ADMIRALTY RESEARCH ESTABLISHMENT
PHYSIOLOGICAL LABORATORY



FORT ROAD
ALVERSTOKE
GOSPORT
HAMPSHIRE
PO12 2DU

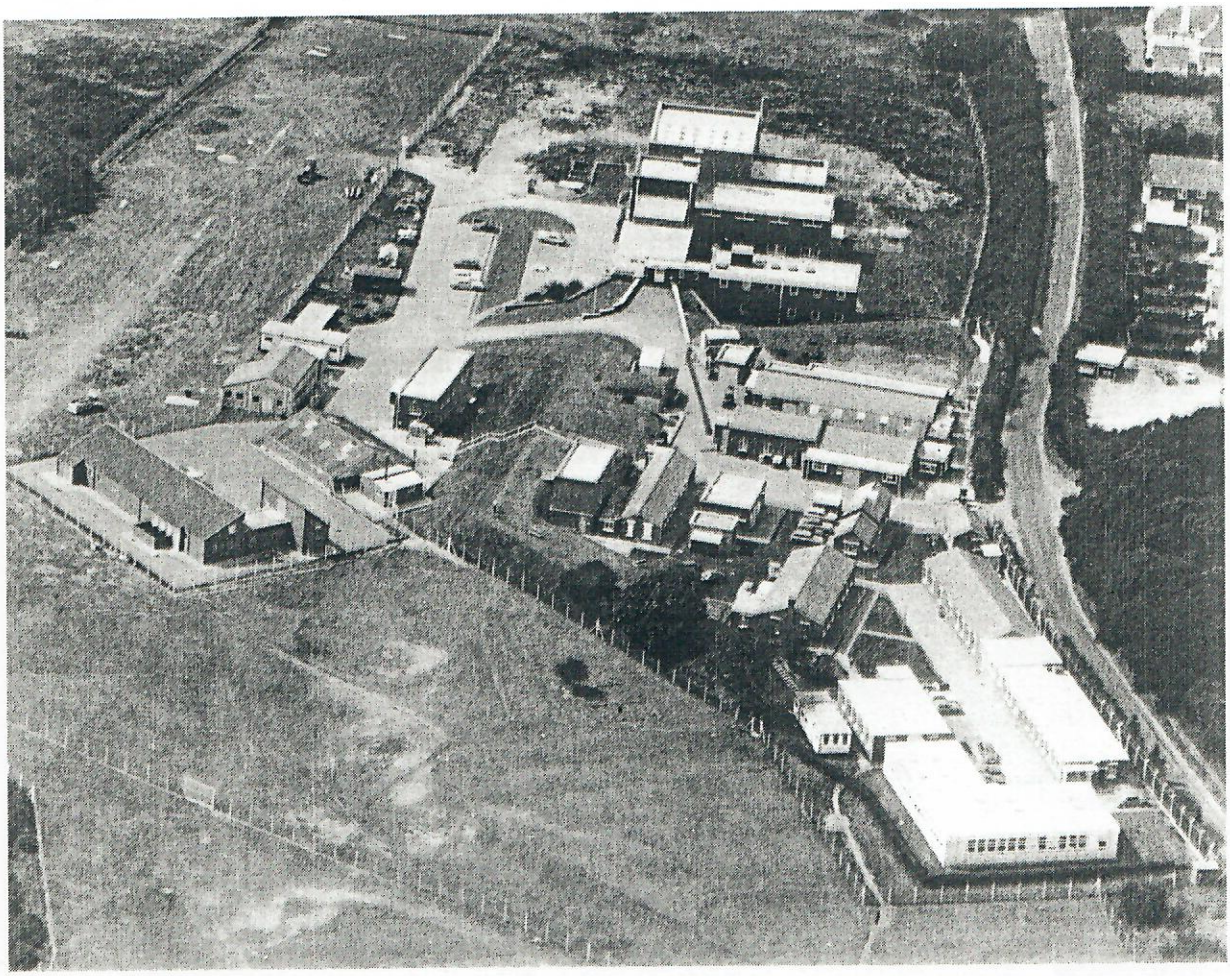
PORTSMOUTH (0705)524651

PADI INSTRUCTOR 33913 Albrecht Salm

PADI Albrecht Salm Master Scuba Diver Trainer PADI MSDT # 33913

11/2026

ARE PHYSIOLOGICAL LABORATORY
VIEWED FROM THE ~~WEST~~ EAST



DCC hatch diameters?
Siphon electricity
Services inside DCC's elec water etc

The author's personal copy

ARE PHYSIOLOGICAL LABORATORY

INTRODUCTION

The scientists, doctors and engineers of the Physiological Laboratory form multidisciplinary teams to carry out research into the biomedical problems of all types of military diving and of the survival of submariners who may be trapped in a damaged submarine.

