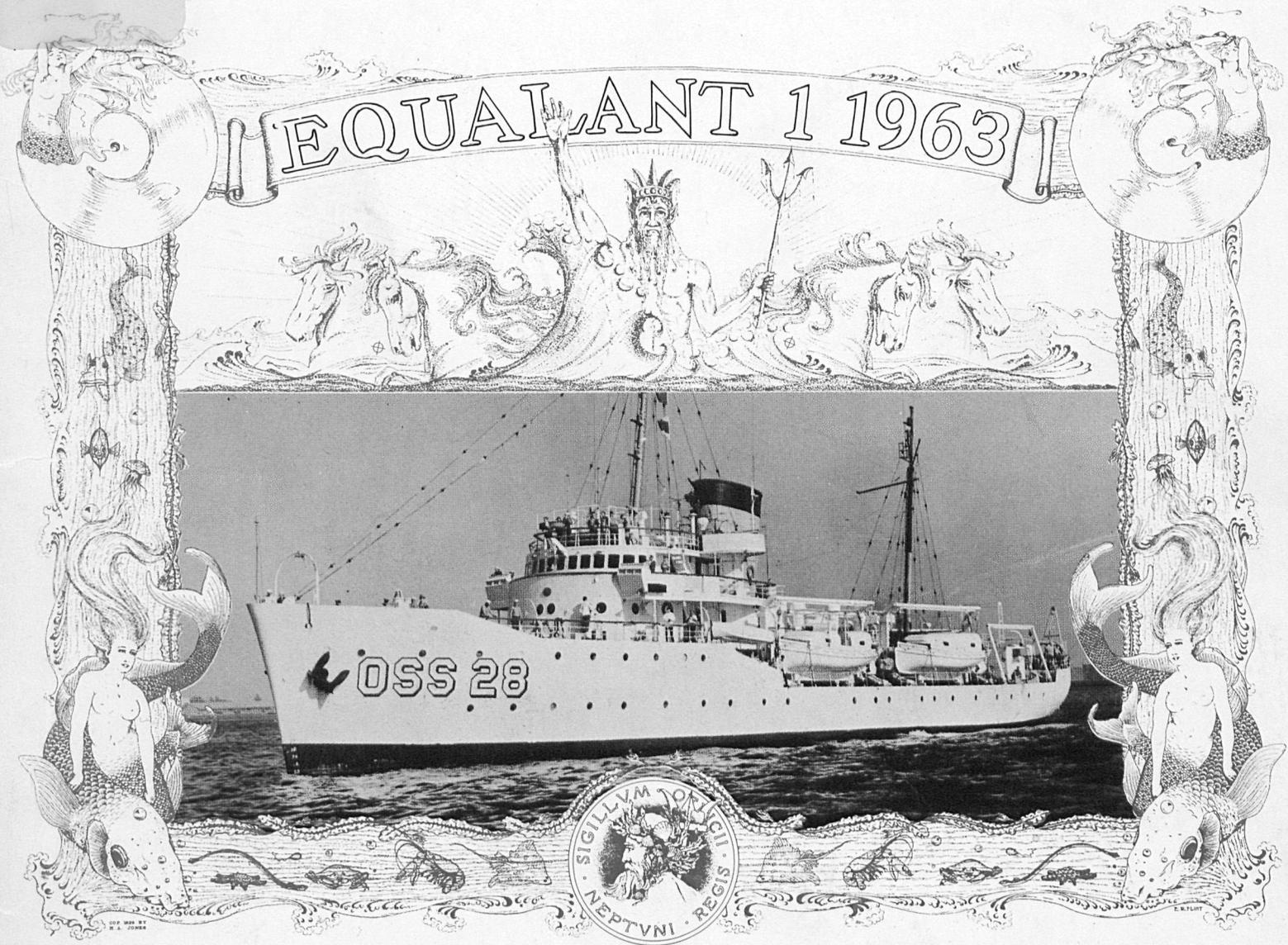


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S. COAST AND GEODETIC SURVEY SHIP EXPLORER



National Oceanic and Atmospheric Administration

ERRATA NOTICE

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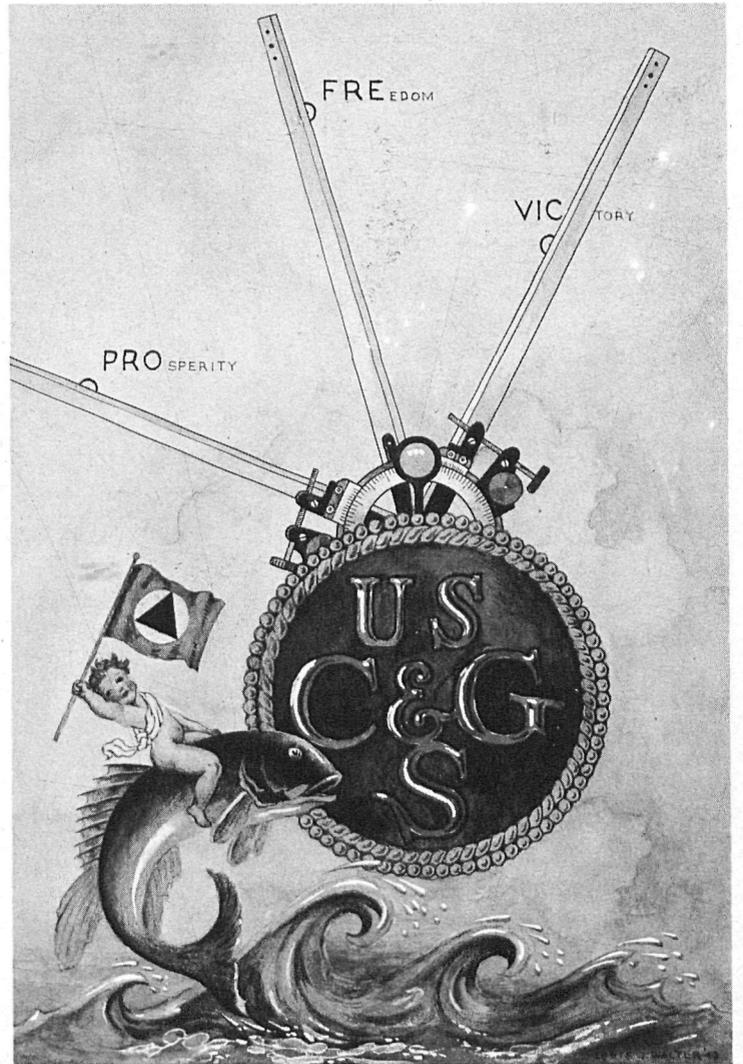
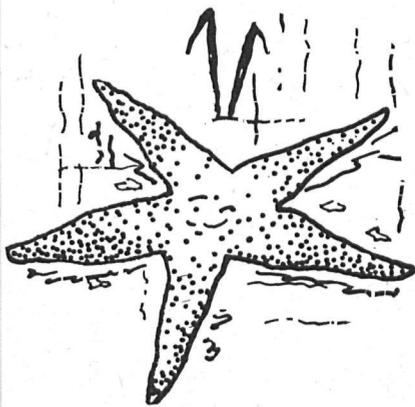
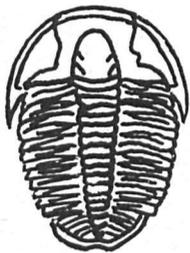
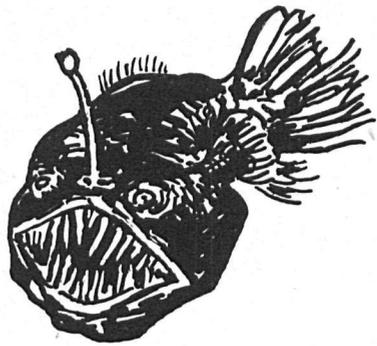
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**INTERNATIONAL
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TROPICAL ATLANTIC**

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Atmospheric Sciences Division
U.S. Dept. of Commerce



H. Arnold Karo
Rear Admiral, USC & GS



EQUALANT I

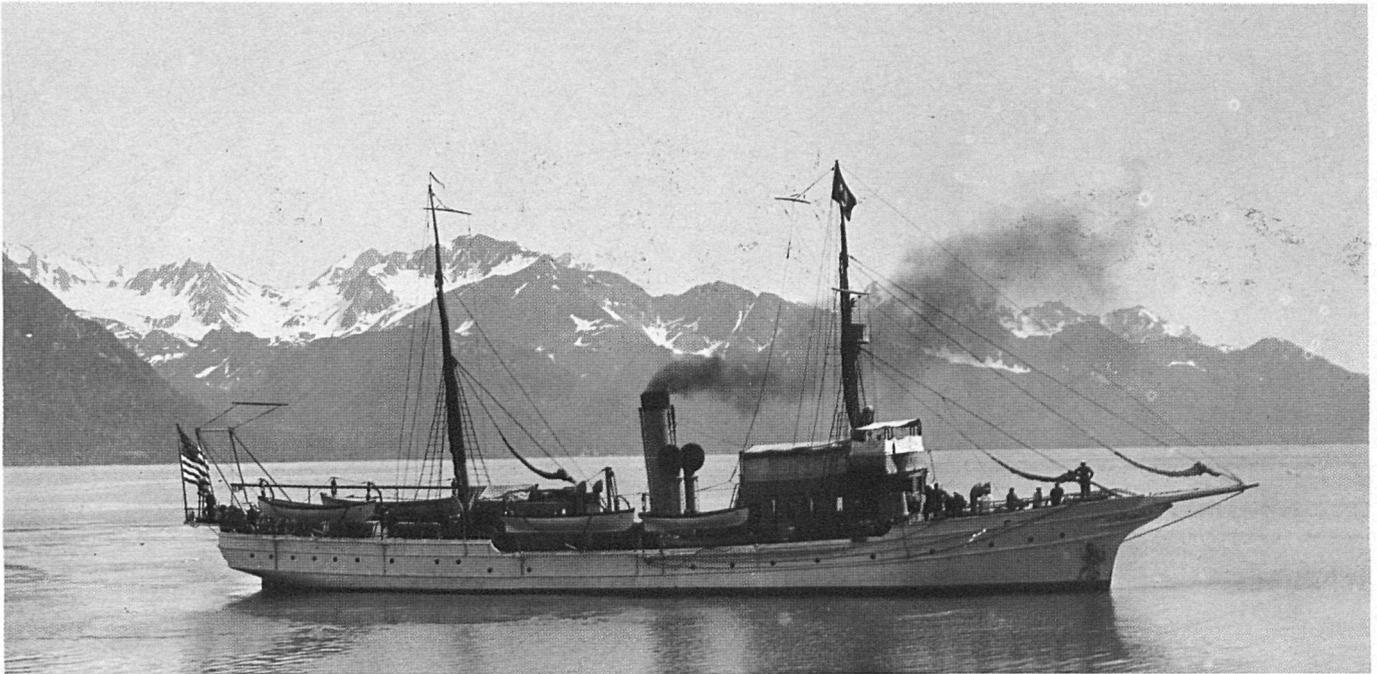
Upon completion, on April 8, 1963, of EQUALANT I of the International Cooperative Investigations of the Tropical Atlantic, the good ship EXPLORER wrote another chapter in the Bureau's modern oceanographic program. All objectives of the technical program were completed in accordance with plans for the expedition.

The photographic record depicted in this brochure provides a visual account of a cross section of the many experiences encountered on this cruise. The EXPLORER has added to her illustrious background as one of our pioneering ships in both Pacific and Atlantic waters.

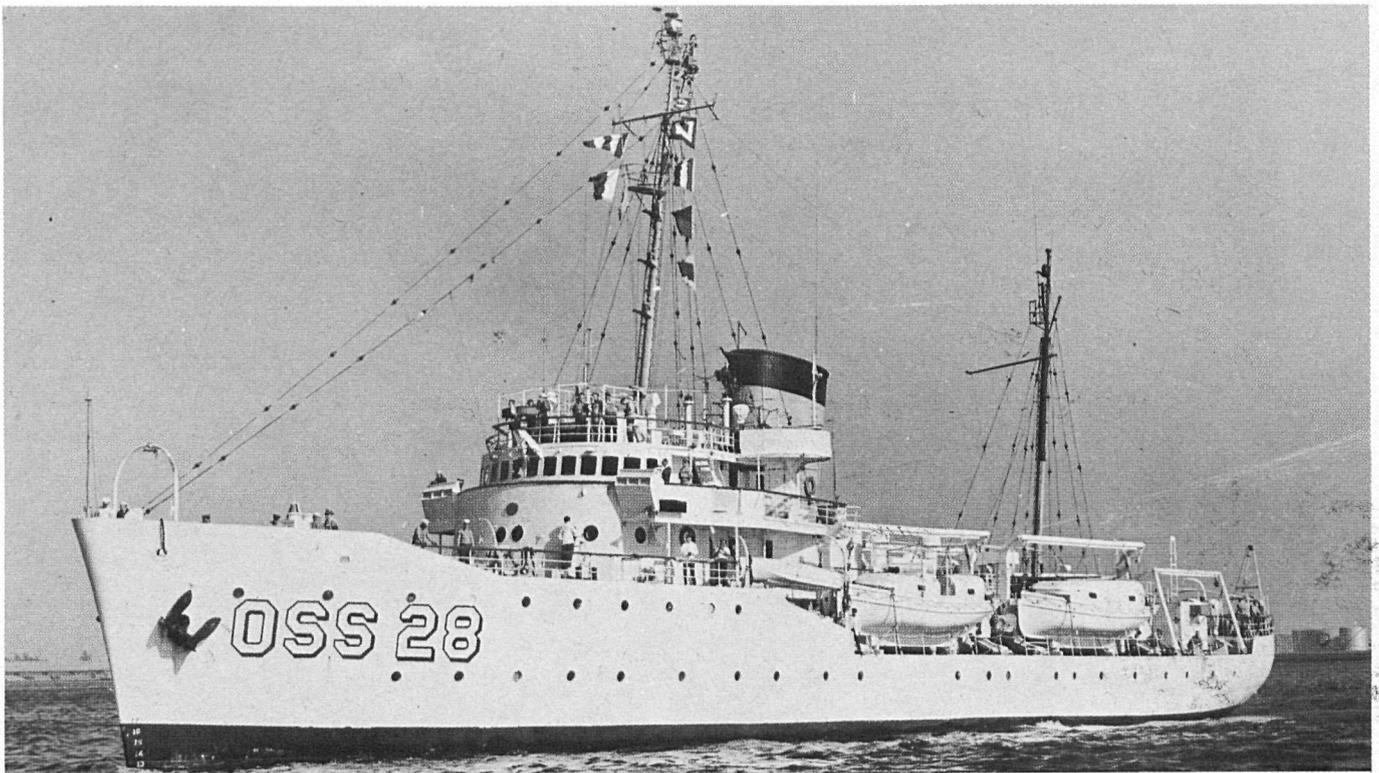
This comprehensive international program is the first deep ocean investigations to be accomplished under the sponsorship of the Intergovernmental Oceanographic Commission of UNESCO. Periodic reports from the ship have written a record of achievement, of which all participants can be justly proud. This cruise book will preserve for each member of the ship's company, as well as all of those in the Bureau who have been intensely interested in the project, a lasting record of a milestone in our expanding oceanographic program.

I take great pleasure in commending the officers, scientists, and crew of the EXPLORER who have written this new record of oceanographic achievement.

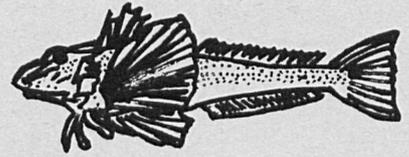
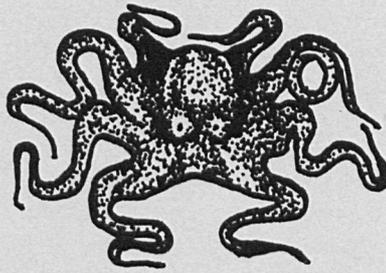
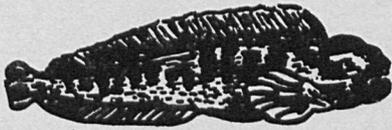
H. Arnold Karo
Rear Admiral, USC&GS
Director



THE OLD USC AND GS SHIP EXPLORER WAS A WOODEN STEAMER OF 450 TONS DISPLACEMENT, 325 GROSS TONS AND 228 NET TONS, WITH A REGISTERED LENGTH OF 135 FEET, A BREADTH OF 27 FEET AND A DRAFT OF 10 FEET. BUILT AT WILMINGTON, DELAWARE IN 1904, THE SHIP HAD AN INDICATED HORSEPOWER OF 400, A SPEED OF 10.3 KNOTS, AND A COAL CAPACITY OF 85 TONS. THE SHIP'S COMPLEMENT CONSISTED OF 7 OFFICERS AND 40 MEN. IT WAS TRANSFERRED TO THE JURISDICTION OF THE U. S. NAVY, IN ACCORDANCE WITH EXECUTIVE ORDER No. 2861, DATED MAY 16, 1918.



THE MODERN EXPLORER, KNOWN AS OCEANOGRAPHIC SURVEY SHIP OSS 28, IS A 220-FOOT, 1900-TON VESSEL, BUILT IN SEATTLE IN 1940. PRIOR TO CHANGING ITS HOME PORT FROM SEATTLE TO NORFOLK IN THE EARLY PART OF 1960, THE SHIP WAS ENGAGED ON SURVEYS AND OCEANOGRAPHIC WORK IN ALASKAN WATERS. THE SHIP HAS PERFORMED SIMILAR WORK ON THE EAST COAST SINCE THEN. HER RECENT CRUISE, IN WHICH THE SHIP PLAYED AN IMPORTANT ROLE IN EQUALANT I OF THE TROPICAL ATLANTIC INVESTIGATIONS, HIGHLIGHTS AN ILLUSTRIOUS CAREER.



United States of America
Department of Commerce
Washington, D. C.

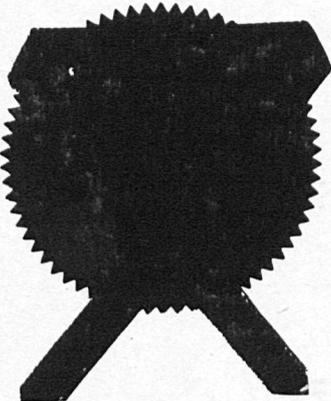
This is to certify that
U. S. Coast and Geodetic Survey Ship
OSS-28 Explorer
a public vessel of the United States of America
is hereby duly commissioned to conduct Hydrographic and
Oceanographic operations in all oceans in accordance with
Public Law 373-80th. Congress, as amended.

Ship Characteristics

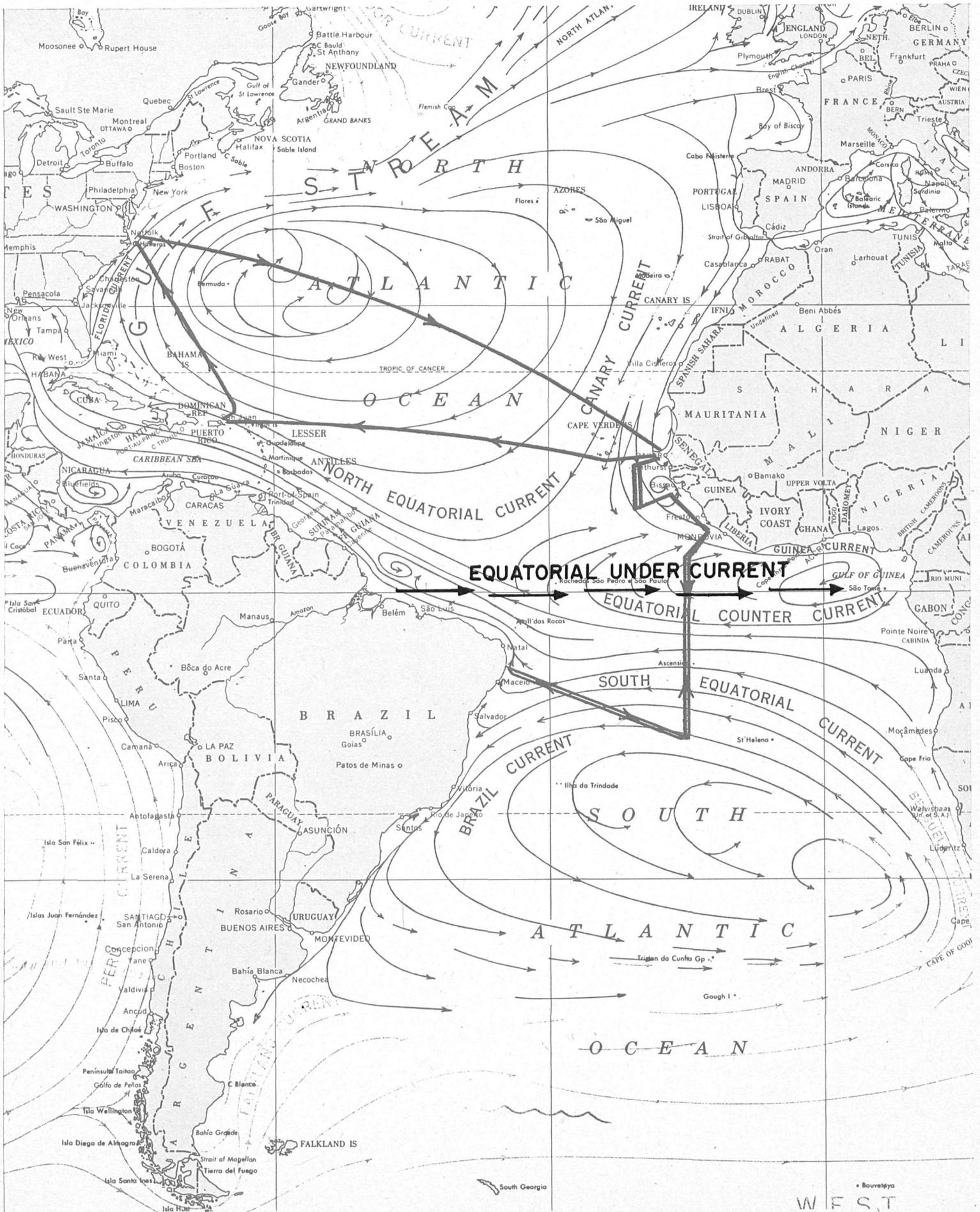
length 220 ft. breadth 38 ft.
displacement 1900 tons mean draft 15 ft.

