

CRUISE REPORT

R/V TRIDENT Cruise 29

"Guinerra"

March 14 -- May 20, 1966

AREA

Three legs of this cruise define the working areas: Narragansett - Bermuda - Dakar, Senegal (Lat. 14°N); the shelf area off Portuguese Guinea, Guinea, and Sierra Leone (Lat. 12°N, Long. 18°W to Lat. 8°N, long. 13°W) which constituted the major effort (see chart); and Dakar, Senegal to Jacksonville, Florida on which a local survey was made in the vicinity of lat. 27°N.

PROGRAM

Primary emphasis was on certain aspects of the geology of the continental shelf off Portuguese Guinea, Guinea, and Sierra Leone. The program began with a study of the bathymetry and magnetics in the area which was restricted roughly to the depth zone between 20 and 200 m. Grab samples, cores, and dredge hauls were made at selected positions as defined by the underwater topography. A number of camera lowerings were made in the area but most of the effort was devoted to photographing specific topographic features which were under study along the shelf edge. Sub-bottom reflectivity investigations were carried out in the area with most of the attention restricted to transverse profiles of the shelf. Finally, B.T. readings were made at several stations along certain transverse profiles in the area within the 20-200 m. depth range.

On the outbound leg (Narragansett, Bermuda, and Dakar) an echo sounding record and magnetic record was maintained except for a time of poor signal reception (cause of this condition unknown). A plot of these data was made for this crossing. Mr. James Dodson, General Dynamics - E.B. Division, taped the outgoing and incoming signals from the Edo over many segments of the track on this leg.

On the inbound (Dakar - Jacksonville, Fla.) a continuous plot of the sounding and magnetic data was made. In the vicinity of lat. 27°N and longs. 52°-55°W, a short sounding and magnetic survey was made for Bonnie McGregor as a continuation of her M.S. research work on the Sohm Abyssal Plain.

SCHEDULE

Narragansett, R. I. -- Dakar, Senegal	March 14th - April 4th
Narragansett to Bermuda	5 days
Bermuda	3.5 days
Bermuda - Dakar	12 days
Dakar	1 day

Guinea - Sierra Leone Shelf

April 5th - May 2nd

Dakar

28 days
2 days

Dakar - Jacksonville

May 4th - May 20th

16 days

SHIP'S CREW

	Master	B. Collinson	
	Chief. Engr.	J. P. Symonds	
Ch. Mate	C. Sawyer	Ord. Seaman	P. Devine
2nd Mate	M. Fanning	Steward	P. Neves
Radio Off.	J. Evans	Messman	A. Santiago
AB Seaman	H. Martin	1st Ass't Engr.	D. F. Symonds
AB Seaman	P. Ouellette	2nd Ass't Engr.	T. R. Densmore
AB Seaman	Y. Burnett	Electrician	A. P. Ells
AB Seaman	T. Morrison	Oiler	G. Alves
Ord. Seaman	E. Collins	Oiler	W. Dillon
Ord. Seaman	J. Stohlberg	Oiler	G. Waldeck

Deep appreciation is expressed to the Captain, Mates, Chief Engineer and Crew for their interest, cooperation, and assistance in getting the scientific work of this expedition accomplished.

SCIENTIFIC PARTY

- A. Ashraf
- A. Buddington
- J. Dodson (Narra., R. I. - Dakar)
- T. Kennard
- R. L. McMaster (Cruise Leader)
- P. Petersen (Narra., R. I. - Dakar)
- D. Smith

WORK DATA

On the Guinea - Sierra Leone Shelf the following was accomplished during the 28-day period:

<i>Magnetic Intensity</i>	1,220 miles
Sounding profiles	3,340 miles
Sub-bottom profiles	560 miles
Grab samples	94
Cores	6
Dredge hauls	11
Camera lowerings	20
B.T.'S	60 stations

