Schnitker)

Purpose

Sediment cores collected on cruise TR-100 are the initiation of a study of living abyssal foraminifera from the western North Atlantic. This investigation will test the possible existence of discrete foraminiferal distribution patterns and attempt to correlate these with patterns of deep water circulation.

Method

To define foraminiferal faunal distribution patterns, a series of large diameter (21 cm) sphincter cores were taken on a transect from the Flemish Cap east of Newfoundland to the Gibbs Fracture Zone. This transect lies across the southern Labrador Basin where Norwegian Basin and Baffin Basin bottom water exit together. A series of cores were also taken across the Gibbs Fracture Zone where Norwegian Basin water enters the western North Atlantic and where sediment-faunal distribution patterns are likely influenced by a deep west to east counterflow.

Preliminary Results

Successful sediment samples were obtained at 12 of the 15 stations planned and occupied. Modification of the original station plan was necessitated due to temporary malfunction of the hydrographic winch.

ROCK DREDGING OPERATIONS (David G. Johnson, representing Dr. Jean-Guy Schilling)

Purpose

Rock dredging operations on cruise TR-100 were planned on a multi-purpose basis as follows:

- (1) To systematically sample the 3 km vertical section of the oceanic crust which is exposed along the Gibbs (Charlie) Fracture Zone where it offsets the Reykjanes Ridge and Mid-Atlantic Ridge.
- (2) To determine the extent of volcanism along a mid-ocean ridge offset.
- (3) To sample the southern part of the Reykjanes Ridge crest from 53°N to 60°N in order to supplement further sampling planned for cruise TR-101.

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Methods

Dredging operations on the Gibbs Fracture Zone ridge offset were planned for three pre-selected areas where bathymetry data (Fleming et al, 1970) showed the greatest vertical relief and exposed basement. Rough sea conditions during the cruise however, limited operations to 2 of the pre-selected sites located in the eastern section of the offset. A survey over the offset was conducted to obtain continuous seismic reflection, bathymetric and magnetic profiles. These data were then utilized to determine the best dredging sites. Pre-dredging reconnaissance surveys were also employed prior to dredging at the Reykjanes Ridge crestal zone sites.

Preliminary Results

Three sub-bottom profiles (200 km) across the Gibbs Fracture Zone offset were made. Five dredge hauls were attempted, of which 4 were successful, recovering a total of about 850 kg. Rock types identified by preliminary inspection include fresh pillow and jointed basalts, serpentinites, gabbros and some granitic erratics. Predominance of rock types in dredge hauls from various depths suggest the possibility of crustal layering. This sequence is capped in some areas with basalt which appears to be the result of recent volcanism. Very recent volcanic activity along the deepest crustal exposure of the Gibbs Fracture offset suggests some recent component of extension normal to the predominant east-west transcurrent movement of plates.

Three successful dredge hauls were made between 53°N and 60°N on the crestal zone of the Reykjanes Ridge, recovering a total of about 200 kg of pillow basalt and granitic and gneissic erratics.

Petrological, geochemical and magnetic studies will be conducted on these rocks.

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TABLE 1. SAMPLING STATIONS

Station No.	Type	Latitude	Longitude	Date 1971	Depth M	Operator	Results
1G	<u>Core</u>	48°16'N	46°14'W	2 July	1130	Schnitker	40 cm olive gray soft calc. ooze
2G	<u>Core</u>	48°33'	45°15'	2 July	840	Schnitker	35 cm olive gray cohesive sandy silt
3G	<u>Core</u>	48°50'	44°13'	2 July	1935	Schnitker	5 cm sand with pebbles
4G	<u>Core</u>	49°09'	43°13'	2 July	3915	Johnson	10 cm light brown clayey silt with pebbles
5G	<u>Core</u>	49°24'	42°15'	3 July	4290	Schnitker	10 cm tan calcilutite blue clay below surface layer
6G	<u>Core</u>	49°45'	41°14'	3 July	4375	Johnston	8 cm olive gray foraminiferal ooze
7G	<u>Core</u>	50°02'	40°12'	3 July	4500	Johnson	10 cm tan colored foraminiferal ooze mottled blue below surface
8G	<u>Core</u>	50°19'	39°13'	4 July	4090	Schnitker	25 cm foraminiferal ooze tan at surface blue and mottled below
9G	<u>Core</u>	50°38'	38°07'	5 July	3621	Johnston	failure in 2 attempts
10G	<u>Core</u>	50°56'	37°04'	5 July	3730	Schnitker	winch inoperable
11D	Dredge	52°29'	31°30'	6 July	3680	Johnston	unsuccessful - no sample
12D	Dredge	52°20'	31°31'	7 July	2300-2500	Schnitker	450 kg,*pillow and jointed basalt, 75 kg serpentinite and serpentinitized gabbro