December 7, 1962
Date

Lester H. Hodges
Secretary of Commerce
Charles G. Laro
Director, U.S. Coast and Geodetic Survey



SHIP'S TRACK 1 Feb. to 30 April



SHIP'S LOG

1 FEBRUARY

DEPARTED NORFOLK, VA. FOR DAKAR, SENEGAL.

14 FEBRUARY

ARRIVE DAKAR, SENEGAL.

16 FEBRUARY

DEPARTED DAKAR ON FIRST PHASE OF EQUALANT I.

22 FEBRUARY

PUT IN TO FREETOWN, SIERRA LEONE, FUELED AND DEPARTED.

27 FEBRUARY - 1 MARCH

PARACHUTE DROGUE TRACKING OF EQUATORIAL UNDERCURRENT.

7 MARCH

COMPLETED FIRST PHASE OF EQUALANT I 15S, 15W AND DEPARTED FOR RECIFE, BRAZIL.

11 MARCH

ARRIVED RECIFE, BRAZIL.

15 MARCH

DEPARTED FOR SECOND PHASE OF EQUALANT I.

18 MARCH

FIRST CONTACT WITH THE RUSSIAN SURVEY SHIP MIKHAIL LOMONOSOV.

20 MARCH

STARTED SECOND PHASE OF EQUALANT I, 15S, 15.52.

25-26 MARCH

PARACHUTE DROGUE TRACKING OF EQUATORIAL UNDERCURRENT.

31 MARCH

PUT IN TO FREETOWN, SIERRA LEONE.

2 APRIL

DEPARTED FREETOWN TO CONTINUE SECOND PHASE OF EQUALANT I.

9 APRIL

ARRIVE DAKAR, SENEGAL COMPLETING EQUALANT I.

12 APRIL

DEPARTED DAKAR FOR SAN JUAN, PUERTO RICO.

22 APRIL

ARRIVED SAN JUAN, PUERTO RICO.

23 APRIL

DEPARTED SAN JUAN, PUERTO RICO FOR DEVELOPMENT OF BROWNSON DEEP.

26 APRIL

COMPLETED DEVELOPMENT.

30 APRIL

ARRIVED NORFOLK, VIRGINIA

STATISTICS

OCEANOGRAPHIC PROJECT OPR-429

SHIP EXPLORER

1 FEBRUARY TO 30 APRIL 1963

TRACKLINES

ASTRONOMIC POSITIONS 1,553
MILES OF HYDROGRAPHY 13,737
MILES OF MAGNETOMETER OBSERVATIONS.. 8,281

OCEANOGRAPHY

NUMBER OF STATIONS 125
BATHY THERMOGRAPH OBSERVATIONS 359
OXYGEN ANALYSES 2,073
SALINITY ANALYSES 2,116
PHOSPHATE ANALYSES 2,121
CURRENT DRIFT BOTTLES RELEASED 1,183
CURRENT DRIFT CARDS RELEASED 1,179

BOTTOM SAMPLES

CORES 7
GRAB SAMPLES 2

EQUATORIAL UNDER CURRENT STUDIES

CURRENT DROGUE TRACKING (HOURS)..... 82
REFERENCE DROGUES USED 9
SHALLOW DROGUES USED 2

METEOROLOGY

RADIOMETER MEASUREMENTS-SEA SURFACE.. 400
TIROS SATELLITE OBSERVATIONS 19
CLOUD FORMATION PHOTOGRAPHS 180
SURFACE WEATHER OBSERVATIONS 336
RADIOSONDE BALLOONS 38
HIGHEST ALTITUDE (FEET)..... 111,847

BIOLOGICAL PROGRAM

PHOTOMETER MEASUREMENTS 29
MICROBIOMASS SAMPLES 149
PRODUCTIVITY SAMPLES 149
PLANKTON HAULS 89
NIGHT LIGHT COLLECTIONS 3
C-14 MICROBIOMASS 350
AMMONIA 232
NITRITE ANALYSES 256
NITRATE ANALYSES 241
TOTAL NITROGEN AND PHOSPHORUS 244
DUPLICATE PLANKTON HAULS 53

SHIP'S OFFICERS



CAPT. JOHN C. BULL
COMMANDING OFFICER
GEORGETOWN, SOUTH CAROLINA



CDR ALLEN L. POWELL
EXECUTIVE OFFICER
LUFKIN, TEXAS



CDR LOCKE L. CRANFORD
CH. ENG.
SPENCER, N. C.



LCDR ROBERT E. WILLIAMS
NAV. OFFICER
RIVERTON, WYO.



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HESSEL, MICHIGAN



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USPHS DOCTOR
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POMPANO BEACH, FLA.



LTJG DEWAINE SEETS
E. PEORIA, ILL.



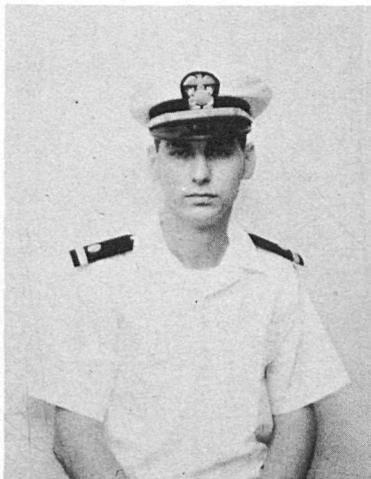
LTJG ROBERT J. LEWIS
GEORGETOWN, KY.



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SEATTLE, WASHINGTON



ENS JON W. DROSENDAHL
KENMORE, N. Y.



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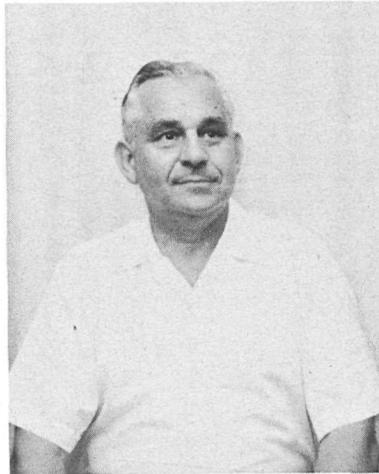


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WHITESTONE, N.Y.

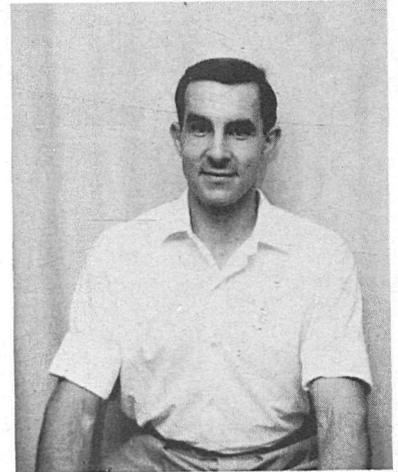
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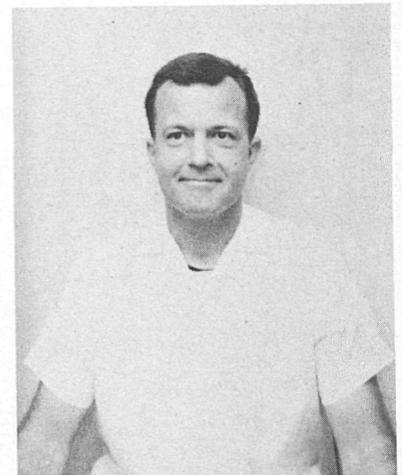
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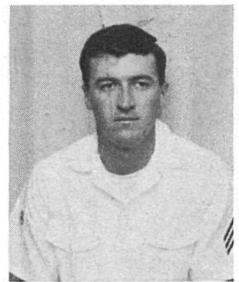
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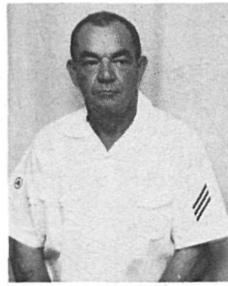
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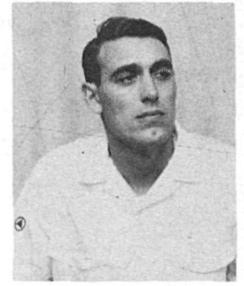
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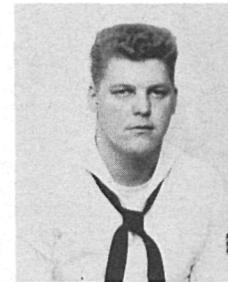
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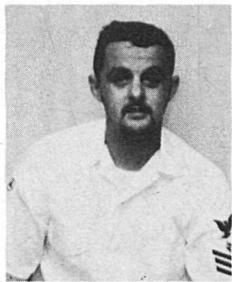
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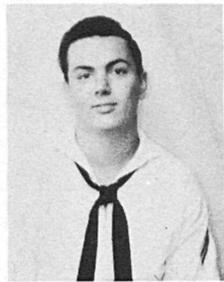
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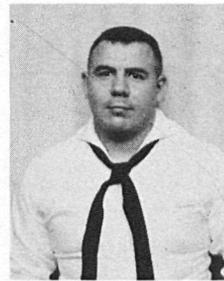
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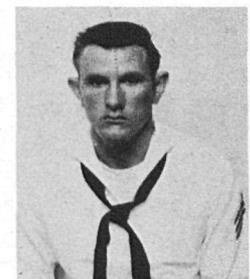
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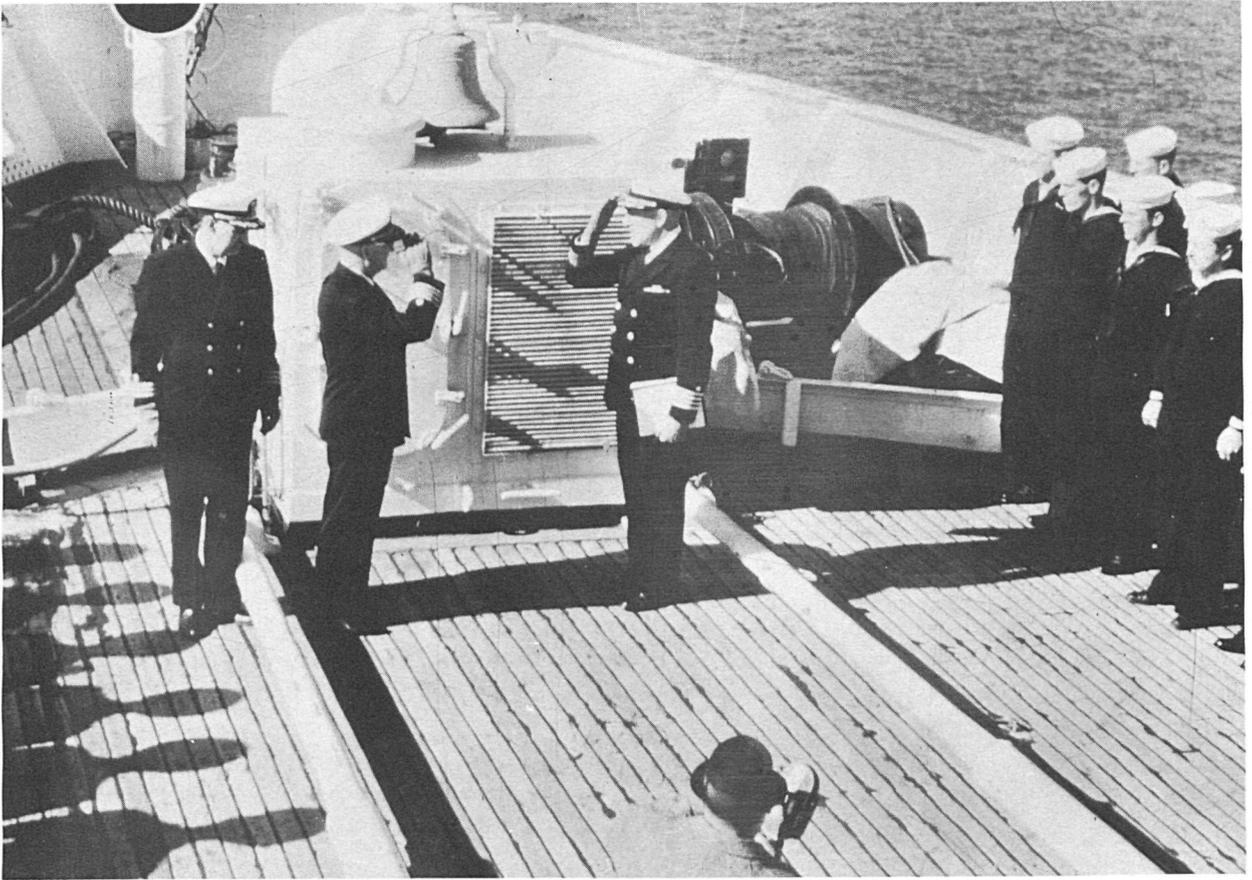
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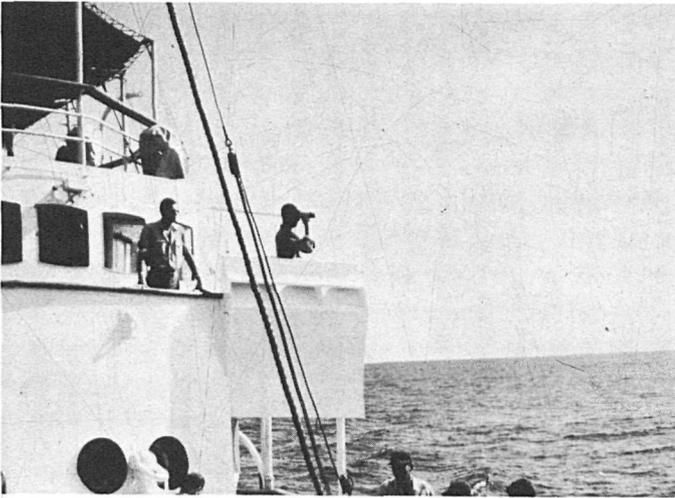


CHANGE OF COMMAND 28 JANUARY 1963
NORFOLK, VIRGINIA

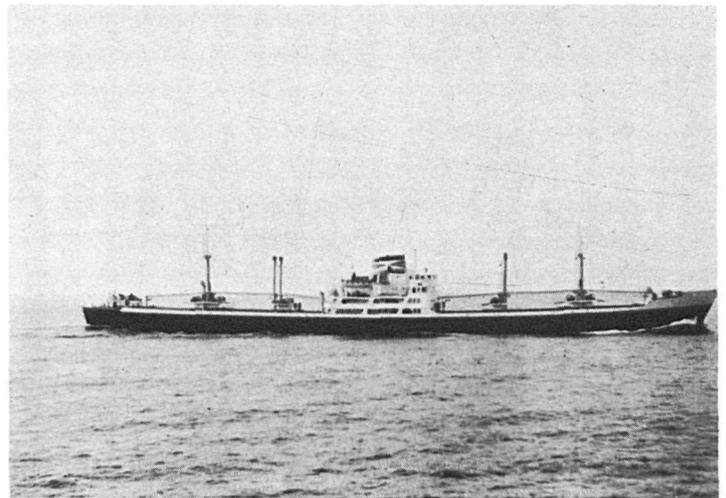


CAPTAIN BULL EXPLAINS MISSION OF EQUALANT I

DAKAR



ENROUTE TO DAKAR



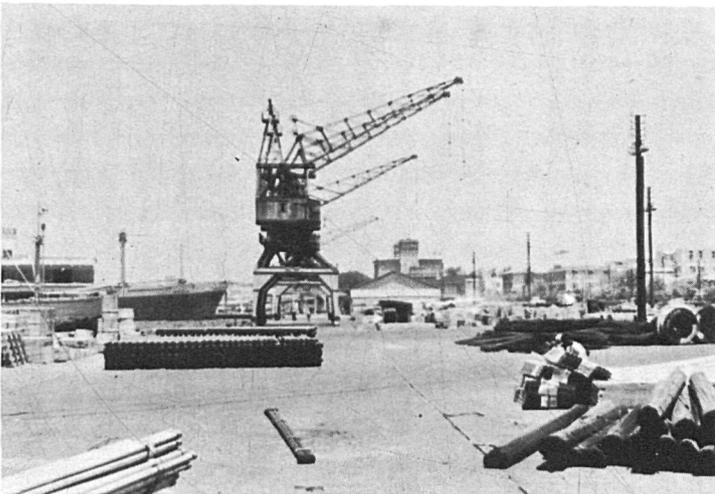
WE MEET OUR FIRST SHIP OFF THE AFRICAN COAST



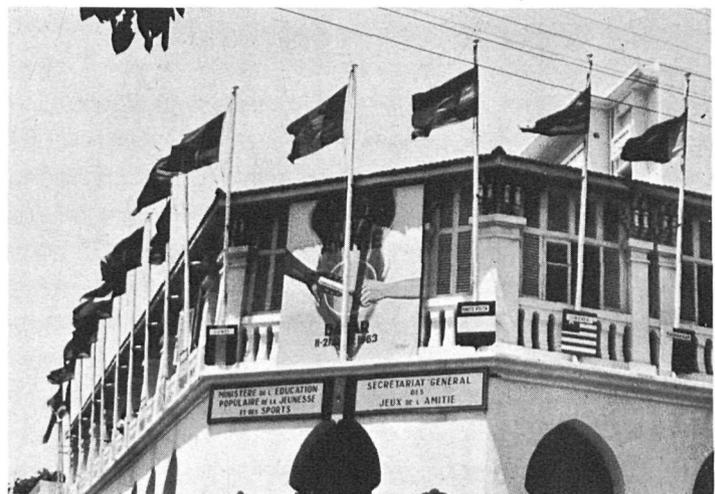
OUR PILOT TAKES US INTO DAKAR HARBOR



ALONG SIDE MOLE 3



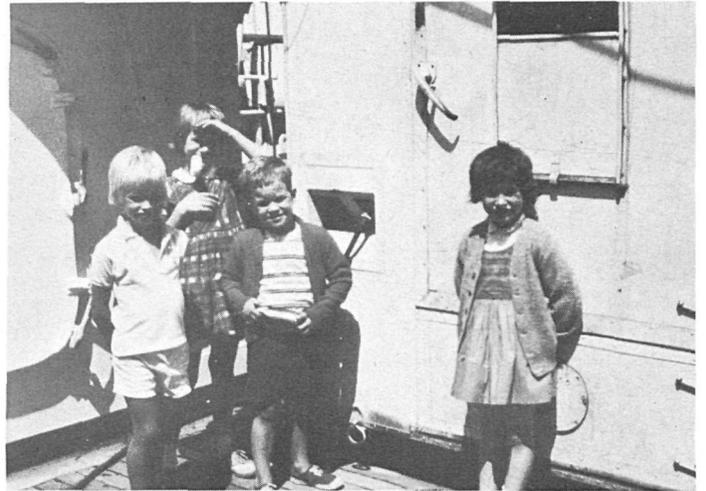
CARGO HANDLING CRANES



AFRICAN OLYMPIC TRYOUT HEADQUARTERS



CHAMBER OF COMMERCE DAKAR



VISITORS FROM THE AMERICAN EMBASSY



CITY MARKET



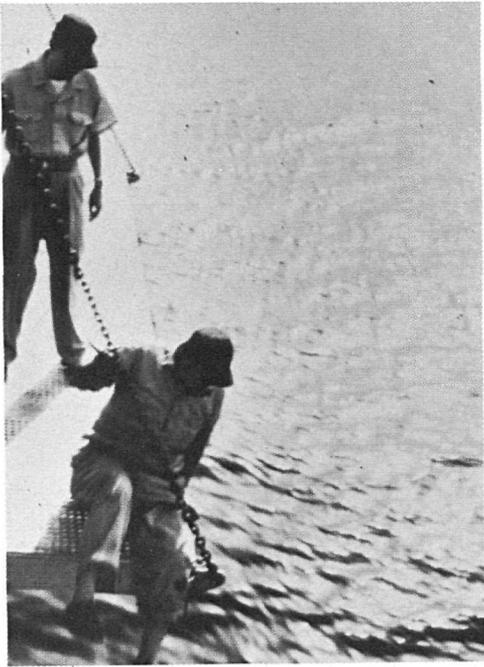
ENSIGN DROSENDAHL ENROUTE TO THE EMBASSY BEACH PARTY