PRELIMINARY FINDINGS

Within the region of lat. 12°N - 8°N the shelf shows a systematic

variation in width with only a 15-20 mile distance between the 20 m. and 110 m. curves on the north (12°N to 11°N) increasing to some 70 miles toward the south between these curves. This condition is unrelated to any variations in overall distances from the shoreline to the 110 m. curve but is caused by the apparent sediment discharge of the Geba River system on to the shelf which has resulted in a sediment encroachment and therefore, a vast shoal area bordering the coast. Where the shelf increases in width, the influence of coastal drainage is either nonexistent or is restricted to the shelf areas landward of the 20 m. curve. Here the pre-Holocene surface of the shelf is well-preserved. Several major stream systems were encountered on this surface and it seems apparent that trunk channels lead directly into submarine canyons along the shelf edge.

Distinct drowned shorelines were explored along the outer part of the shelf. The stature of these is variable but the tops of these features occur at about 100 m. and 80 m. Sub-bottom records indicate conclusively that these features are in part erosional. Dredge hauls show consolidated rock (sandstone) fragments from the surface of these features but also indicate that some biogenic material may be or may have grown on the surfaces. In any event, these exposed surfaces are extremely hard and difficult to sample. Fortunately, bottom photographs across these features were obtained on several occasions. It may be of some significance that a large bone, some 12 inches in length and about 2 inches in diameter, was dredged from the shoreline at 100 m. Identification has not been made at this time. Although there may be shoreline features landward of the outer shelf the nature of these and their state of preservation does not permit positive identity at this time.

Along a number of profiles selected grab samples were collected. With the exception of a small area around the main Geba River discharge channel, in which siltclays were found on the bottom surface, the shelf is covered with sand which is inorganic but with some shells or shell fragments. Inorganic gravel was not common.

The sub-bottom records show good resolution over the upper 100-200 m. beneath the bottom although the number of profiles run was not as many as had been planned due to several serious breakdowns of the equipment. In general, the strata in the upper part of the shelf are flat lying or dip very gently in both the transverse and longitudinal crossings. At the shelf edge, there seems to be strong indications of upbuilding and outbuilding.

From the B.T. data, the thermocline occurred between 10 and 40 m. with a temperature range of 21°C to 27°C .

COMMENTS

Based on some 28 days of ship work several comments relative to TRIDENT are presented:

Navigation: The West Coast of Africa is recognized as a very difficult region to expect precision navigation because atmospheric haze, currents, and lack of Loran and Decca Stations. With this in mind I took

the VLF receivers on my cruise with the hope that they would provide a great deal more control than the celestial techniques. For various reasons the VLF did not come up to expectations so that we were forced to rely completely on whatever the Bridge could use relative to fixing our position. The results were not good but neither were they hopeless. The point is that if we are going to try and do more detailed work in the Atlantic Basin we are going to have to have better navigation equipment.

Ship's Noise: Acoustic Seismic Profiling is being used more and more each year. Although the source and recording equipment is improving very rapidly we are still forced to recognize that our dear ship is a very noisy platform for this type of work. Undoubtedly the bioacoustic people are concerned with this problem too.

I believe that every effort should be made to investigate this noise problem (i.e. the level and distribution of the noise; sources of noise, bands, and their contributions to the background, etc.) with the hope that some of the sources can be toned down or even eliminated.

Ventilation in Laboratory Space: It is assumed that TRIDENT will operate more and more in the Tropics or sub-tropics during the course of a year. This means that air temperatures will be in excess of 75° F during much of the day and certainly during the daylight hours. Moreover, humidity will be high.

As the lab space is laid out, much of the scientific work involving soundings, sub-bottom reflectivity studies, camera, recordings, and other techniques is carried out in the small semi-isolated area on the starboard side of the ship. Working in this space can be very uncomfortable under high temperature and humidity conditions because of the poor ventilation for this space. Some consideration should be given to improving this situation.

*On the outbound leg Narragansett - Bermuda - Dakar
and the inbound leg Dakar - Jacksonville,
magnetic intensity and bathymetric measurements were
made for Krause / McGregor — 7200 n. miles - magnetic int.
7200 bathymetry.*