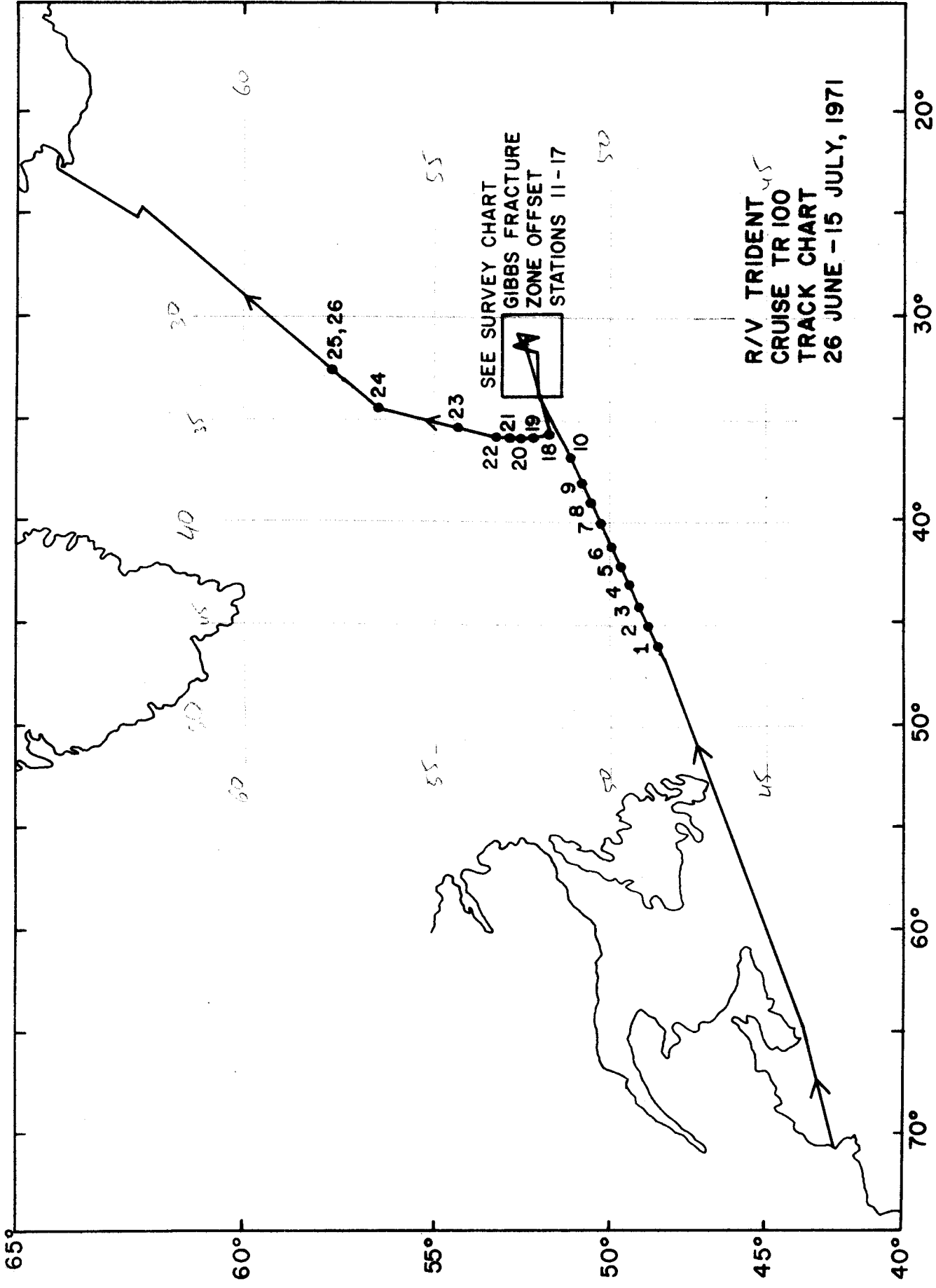
*approximate weights only

TABLE 1. (continued)

Station No.	Type	Latitude	Longitude	Date 1971	Depth M	Operator	Results
13D	Dredge	52°29'N	31°34'W	7 July	3800-4300	Johnston	200 kg. fresh basalt with glass, pillow frags, jointed basalt; some gabbro and 15 kg. sediment
14D	Dredge	52°29'	31°31'	8 July	3150-3400	Schnitker	4 boulders - very coarse hornblende gabbro
15C	Camera	52°26'	31°38'	8 July	2750-2800	Weishan	pinger failure after 4 min. on bottom
16D	Dredge	52°14'	30°59'	8 July	1800-2000	Johnson	13 kg. weathered hornblende gabbro, 13 kg. granitic erratic
17C	Camera	52°19'	31°24'	8 July	2400	Johnson	aborted because of bad sea conditions
18G	<u>Core</u>	51°30'	35°58'	9-10 July	3800	Schnitker Johnson	<u>45 cm</u> tan foraminiferal ooze
19G	<u>Core</u>	52°04'	35°57'	10 July	3350	Schnitker Johnson	<u>0.5 liter</u> foraminiferal ooze (sphincter closed incompletely)
20G	<u>Core</u>	52°20'	35°58'	10 July	3880	Schnitker	<u>15 cm</u> tan foraminiferal ooze
21G	<u>Core</u>	52°42'	35°52'	10 July	3760	Schnitker Johnston	<u>60 cm</u> very soft blue-gray ooze, brown surface layer
22G	<u>Core</u>	53°08'	35°48'	10 July	1690	Johnson	failure
23D	Dredge	54°15'	35°24'	11 July	880	Johnston	jointed basalt with slight Mn coating, weathered pillows, gneissic boulder.

TABLE 1. (continued)

Station No.	Type	Latitude	Longitude	Date 1971	Depth M	Operator	Results
24D	Dredge	56°28'N	34°35'W	11 July	1450-1670	Johnson	2 large gneissic boulders 16 small cobbles
25D	Dredge	57°40'	32°36'	12 July	1450	Schnitker	lost dredge
26D	Dredge	57°41'	32°34'	12 July	1380	Johnston	granitic and gneissic cobbles, weathered basalt pillow fragments



R/V TRIDENT ^{US}
CRUISE TR 100
TRACK CHART
26 JUNE - 15 JULY, 1971

SEE SURVEY CHART
GIBBS FRACTURE
ZONE OFFSET
STATIONS 11-17

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