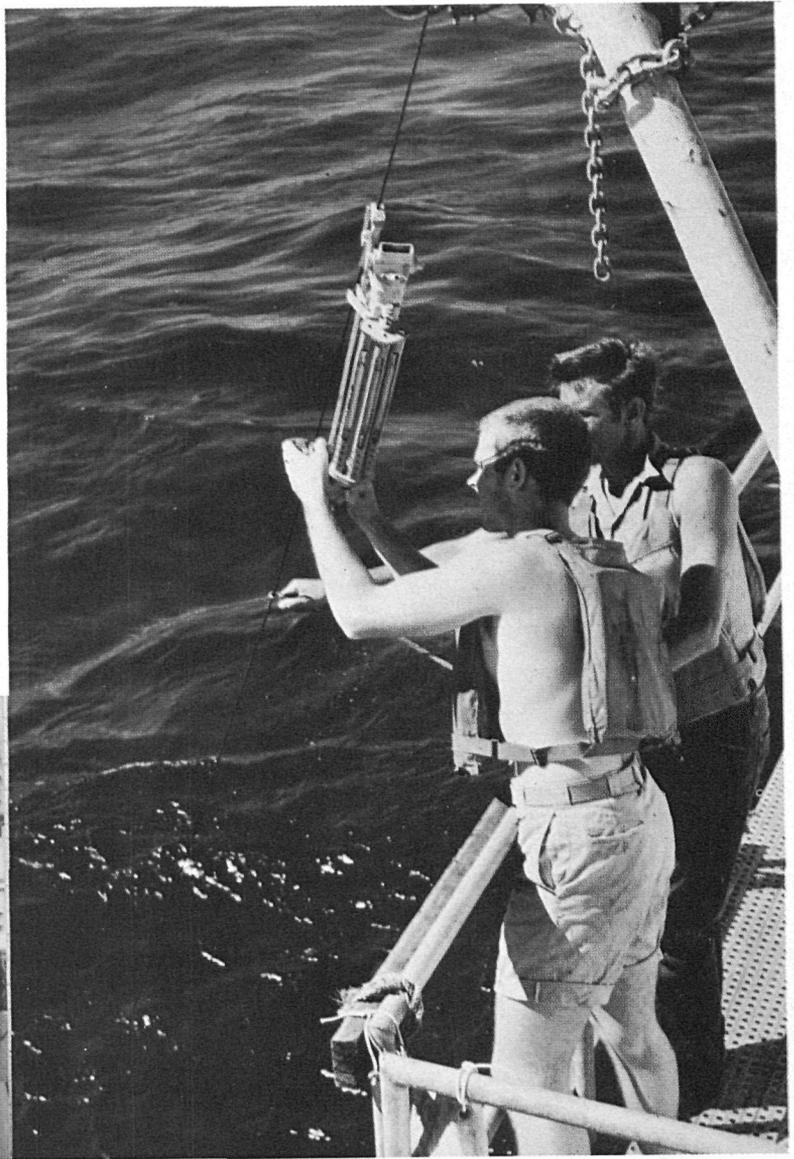
ENJOYING THAT TROPICAL SUN



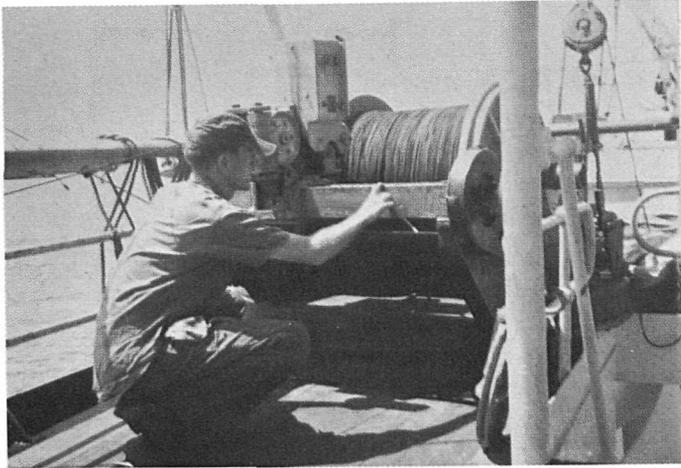
ENSIGN FLEMING GOES FOR A SWIM



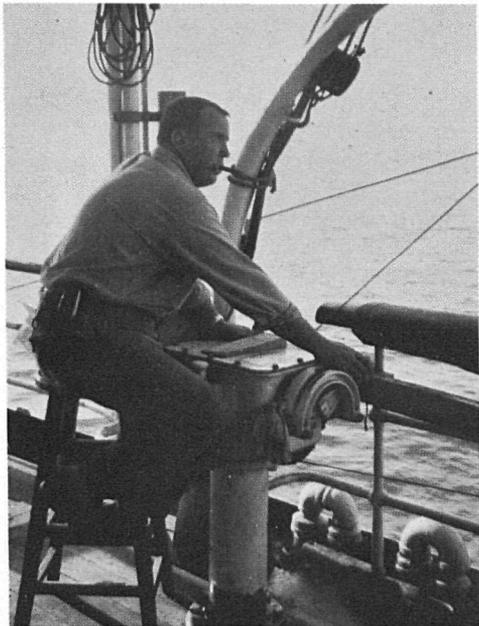
CDR. POWELL RIGGS THE OCEANOGRAPHIC PLATFORM



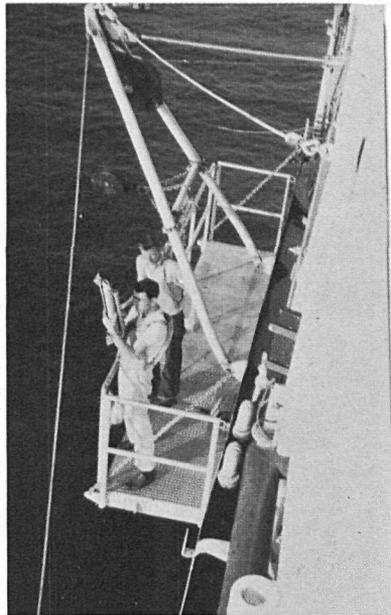
ENSIGN FLEMING ATTACHES A NANSEN SAMPLER



(MM2) HIBBS OILS THE OCEANOGRAPHIC WINCH



(CBM) GOUGH OPERATES THE OCEANOGRAPHIC WINCH



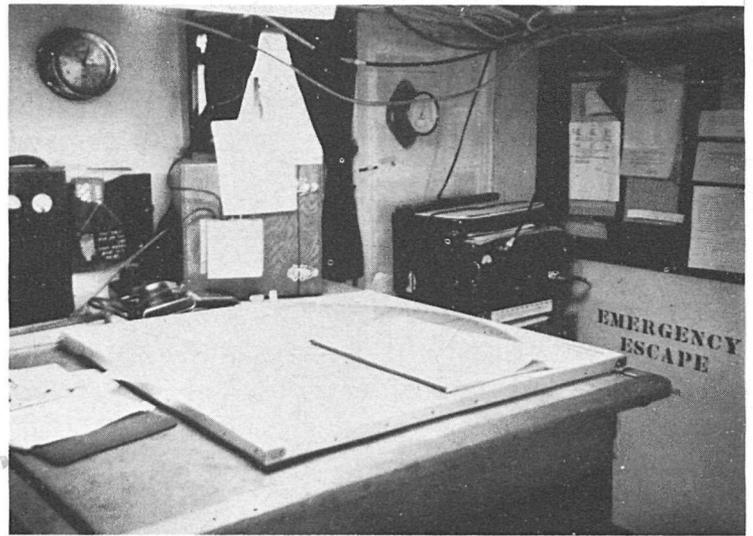
RON REED CHECKING A BOTTOM TEMPERATURE



TAKING IN A NANSEN SAMPLER CAST



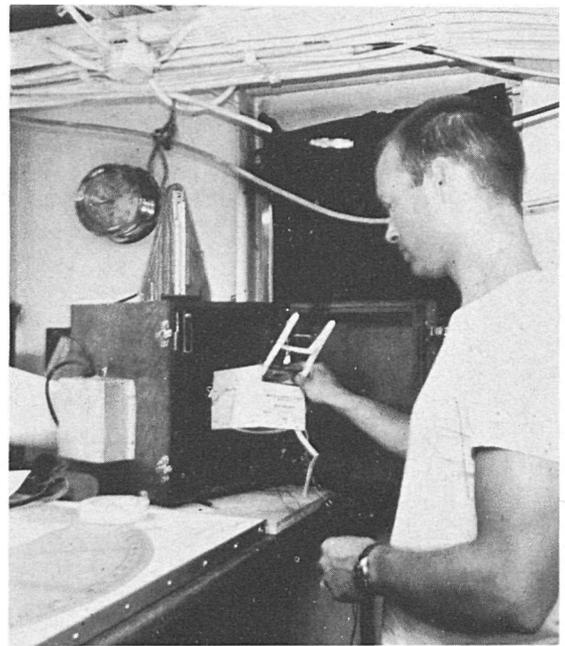
(SA) LINTON PREPARING TO TAKE A RADIOMETER READING



US WEATHER BUREAU EQUALANT-I 1963



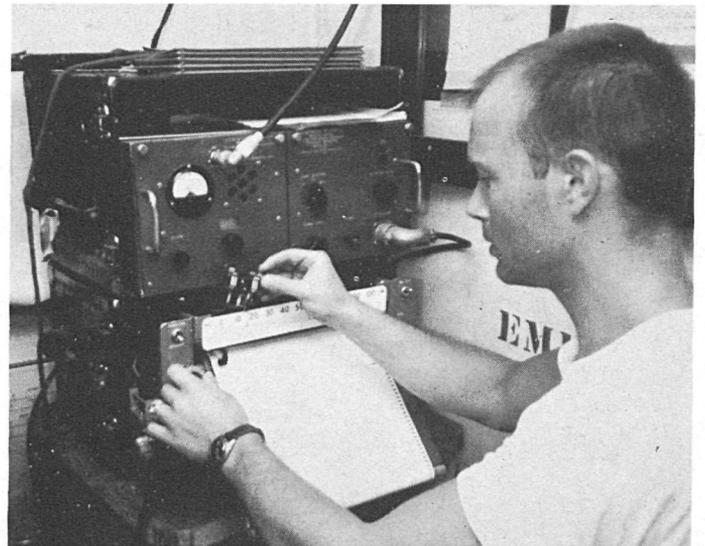
DETERMINING THE HUMIDITY



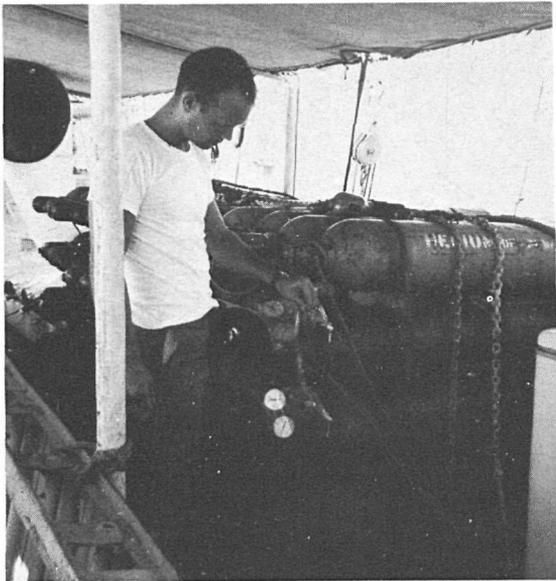
CHECKING A RADIOSONDE



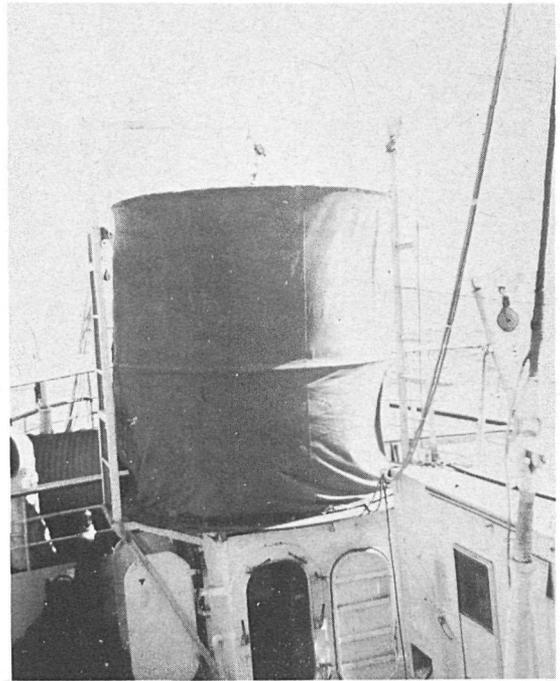
FILLING THE RECORDER STYLUS



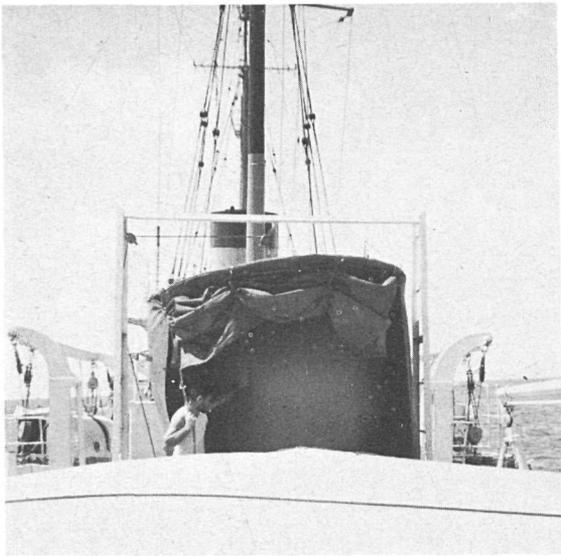
TEMPERATURE HUMIDITY PRESSURES RECORDER



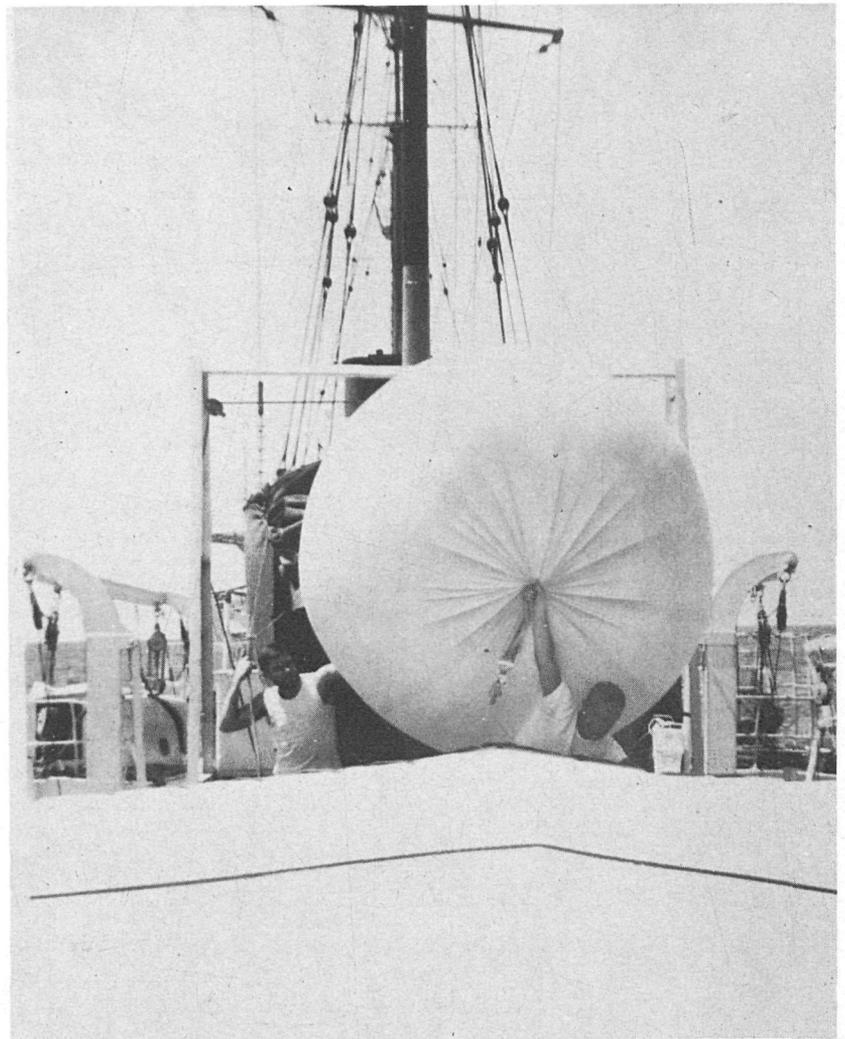
HELIUM SUPPLY TO INFLATE WEATHER BALLOONS



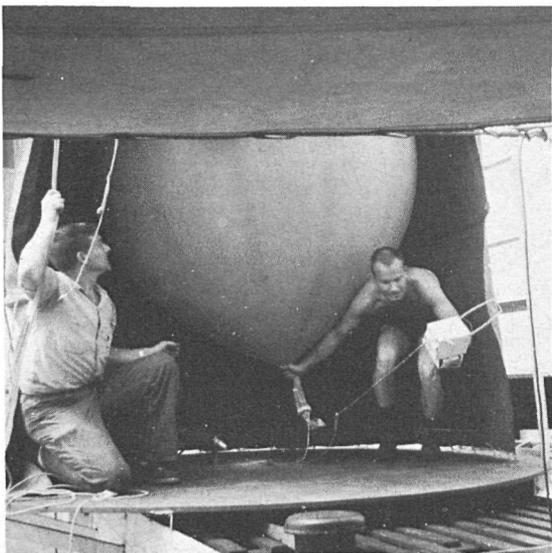
COLLAPSABLE WEATHER TENT



INFLATED BALLOON JUST PRIOR TO RELEASE



UP SHE GOES!

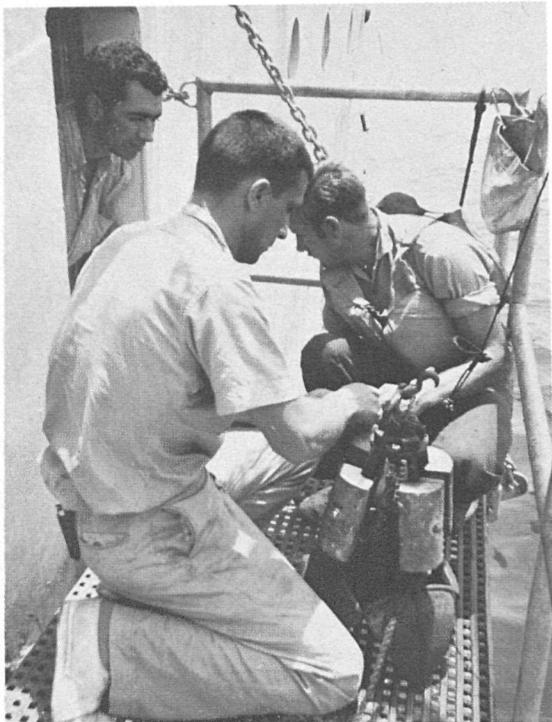


MOUNT POINDEXTER US WEATHER BUREAU
RELEASING A BALLOON

TAKING BOTTOM SAMPLES ALONG THE 50 AND 100 FATHOM CURVES OFF THE AFRICAN COAST



PHLEGER CORER



ORANGE PEAL SAMPLER



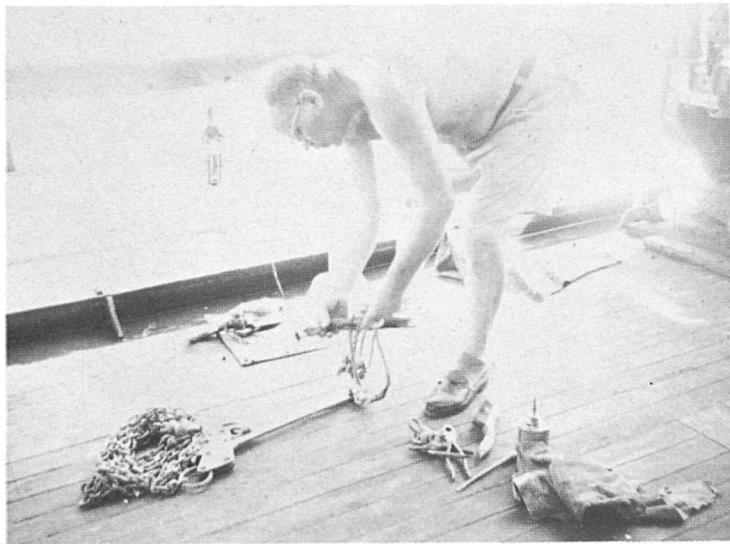
COURSE, GRAY, GREEN, SAND
NO, DIAMONDS!



ENSIGN FLEMING DETERMINES SALINITY USING THE UNIVERSITY OF WASHINGTON TYPE BRIDGE



CHIEF QUARTER MASTER UPORSKI CHECKING THE HYDRALIC STEERING



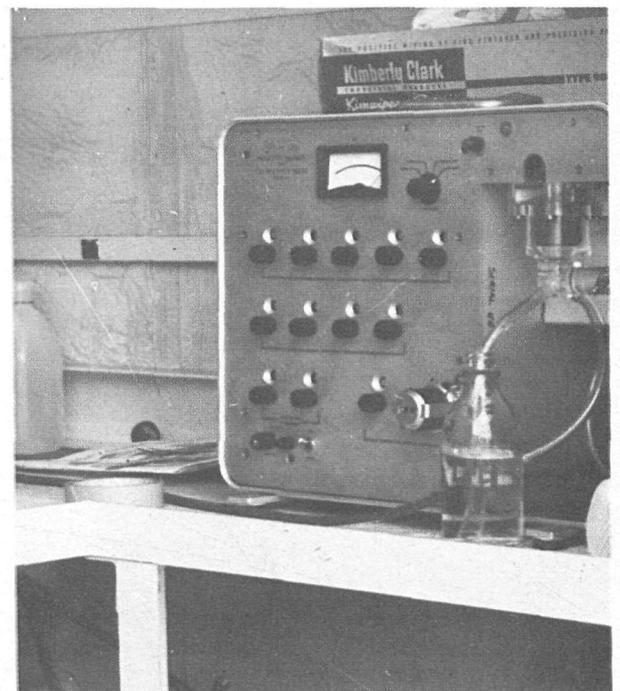
RIGGING A BALL BREAKER TRIPPING RELEASE



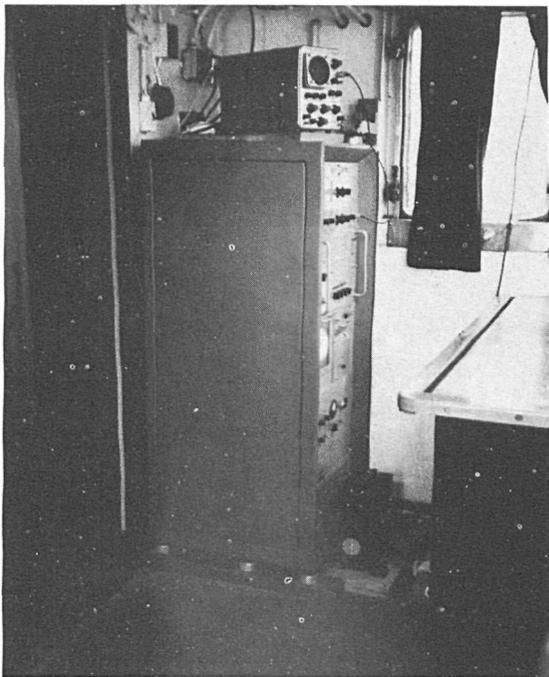
BOXING BOTTLES FOR OXYGEN SAMPLES



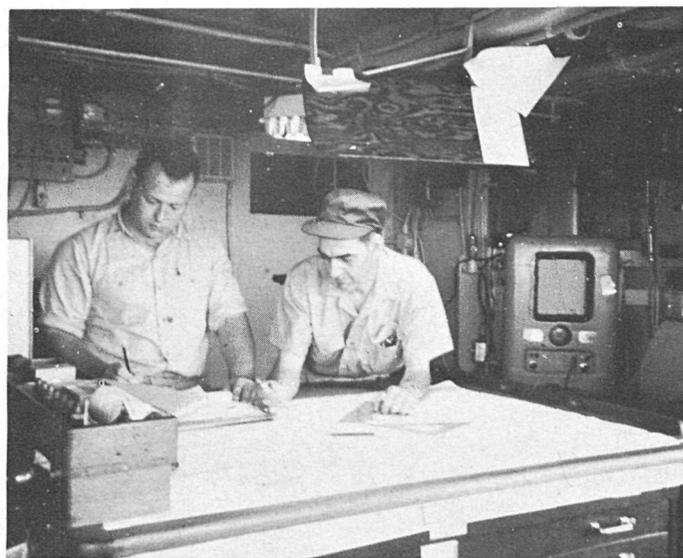
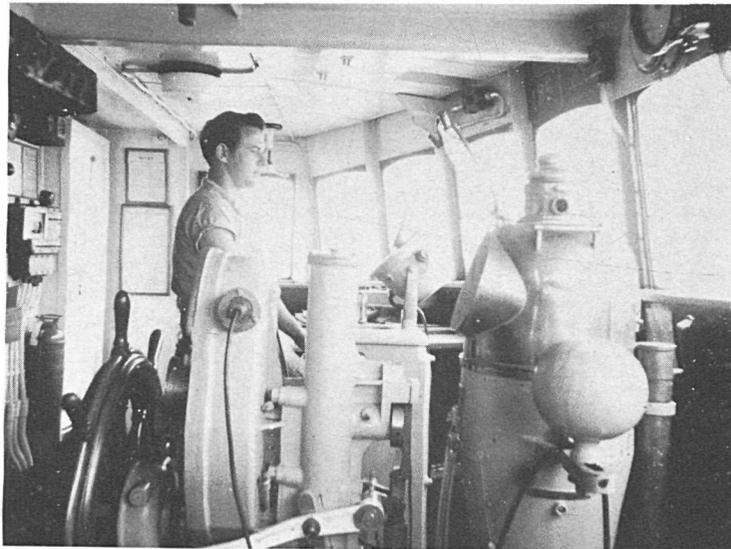
Q-3 HARRELL CLEANS UP A BOTTOM CORER



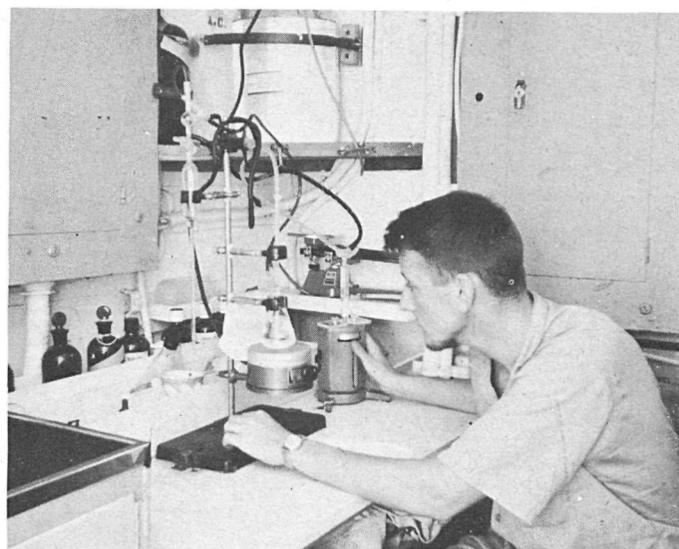
HY-TECH SALINITY BRIDGE



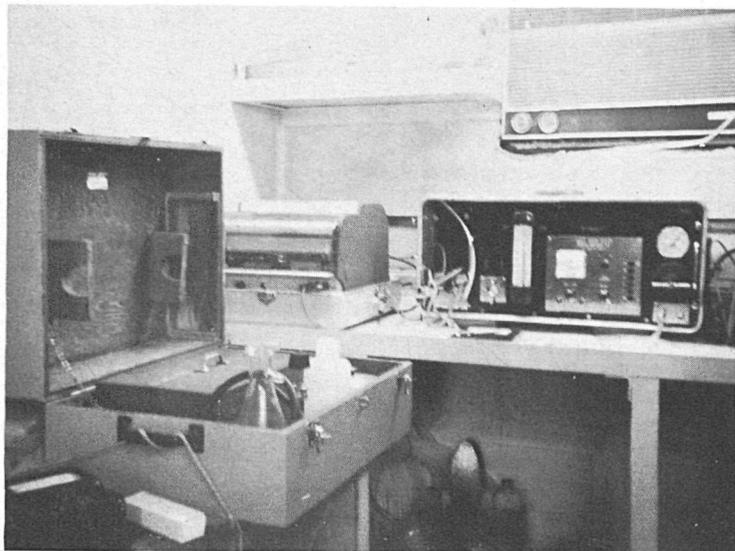
MAGNETOMETER RECORDING CONSOLE



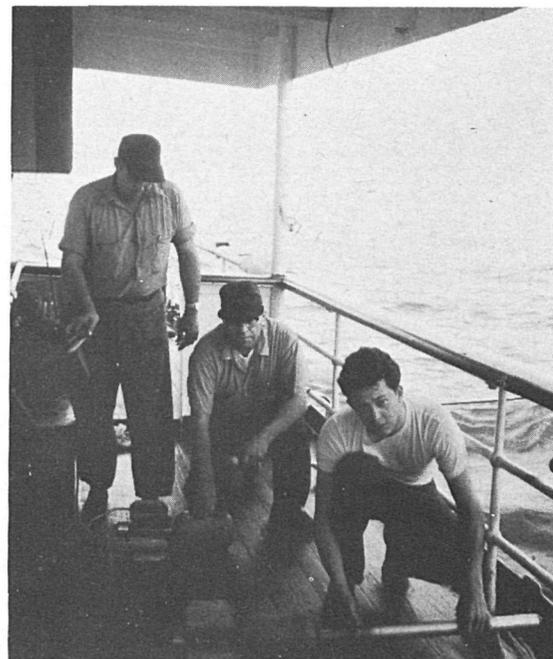
CDR. POWELL AND LCDR McDONALD CHECK THE SHIP'S POSITION



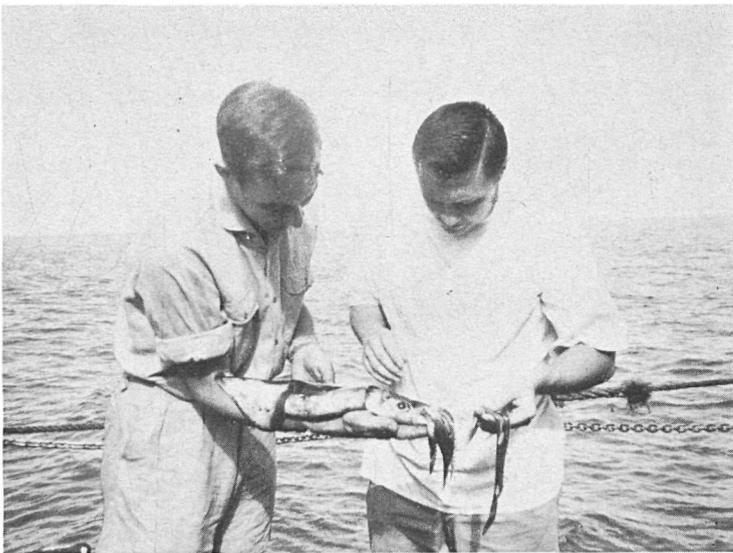
ENSIGN DROSENDAHL DETERMINES OXYGEN CONTENT BY FILTRATION



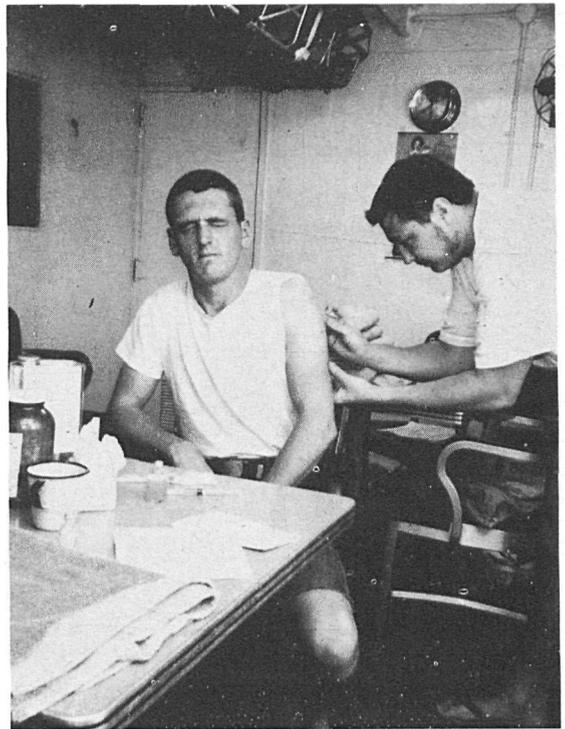
GAS CHROMOTOGRAPHER



ASSEMBLING A PHLEGER CORER



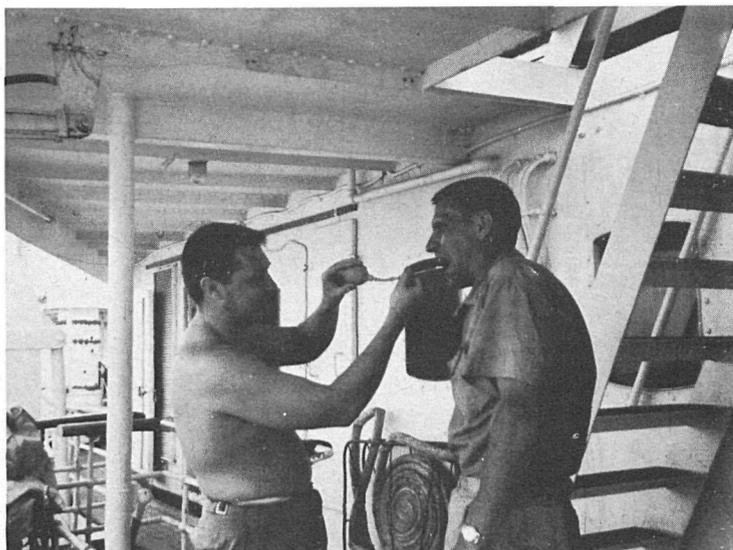
DR. HINDERLICHTER AND DR. HAGMEIER
EXAMINE A LARGE SQUID



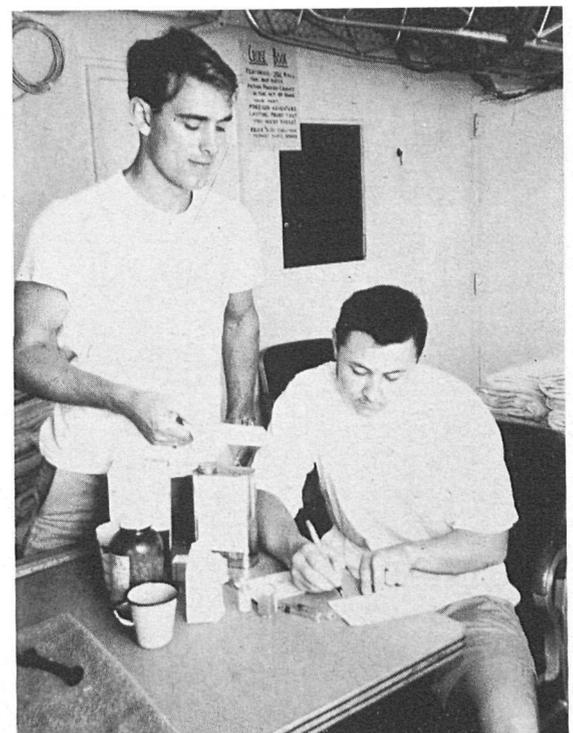
OUCH! THAT HURTS, DOC.



REMOVING A TOE NAIL



DOC CATCHES LCDR WILLIAMS ON THE GO!

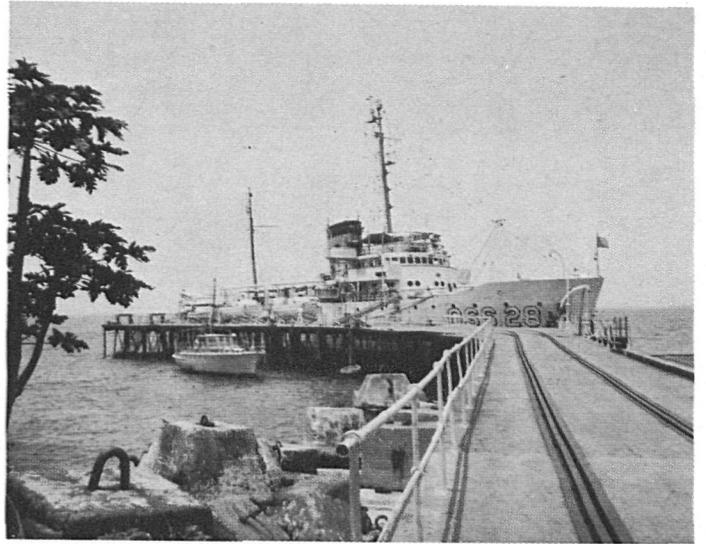


FILLING IN AN IMMUNIZATION RECORD

FREETOWN



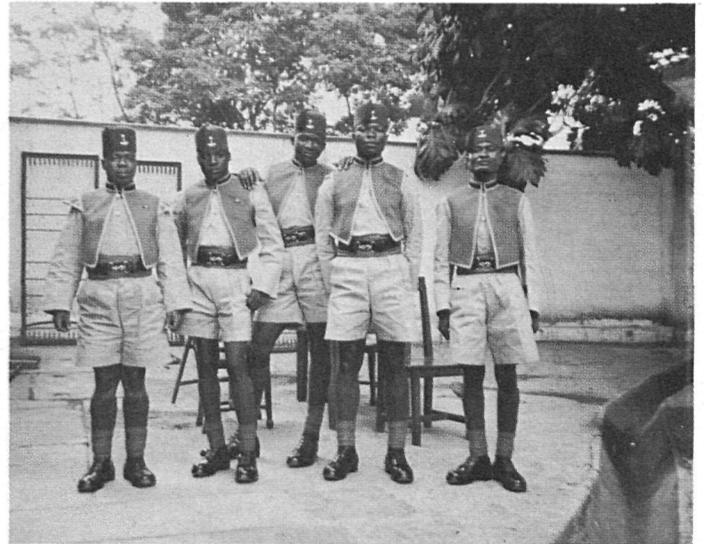
SHIP LEAVES THE OIL PIER



ALONGSIDE THE SIERRA LEONE NAVAL PIER



PRESIDENT'S PALACE, SIERRA LEONE



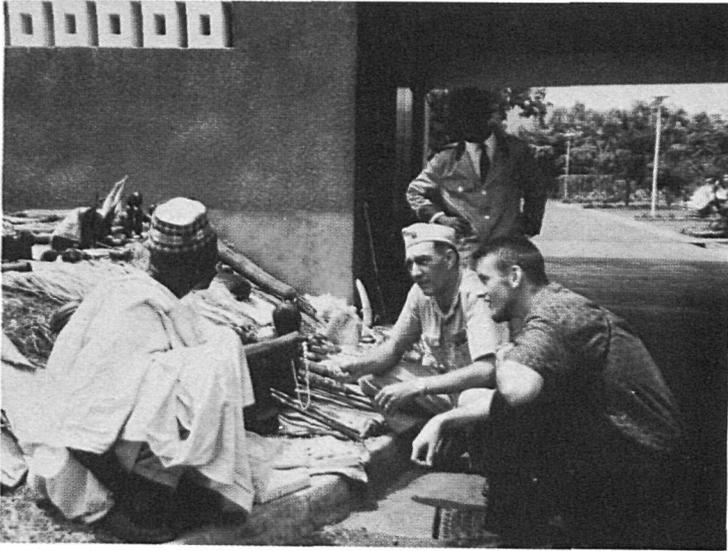
PALACE GUARD



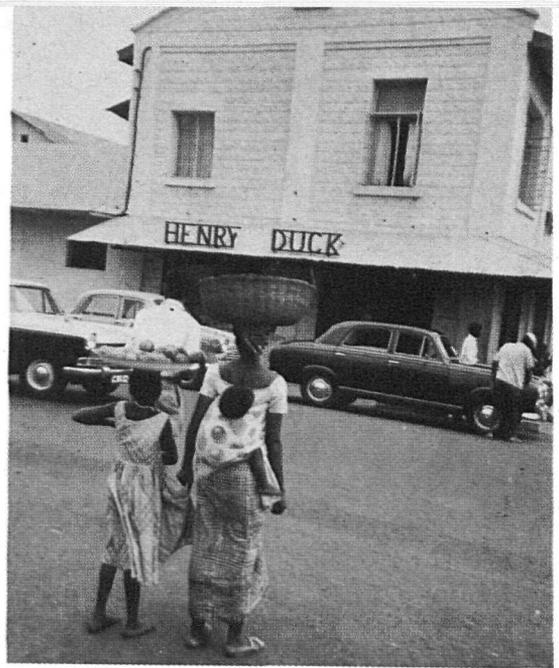
TAILOR SHOP



CITY MARKET FREETOWN



CHARLIE BARTERS WITH CDR. POWELL AND
ENSIGN DROSENDAHL



MOTHER CARRIES A FULL LOAD



MR. AND MRS. ALBERT P. BRUNO CASTON
ON BOARD FOR LUNCH WITH THE COMMANDING
OFFICER



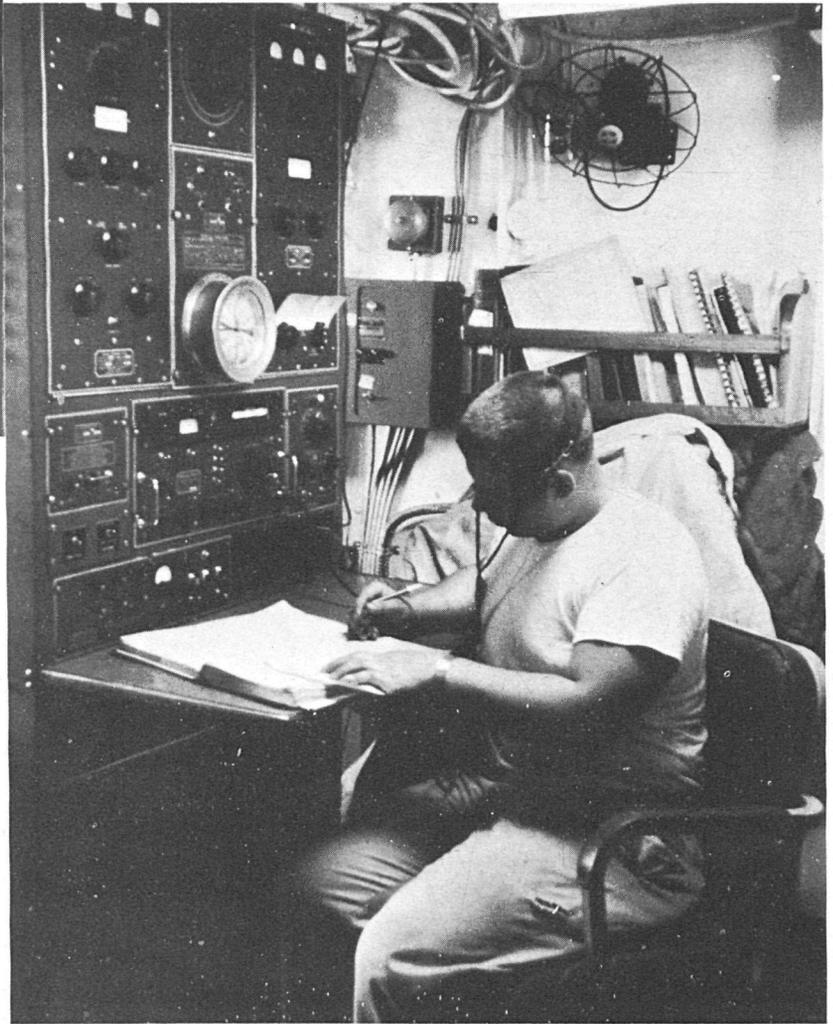
A BUSY STREET IN THE NATIVE QUARTER



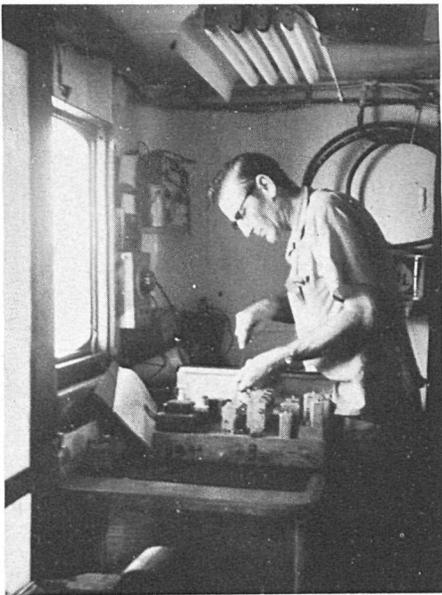
THE OLD SWIMMING HOLE



THE CHIEF AND HIS BOYS TAKE A MOVING PICTURE SHOT



(RM) MORAN LOGS A RADIO MESSAGE



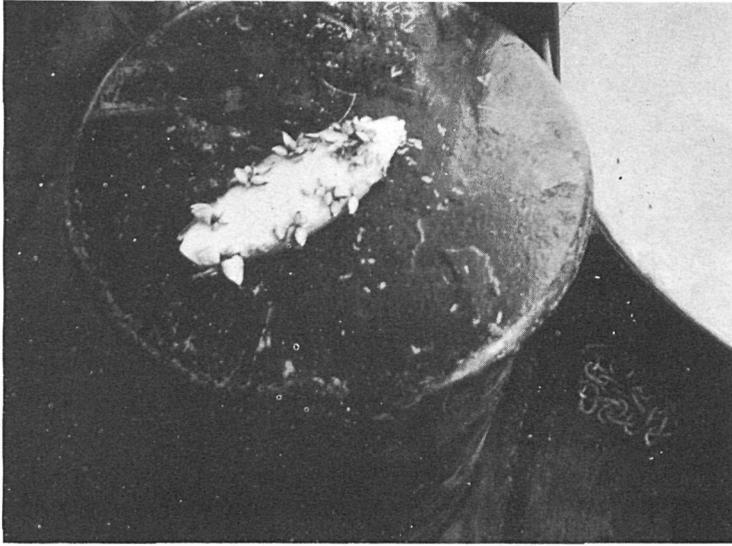
(CET) WEISGERBER REPAIRS A RADIO RECEIVER



CHIEF ELECTRONICS TECHNICIAN THOMPSON STUDIES A WIRING DIAGRAM.



(RM) BEZEKOFF SENDS OUT A RADIO MESSAGE



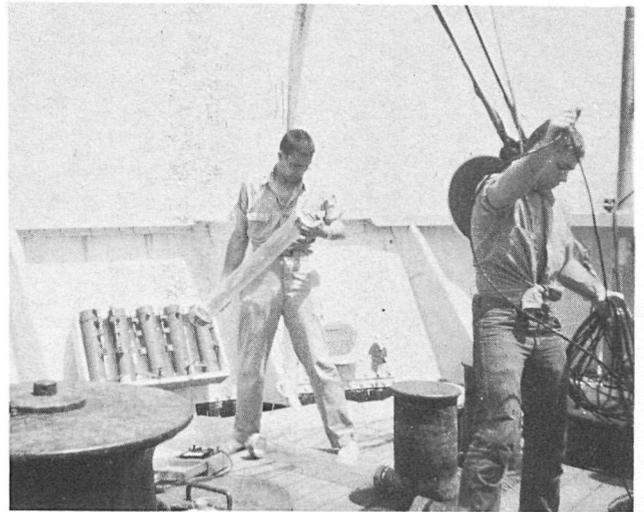
CUTTLE FISH



OVER THE SIDE TO GET A PAIL OF WATER



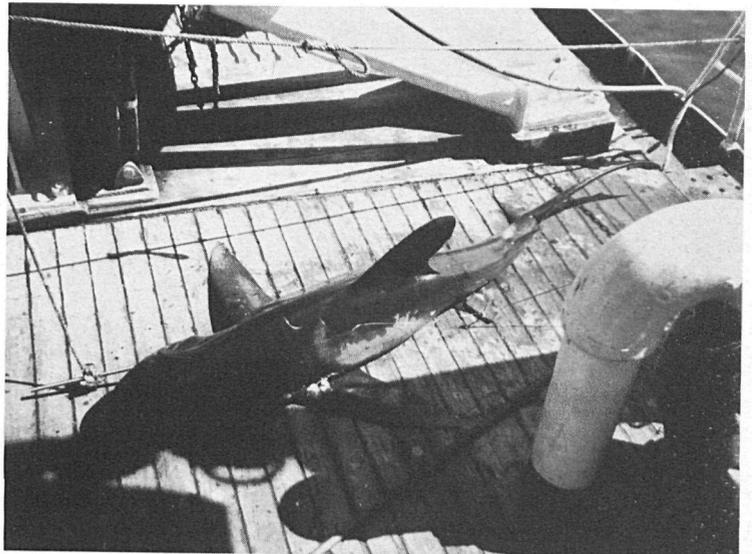
DR. AMAUX AND DR. ROSSIGNOL, SENEGAL MARITIME FISHERS, INSPECT SHIP'S EQUIPMENT



LCDR WILLIAMS CHECKS A 5 LITER SAMPLER



CDR. POWELL AND ENSIGN FLEMING EXAMINE A CUTTLEFISH



THE BOYS LAND AN 8 FOOT SHARK



DR. ERIK HAGMEIER AND LCDR. WILLIAMS EXAMINE A PLASTIC SAMPLER



ENSIGN SEETS TAKES A SUN AZIMUTH



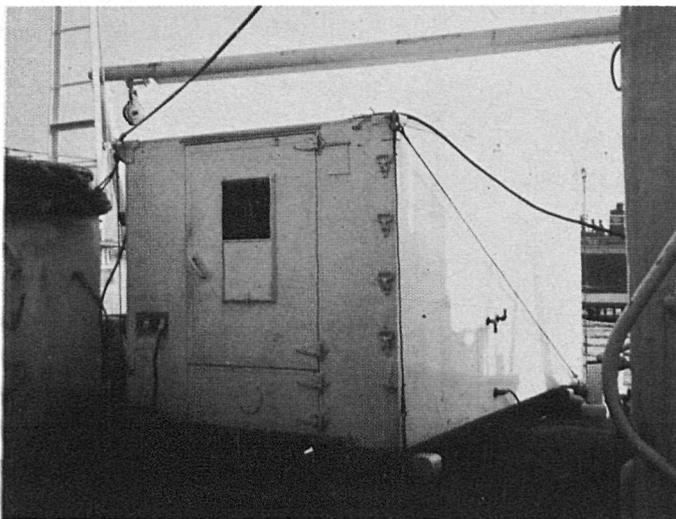
DR. HAGMEIER NETS A PORTUGUESE MAN-OF-WAR



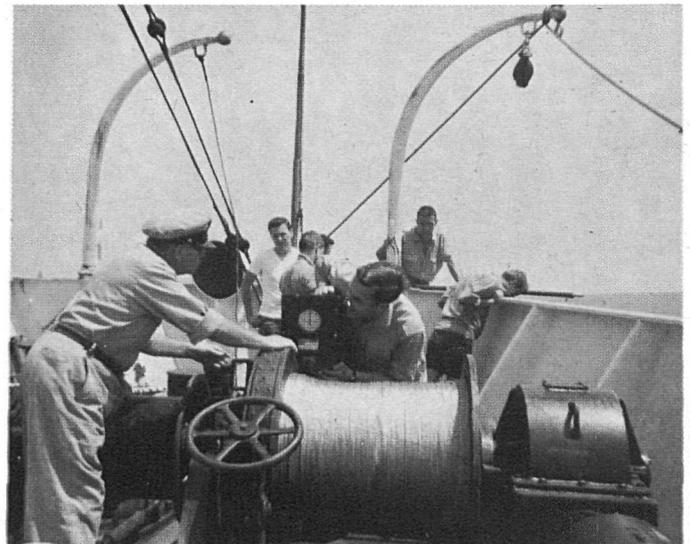
PLACING A PLASTIC BIOLOGICAL SAMPLER ON THE WIRE



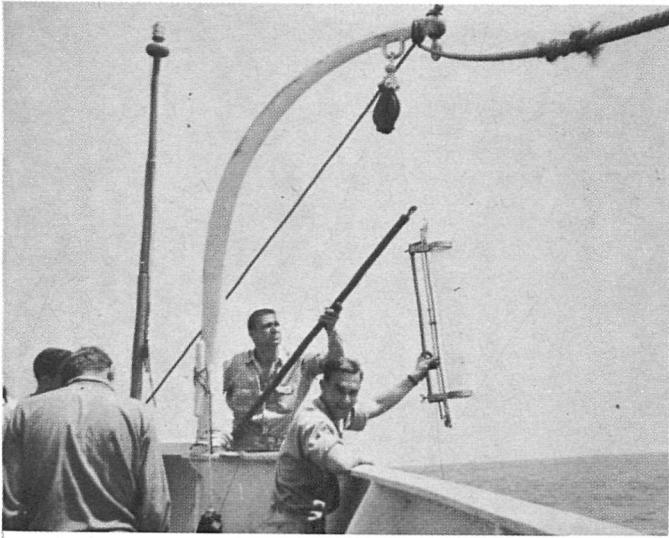
(BM2) DUNGAN RIGGS A PLANKTON NET



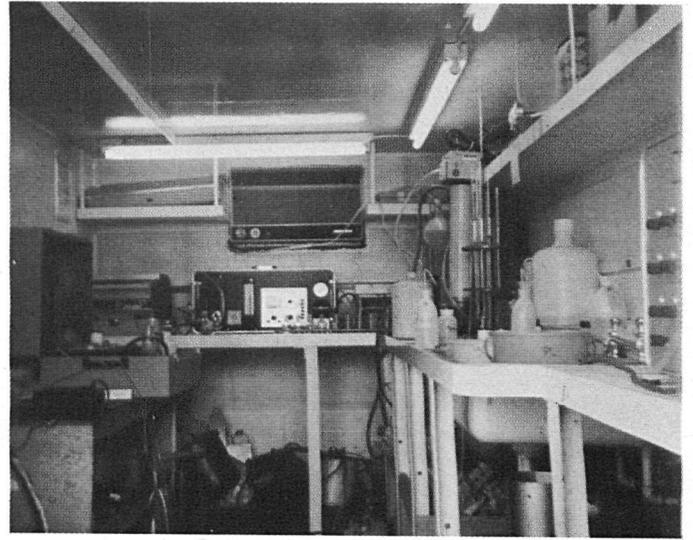
OUR PORTABLE LABORATORY



DR. HAGMEIER AND (CQM) UPORSKI CHECK THE DEPTH OF A BIOLOGICAL CAST



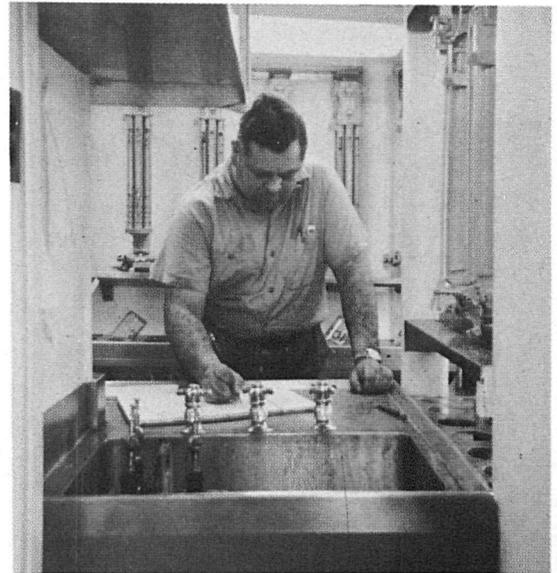
TAKING A 5 LETER BIOLOGICAL SAMPLE



INTERIOR PICTURE OF THE PORTABLE LAB .



PREPARING CARBON 14 FILTERS



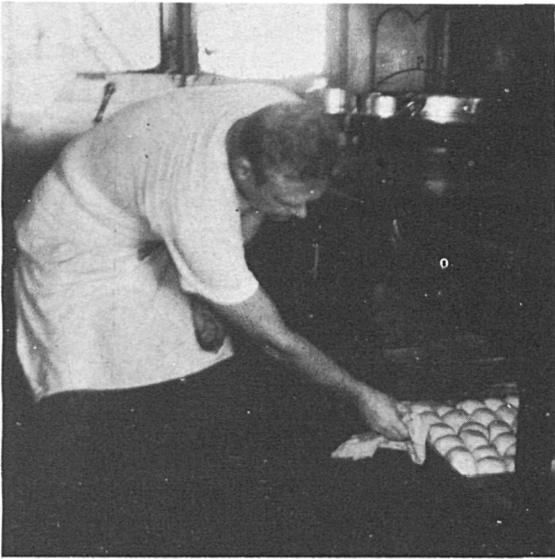
MELVIN LIGHT RECORDS SEA WATER TEMPERATURES



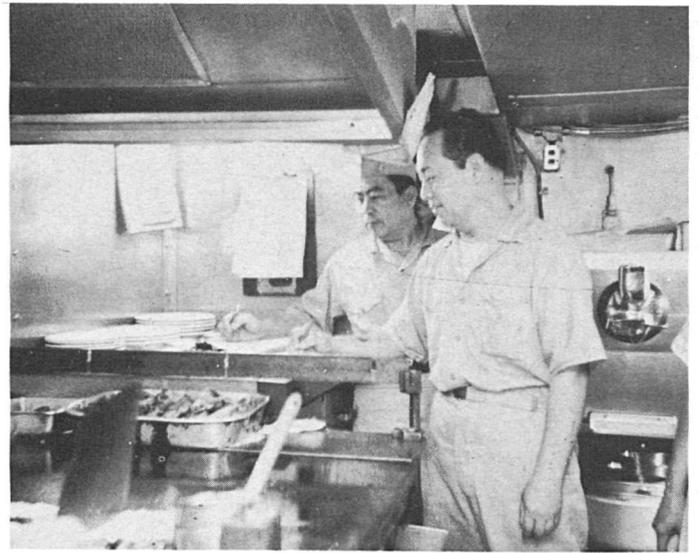
LOWERING A PHOTOELECTRIC CELL TO MEASURE LIGHT PENETRATION IN SEA WATER



SHIP MAINTENANCE CONTINUES



STEWARDMAN MACHIESKY PREPARES
HOT ROLLS FOR DINNER



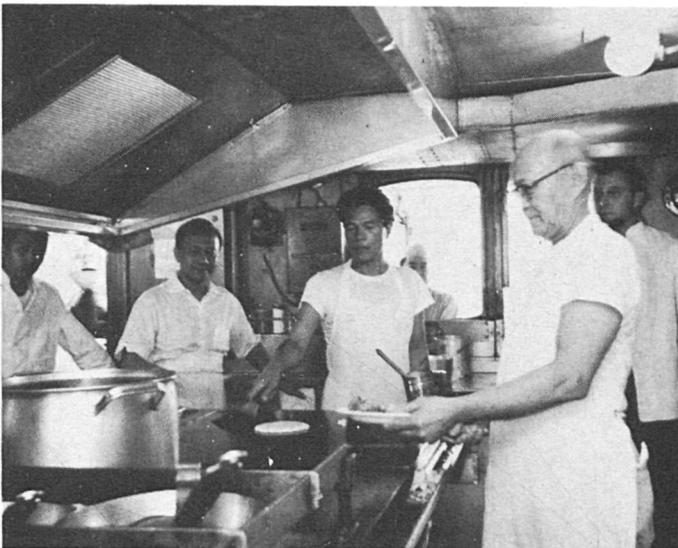
CHIEF STEWARDS HERACILO MARTIN AND LAMBERTO
MARTIN CHECK SUPPLY LISTS



ROAST BEEF FOR DINNER



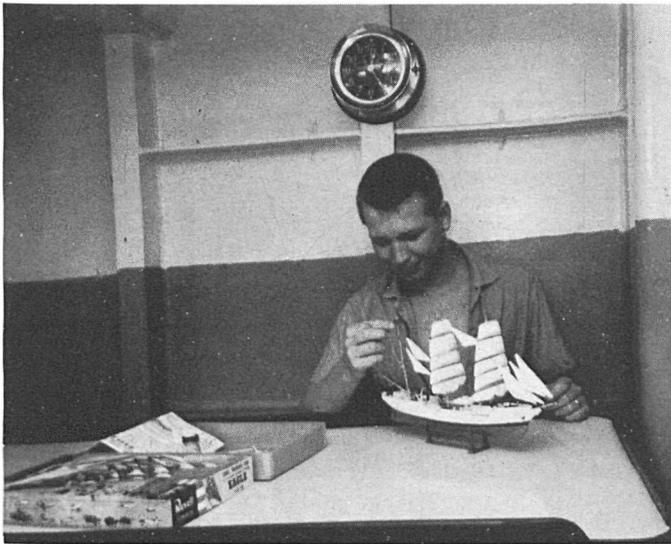
APPRENTICE STEWARDMEN JENNINGS AND MASON -
CREWS MESS



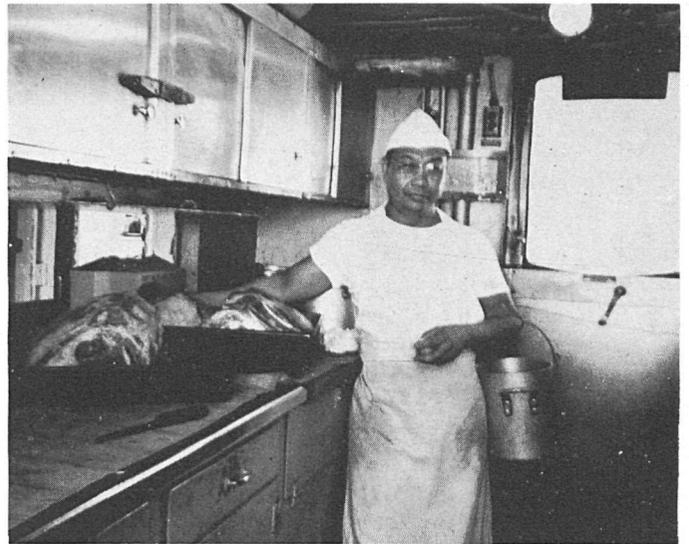
PANCAKES FOR BREAKFAST



CAKE FOR THE CPO MESS



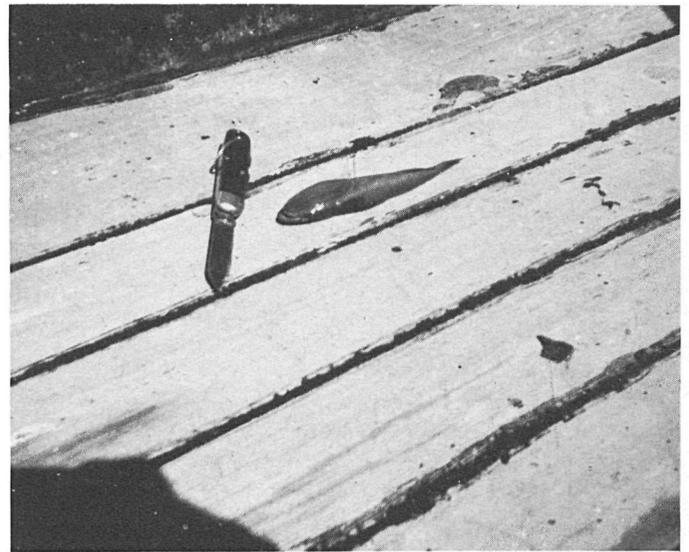
(F.) MIDGETT MAKES A SAILING SHIP MODEL



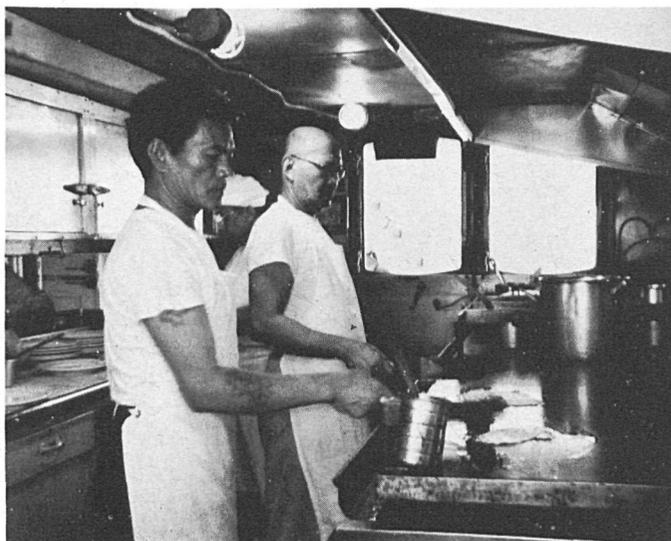
WHAT! ROAST BEEF AGAIN!



OUR LARGEST CATCH



OUR SMALLEST CATCH



TWO OVER LIGHT!

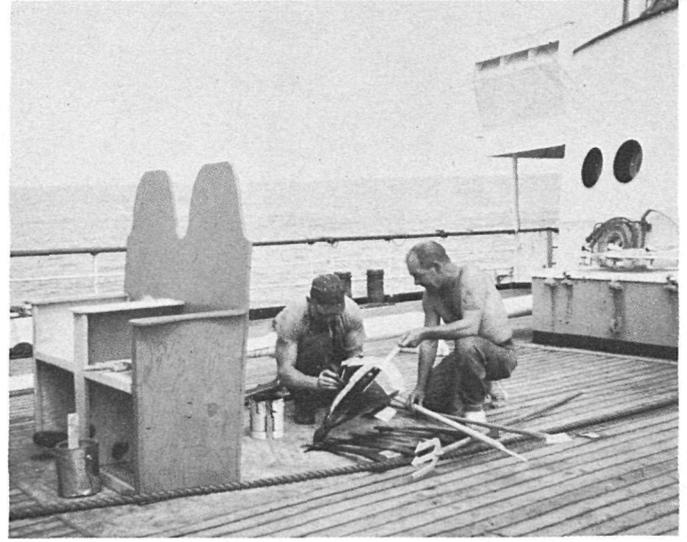


BIRD WATCHING AT SEA

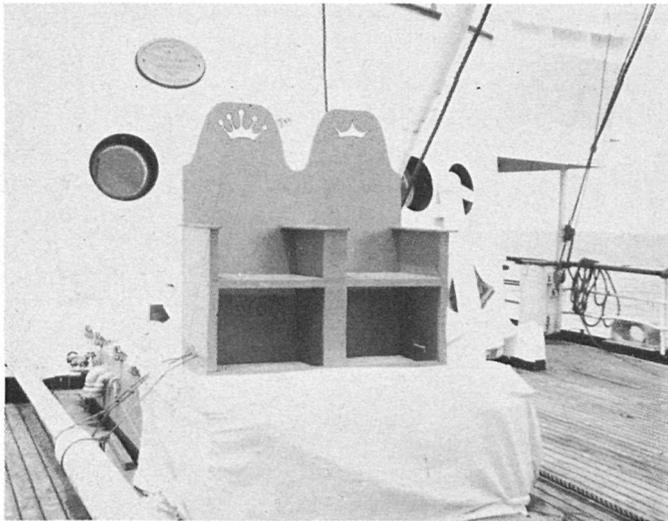
AT THE EQUATOR KING NEPTUNE TAKES OVER -



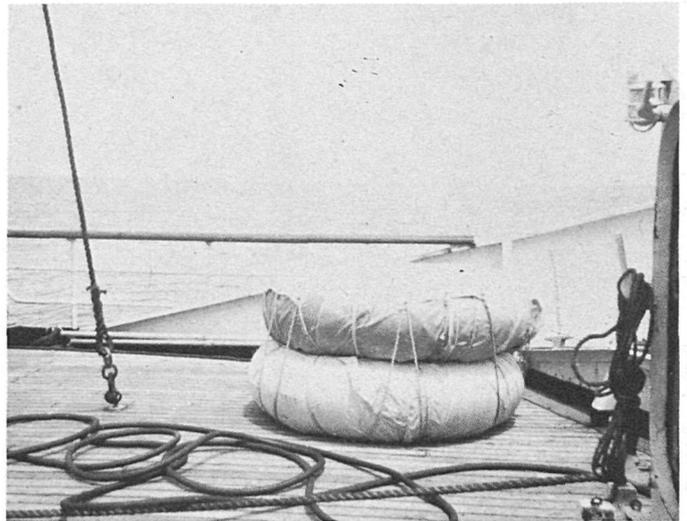
CHIEF ENGINEER CRANFORD PLANS KING NEPTUNE'S ARRIVAL



ALL HANDS TURN TOO TO PREPARE FOR THE BIG EVENT



THE THRONE IS READY FOR THE KING AND QUEEN

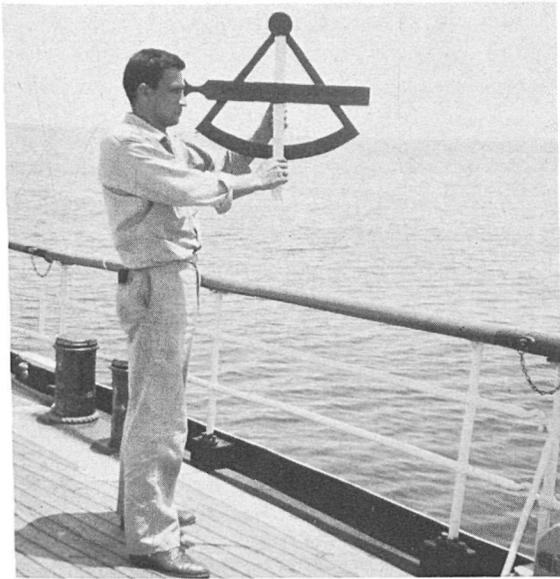


THE BAPTISMAL POOL IS FILLED

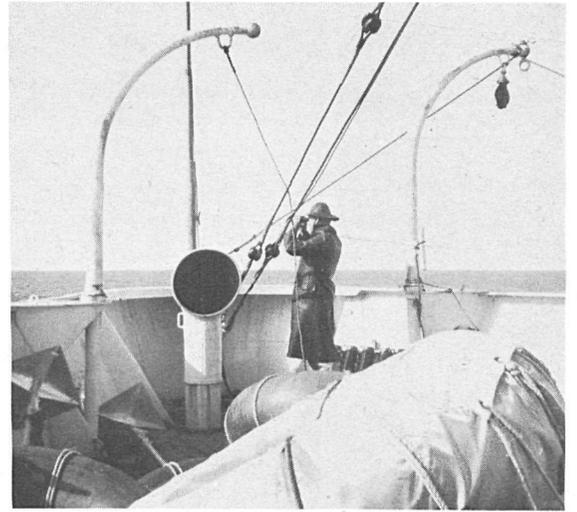


THE "OLD MAN" AND "THE COMMANDER" WASH DOWN





THE NAVIGATOR REPORTS THE EQUATOR CROSSING



THE LOOKOUT REPORTS KING NEPTUNE ON THE PORT BOW



KING NEPTUNE AND HIS ROYAL COURT COME ABOARD

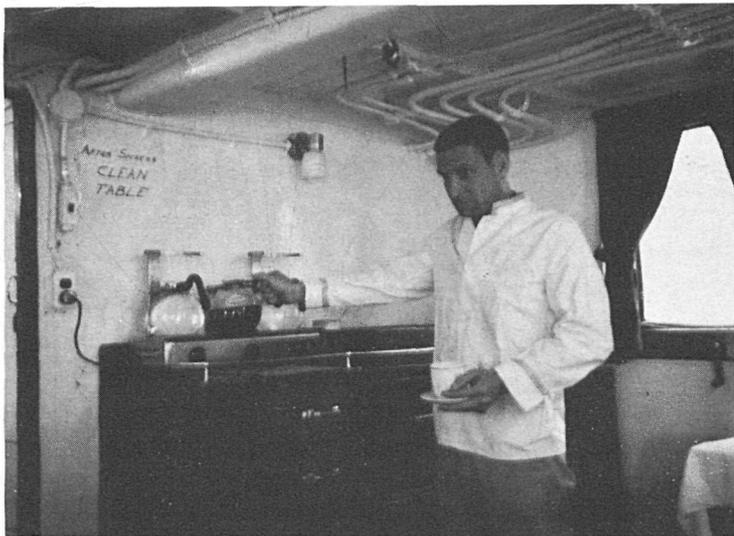


CAPTAIN BULL AND CDR. POWELL RECEIVE THE KING AND QUEEN

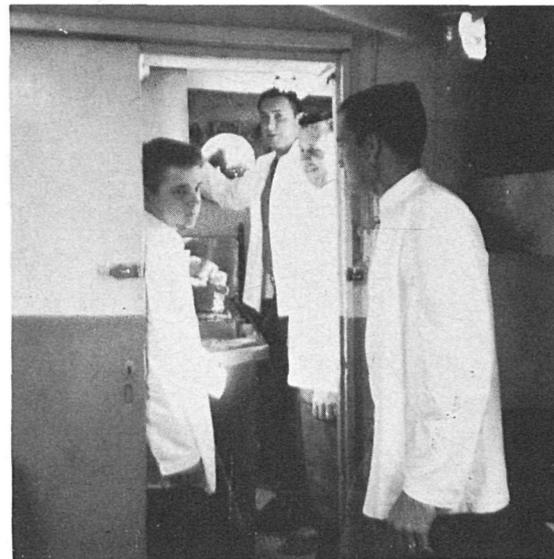


THE CAPTAIN IS SENTENCED TO TORTURE BY FIRE

KING NEPTUNE'S PUNISHMENT IS SEVERE -



BOB WILLIAMS SERVES COFFEE IN THE WARDROOM



(F) BAGE, (Y1) BLACKMON, (QM) REED AND (BM) STYRON WAIT TABLES IN THE CREW'S MESS



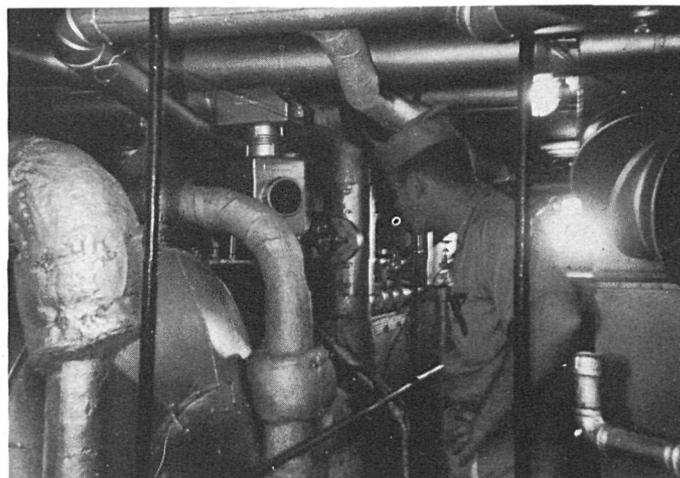
(CET) MITCHELL SERVES IN THE CPO MESS



DR. HINDERLITER WAITS TABLE IN THE OFFICER'S MESS

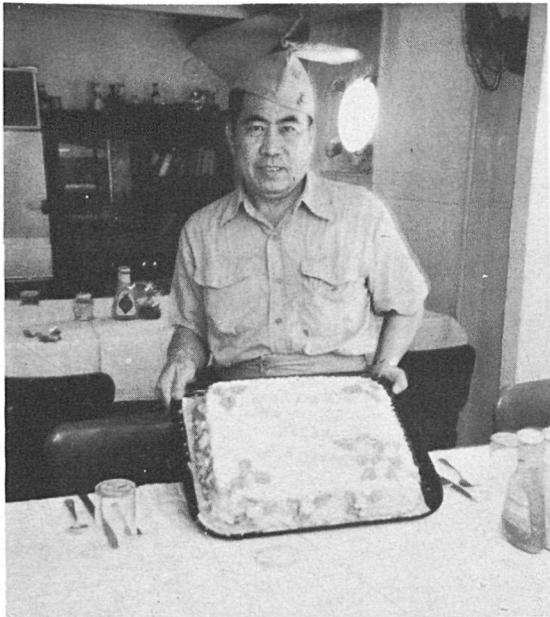


RICH ALLBRITTON POLISHES THE BOILER ROOM DECKS

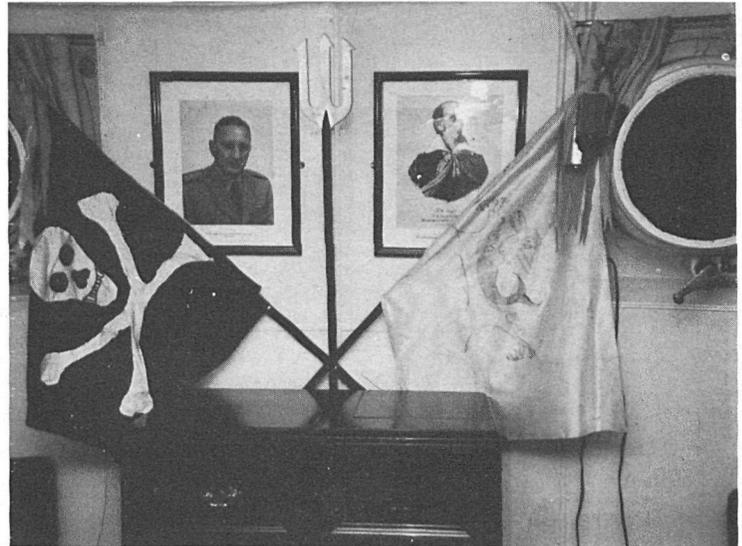


MIKE FLEMING ON WATCH AT THE SMOKE INDICATOR

KING NEPTUNE HOLDS COURT

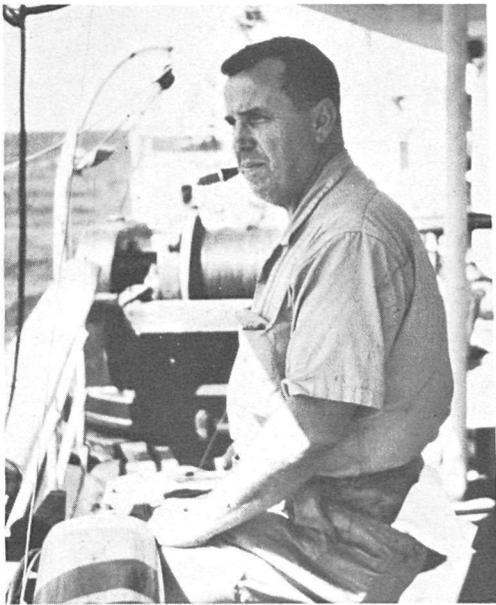


CAKE FOR THE ROYAL FEAST

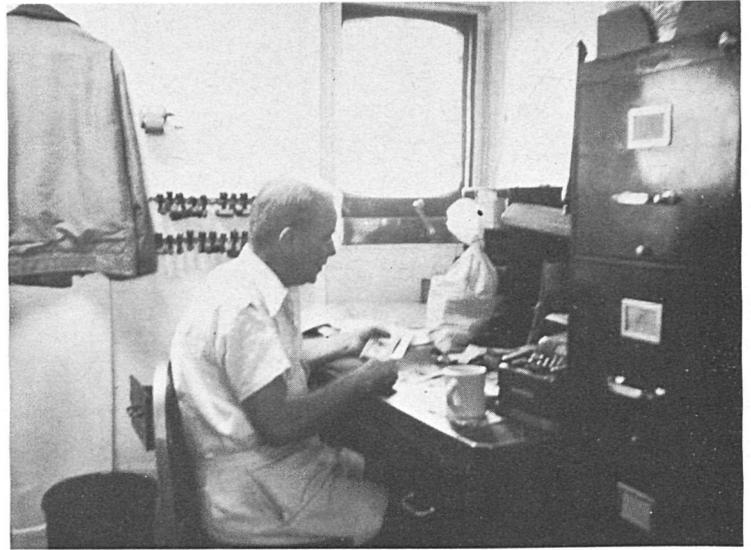


KING NEPTUNE SURRENDERS HIS FLAGS AND DEPARTS

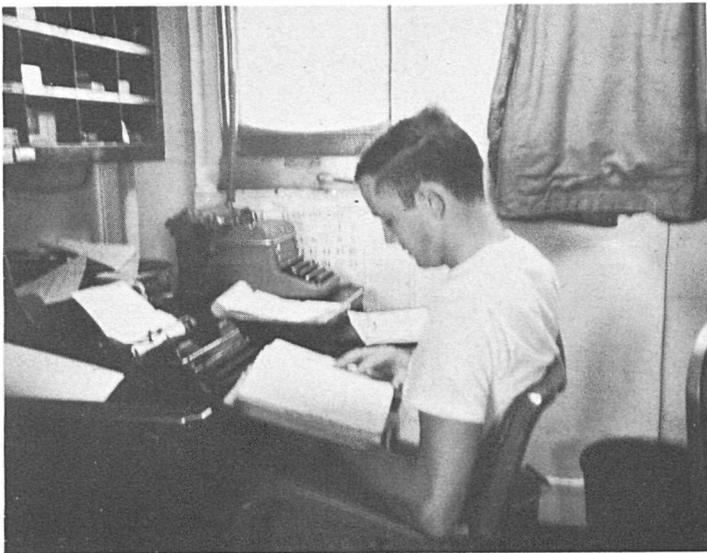




(CBM) GOUGH THINKS OF HOME



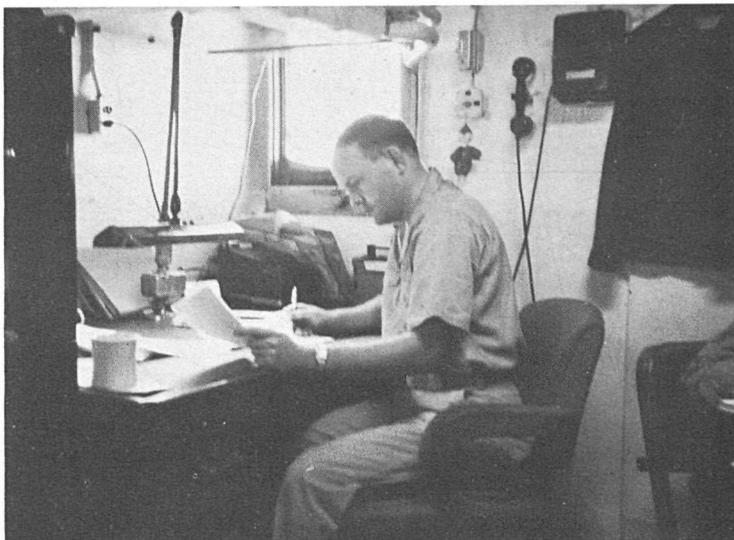
(CY) MCCONNELL COUNTS THE SHIP'S CASH



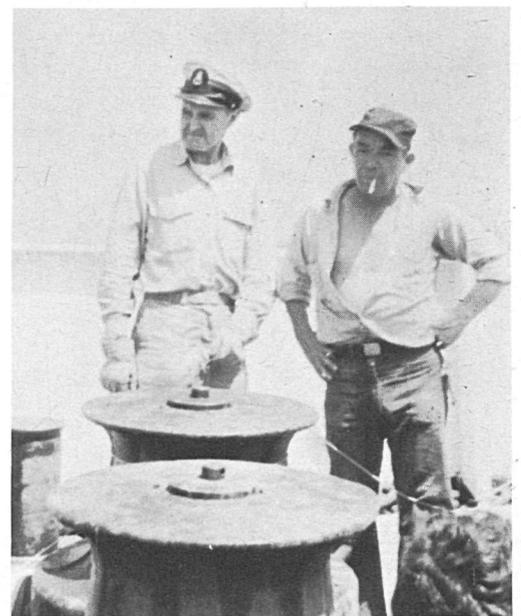
HOW DO YOU SPELL THAT WORD!



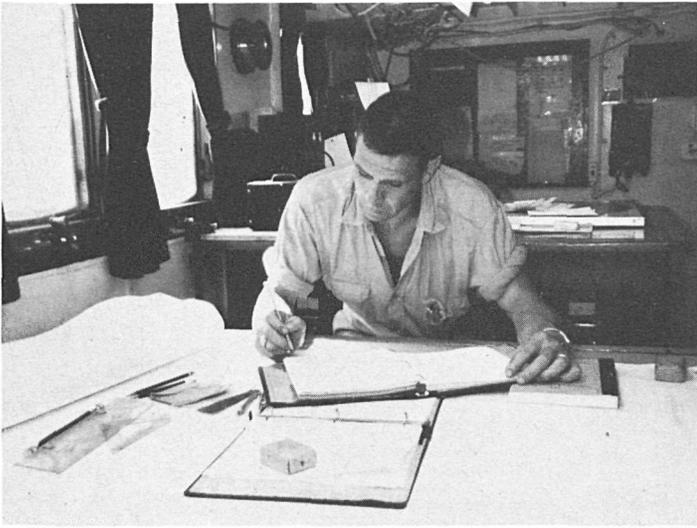
MAKING UP ID CARDS



(CY) BREWINGTON CHECKS A TIME RECORD



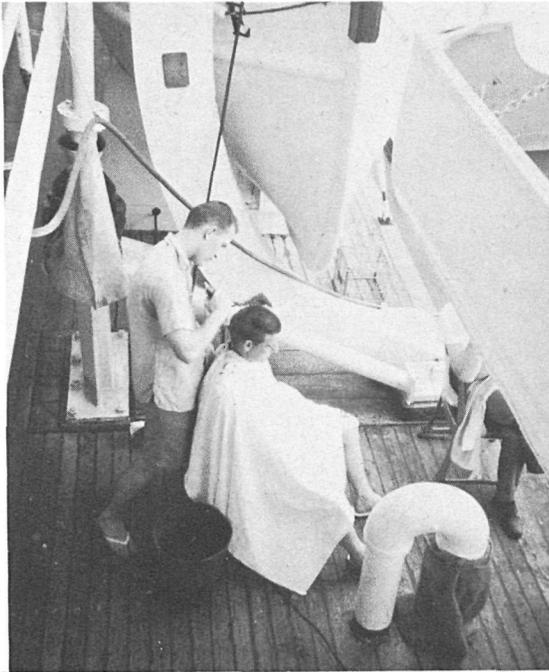
(CB) GRANT LEWIS AND (BM) DUNGAN INSPECT THE ANCHOR WINDLASS.



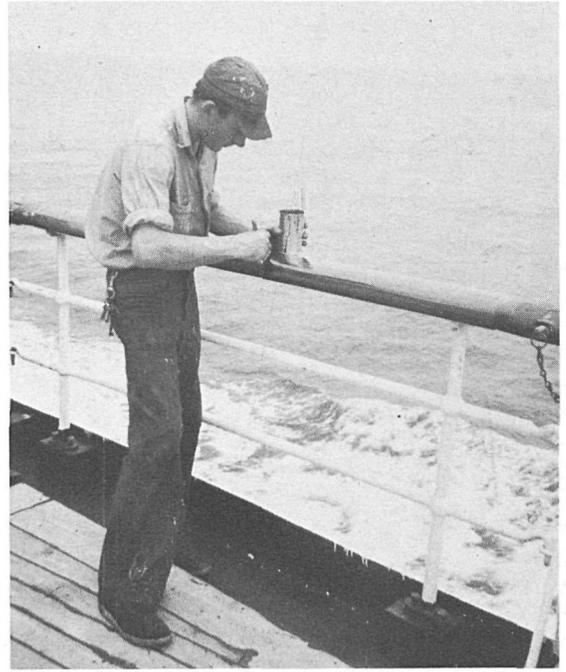
PLOTTING THE EQUANT CRUISE



PILOT TAKES THE SHIP ALONGSIDE IN FREETOWN, SIERRA LEONE



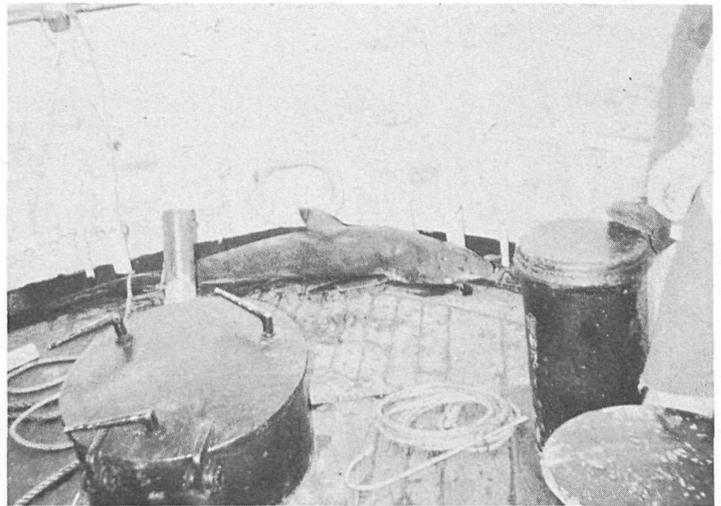
HAIRCUT TIME ON BOARD SHIP



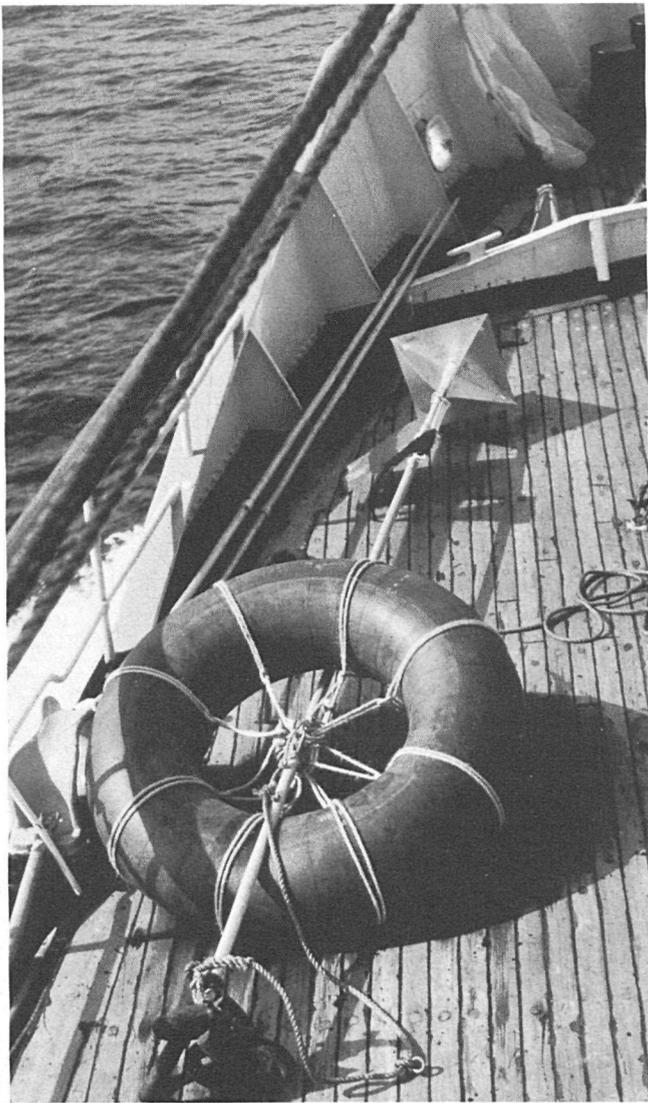
SHIP MAINTENANCE IS A CONTINUOUS PROCESS



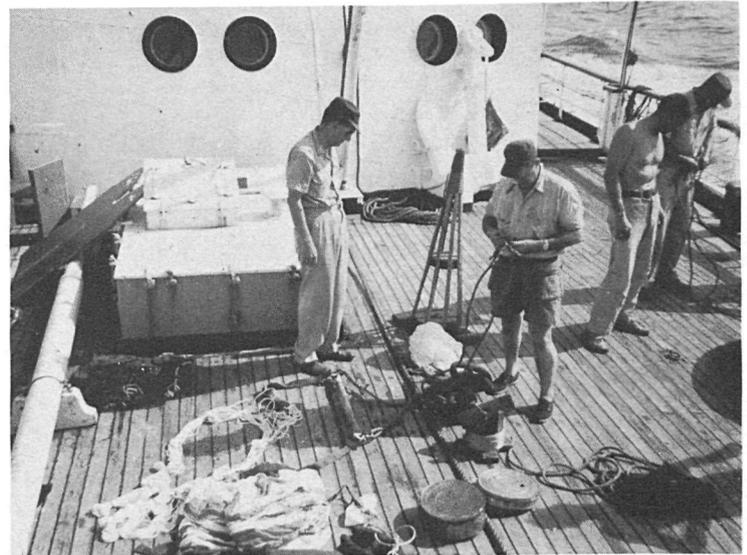
DR. NEUMAN EXAMINES THE OCEANOGRAPHIC WINCH.



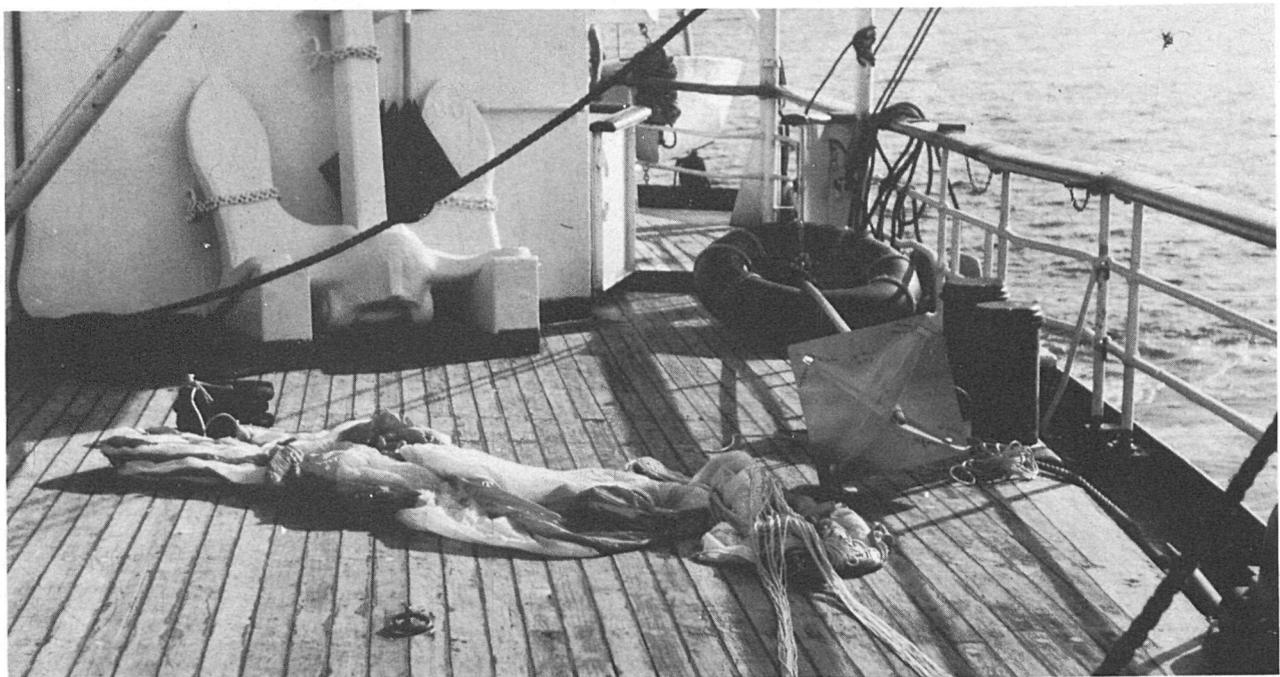
OUR SECOND LARGEST CATCH —



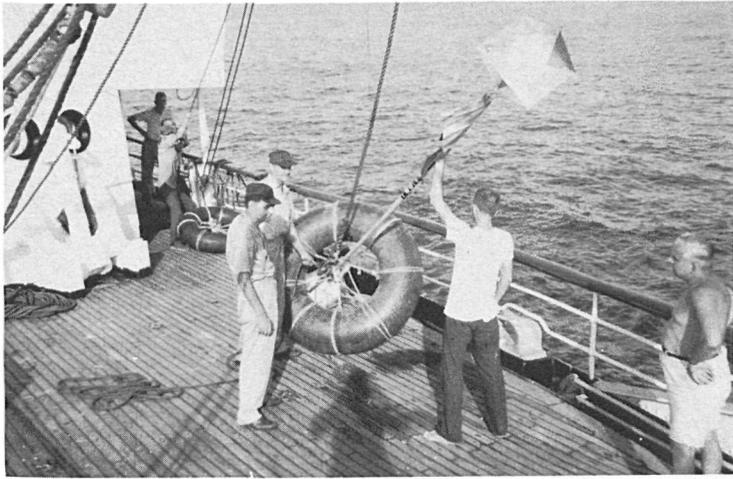
CURRENT DROGUE BUOY



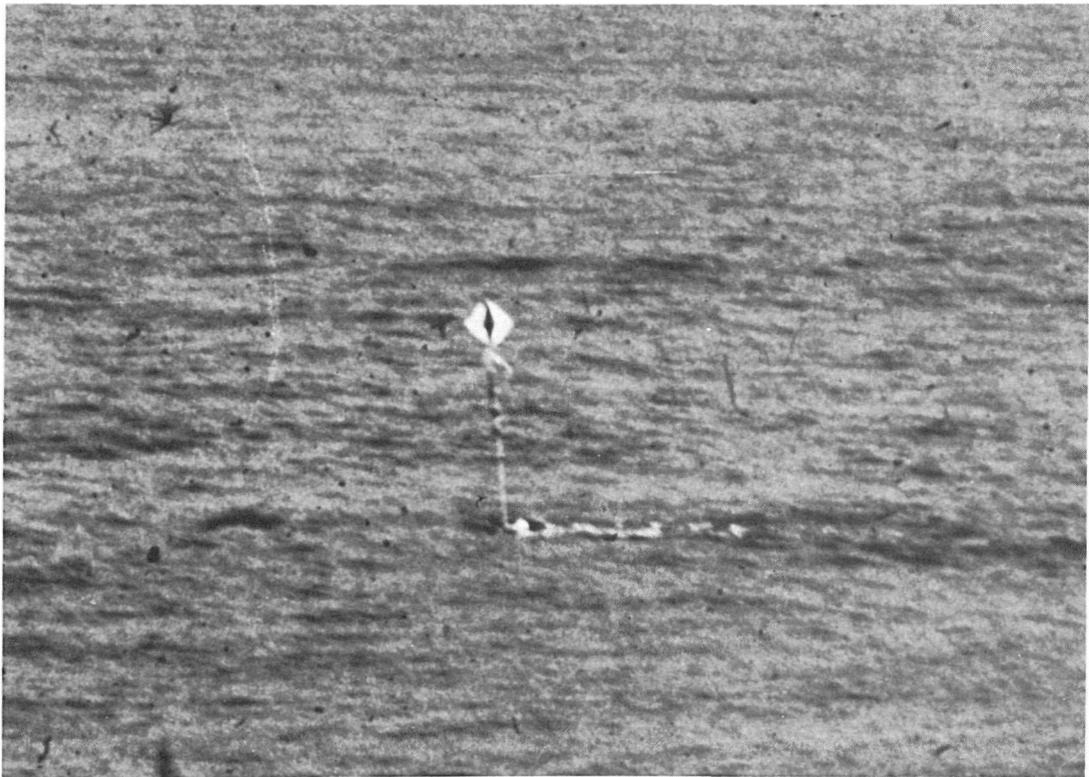
RIGGING A PARACHUTE DROGUE



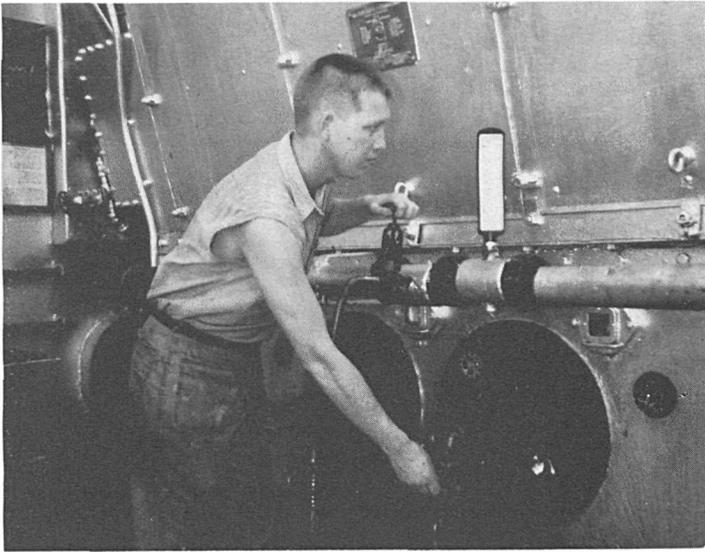
DROGUE AND BUOY RIGGED AND READY TO GO OVER THE SIDE TO CHECK THE EQUATORIAL UNDERCURRENT



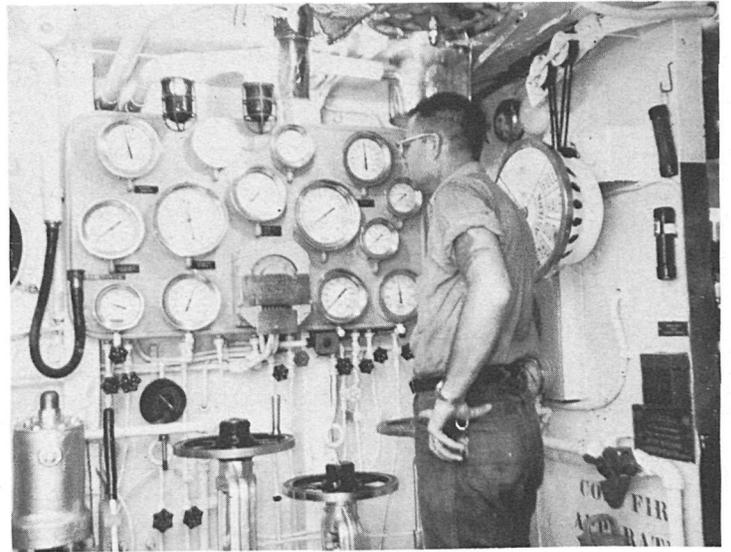
OVER SHE GOES



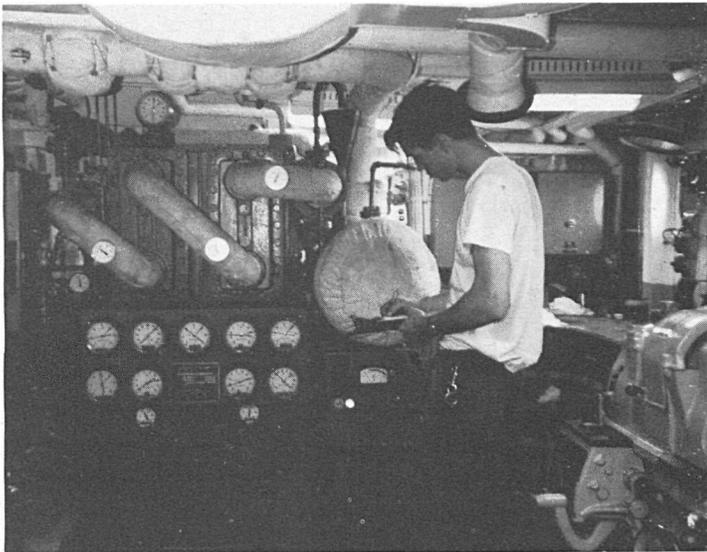
CURRENT DROGUE BUOY BEING TOWED THROUGH THE WATER BY THE EQUATORIAL UNDERCURRENT



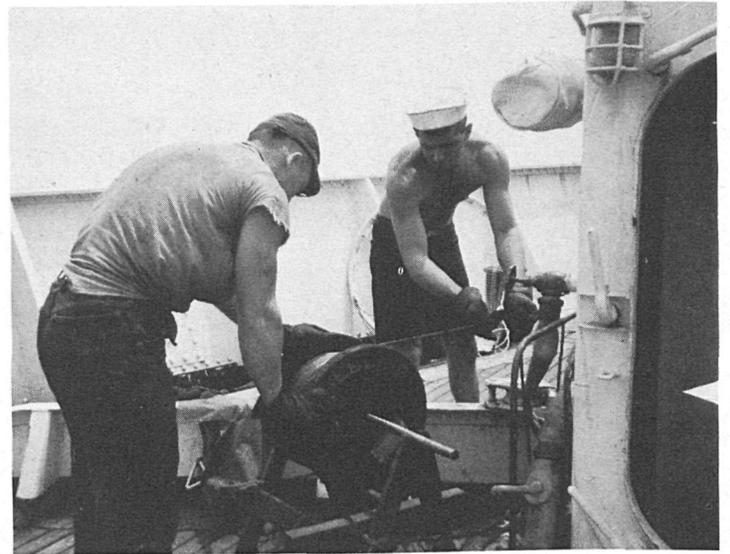
REGULATING THE FIRES



(CM) MATHEWS AT THE THROTTLE



OUR NEW EVAPORATOR IN OPERATION



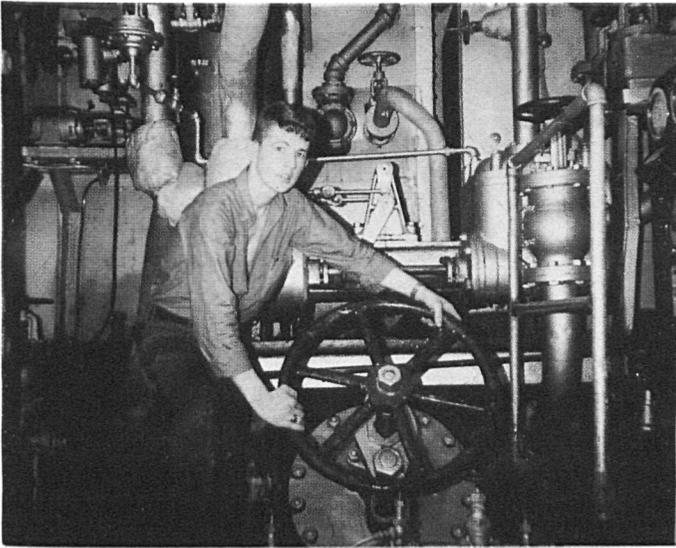
SEAMEN BRANNON AND HARRIS, M. STOW A REEL OF BT WIRE



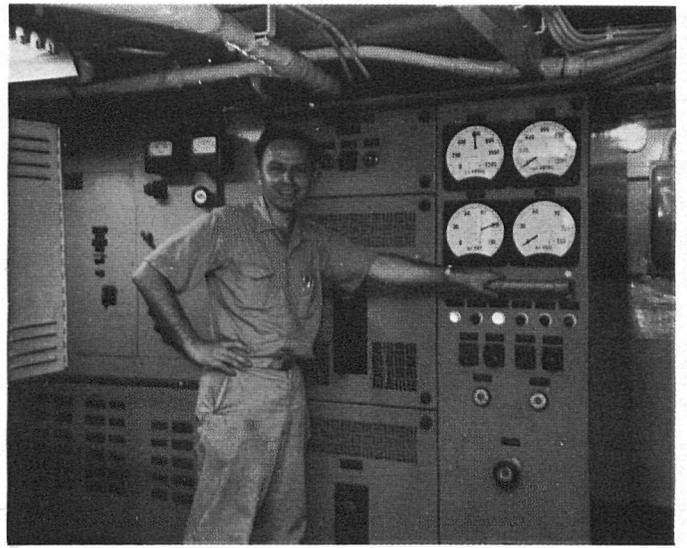
RON REED AND LIGHT READ AND RECORD TEMPERATURES



(QMS) LEWIS OPERATES THE SPECTROMETER TO DETERMINE PHOSPHATES



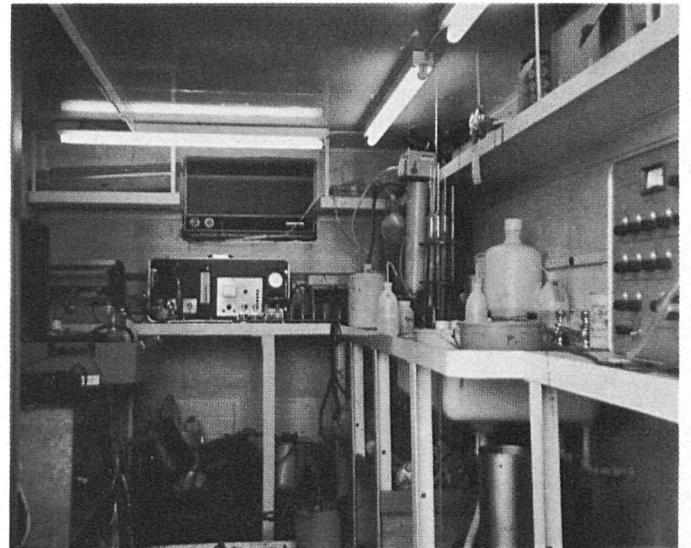
A BIG WHEEL IN THE ENGINEROOM



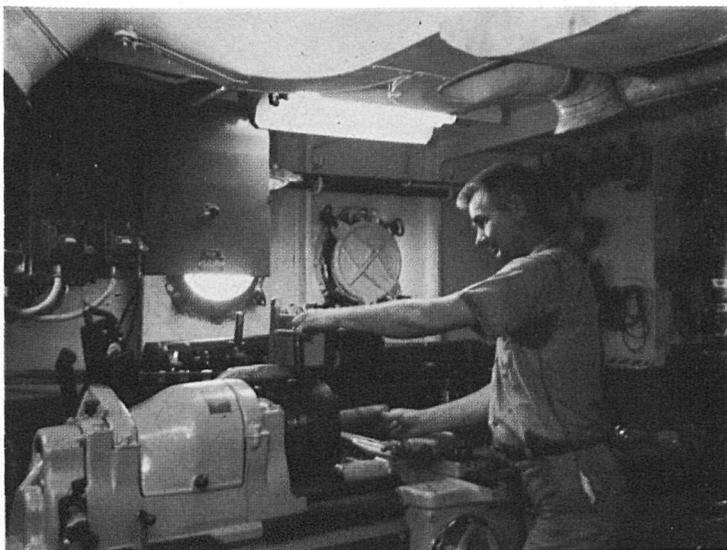
FIRST ASSISTANT FICKEN RUNS A TAUT ENGINE ROOM



MIKE FLEMING PREPARES A STANDARD SOLUTION



INTERIOR VIEW OF THE PORTABLE LAB



(CM ANSELL A. SETS STOCK IN THE LATHE



CHIEF ENGINEER CRANFORD AND THE FIRST CHECK SPARE PARTS LIST



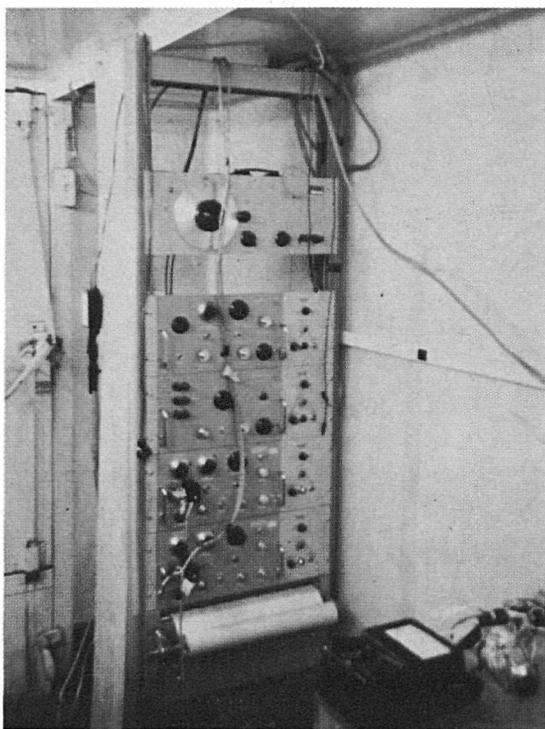
DR. PIERSON OBSERVES INTERNAL
WAVE STREAKS



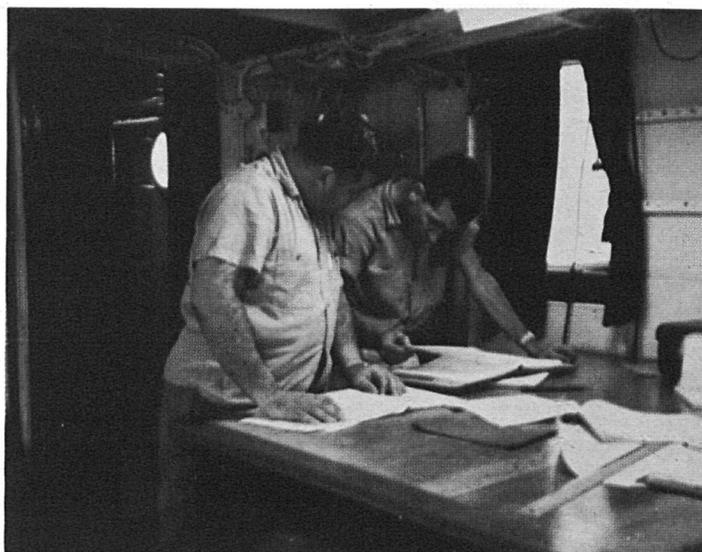
DR. NEUMAN AND MR. HOLLMAN PLOT TEMPERATURES
AND SALINITIES SEARCHING FOR EVIDENCE OF THE EQUA-
TORIAL UNDER-CURRENT.



QUEST FOR KNOWLEDGE



FLOWMETER SENSING AND RECORDING CONSOLE



CHECKING THE RECORDS



FLOW METER WINCH AND TOWING CABLE



WHERE MECHANICS FAIL HAND POWER WILL PREVAIL

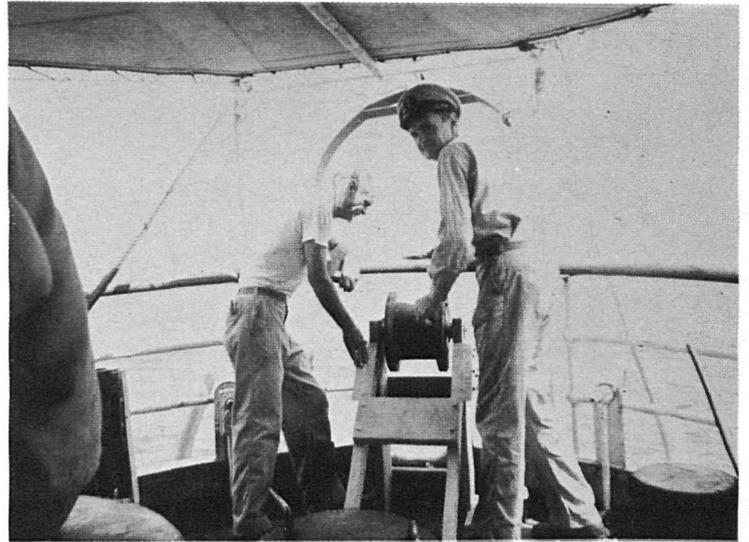


A STUDY IN HYDRAULICS





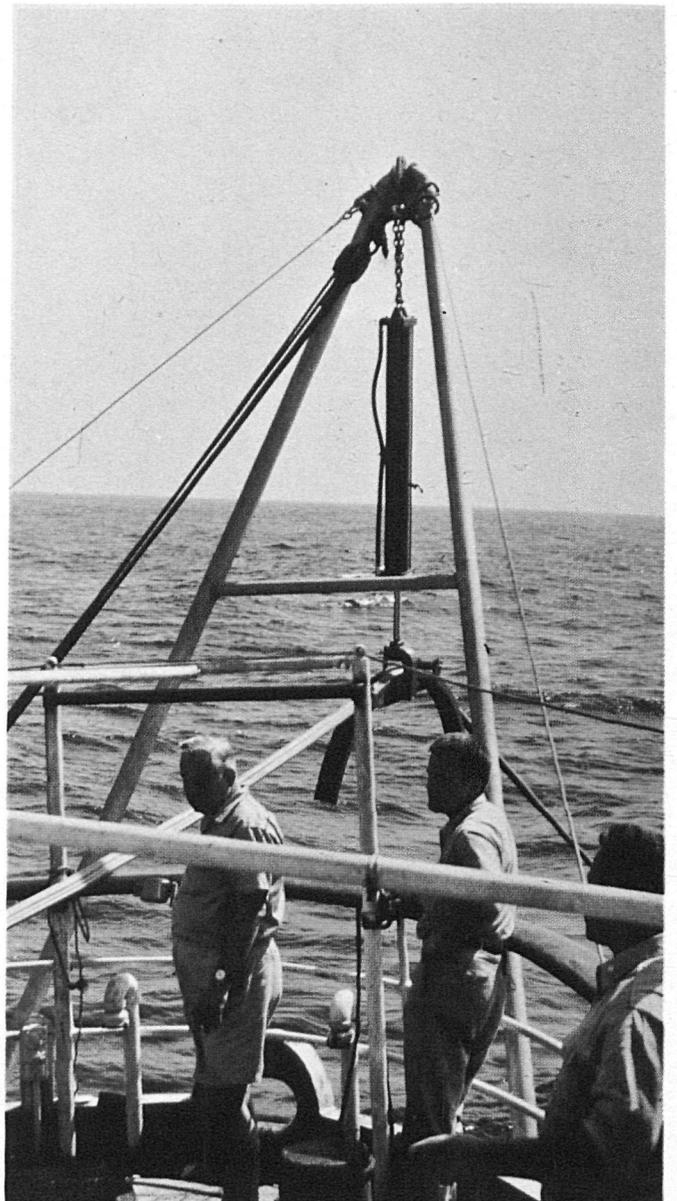
MR. REINERT AND MR. HOLLMON MAKE FINAL CHECKS ON THE FLOW METER FISH



SOMETIMES THE SIMPLER THINGS IN LIFE WORK BEST



DYE MIXING PARTY ON THE AFTER DECK



HYDRAULIC ACCUMULATOR FOR FLOW METER



SHIPS OFF RECIFE, BRAZIL WAITING TO ENTER HARBOR

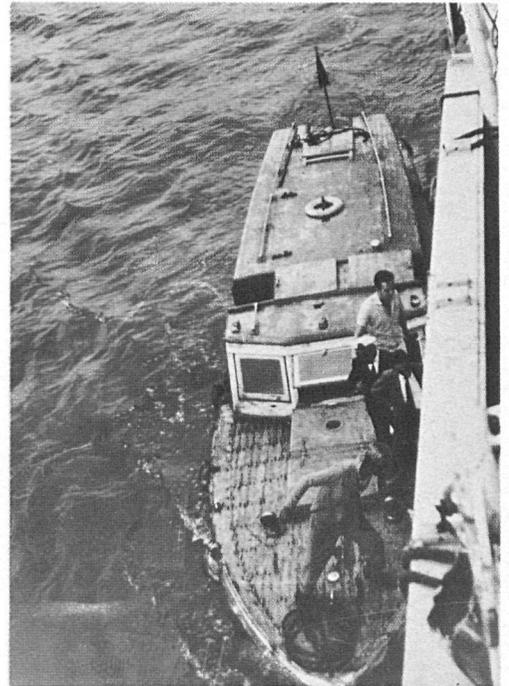


PILOT BOAT COMES ALONGSIDE



ENTERING THE HARBOR OF RECIFE

RECIFE



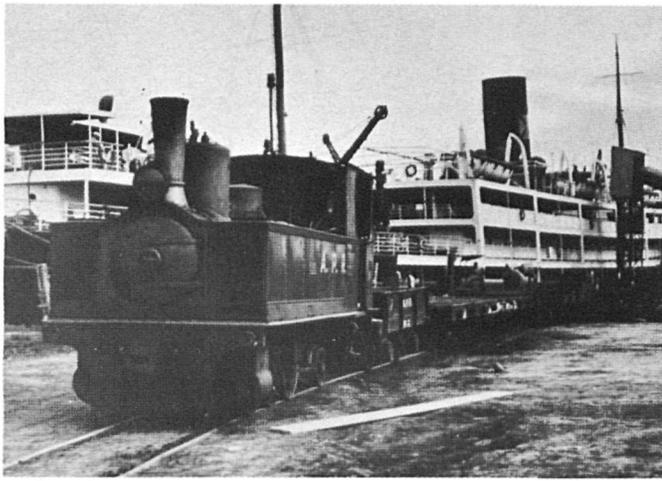
BRAZILIAN PUBLIC HEALTH OFFICERS COME ON BOARD



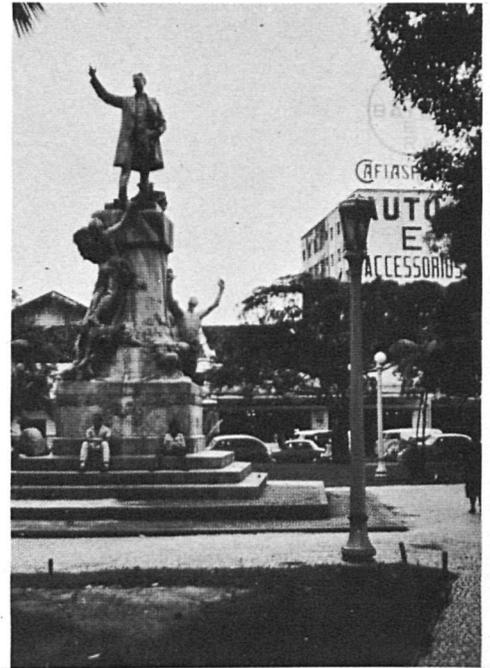
A BUSY PORT



ALONGSIDE AT RECIFE, BRAZIL



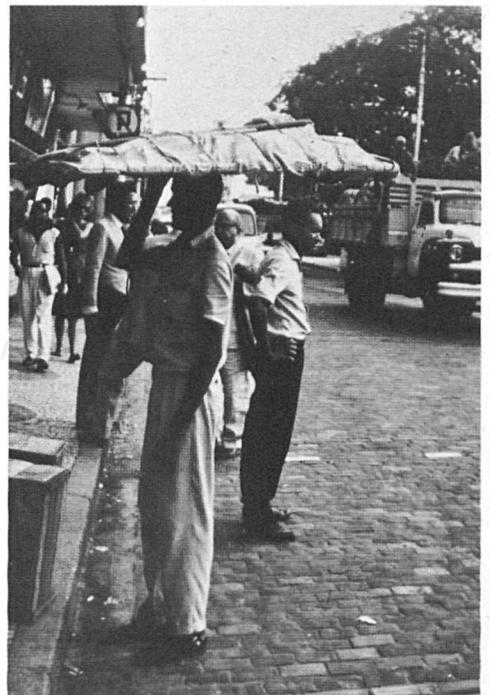
THE LITTLE ENGINE THAT COULD



AT THE SQUARE IN DOWNTOWN RECIFE



DOWN - TOWN



IN RECIFE ONE PICKS UP HIS STORE AND WALKS



LOCAL TRANSPORTATION



COCONUT JUICE VENDOR ON THE BEACH



BEAUTIFUL OLD CHURCH ON THE BEACH SOUTH OF RECIFE



BEAUTIFUL CHURCH IN THE CENTER OF TOWN



JACANDA BOATS RETURN AFTER A DAYS FISHING

AUTOGRAPHS



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