The diving work deals with the thermal, decompression, neurological and cardiorespiratory problems of shallow (bounce) diving using oxygen, air or mixtures of oxygen and nitrogen, and of deeper (saturation) diving using mixtures of oxygen and helium.

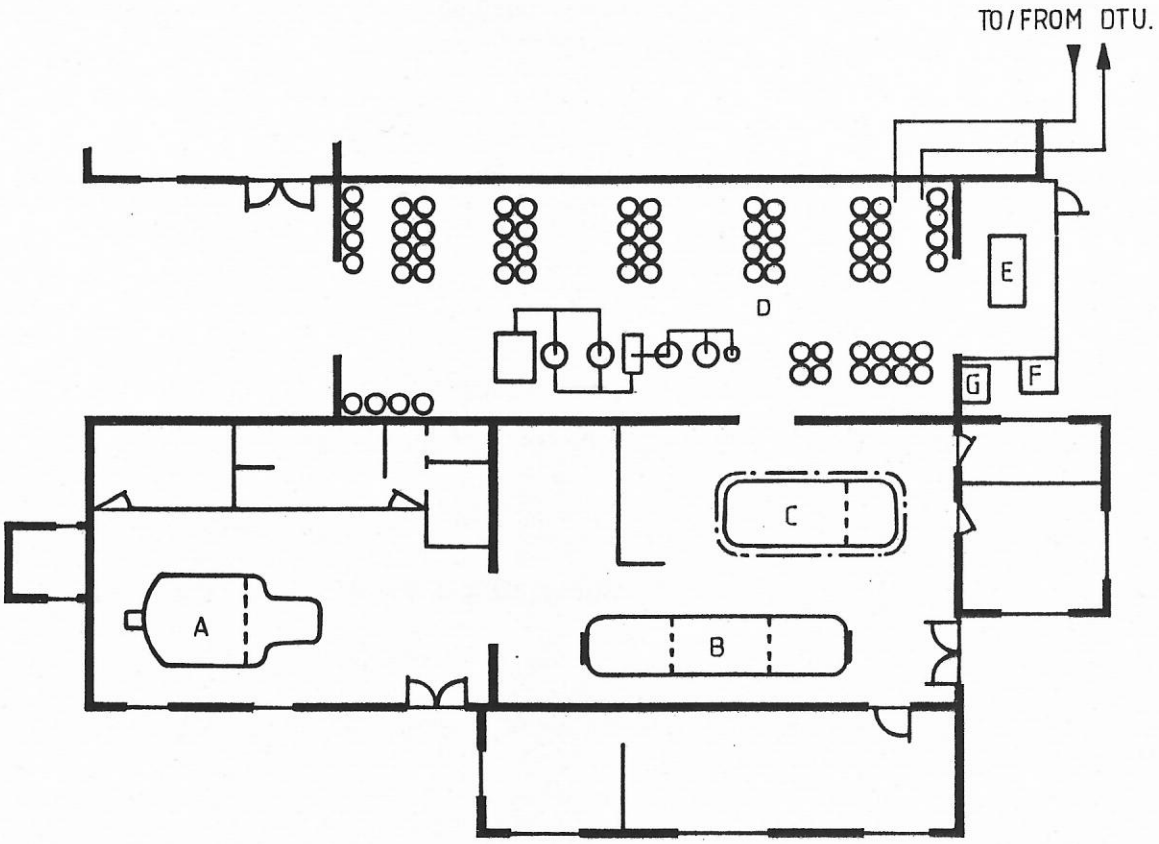
The submarine work is concerned with exploring ways of returning the survivors of a submarine accident safely to the surface. It involves research on the physiology of very rapid changes in pressure, of maintaining a survivable environment within a damaged submarine, and of caring for the survivors during and after their return ot the surface.

Although trials at sea are an important part of the Laboratory's task, most of the diving research is carried out in hyperbaric chambers in which the conditions encountered in military diving can be simulated. The smaller chambers can accommodate 2 or 3 subjects; the larger ones can cope with dives lasting many weeks. The special requirements of simulating the escape or rescue of survivors in a damaged submarine are met by a purpose-built hyperbaric chamber which can also be use for long saturation dives. All these facilities are operated and maintained by the specialist staff of the Laboratory.

Staff also act as special advisors during the procurement of diving equipment for the armed services. This work frequently involves a lengthy programme of dives to evaluate the capabilities of equipment proposed for purchase.

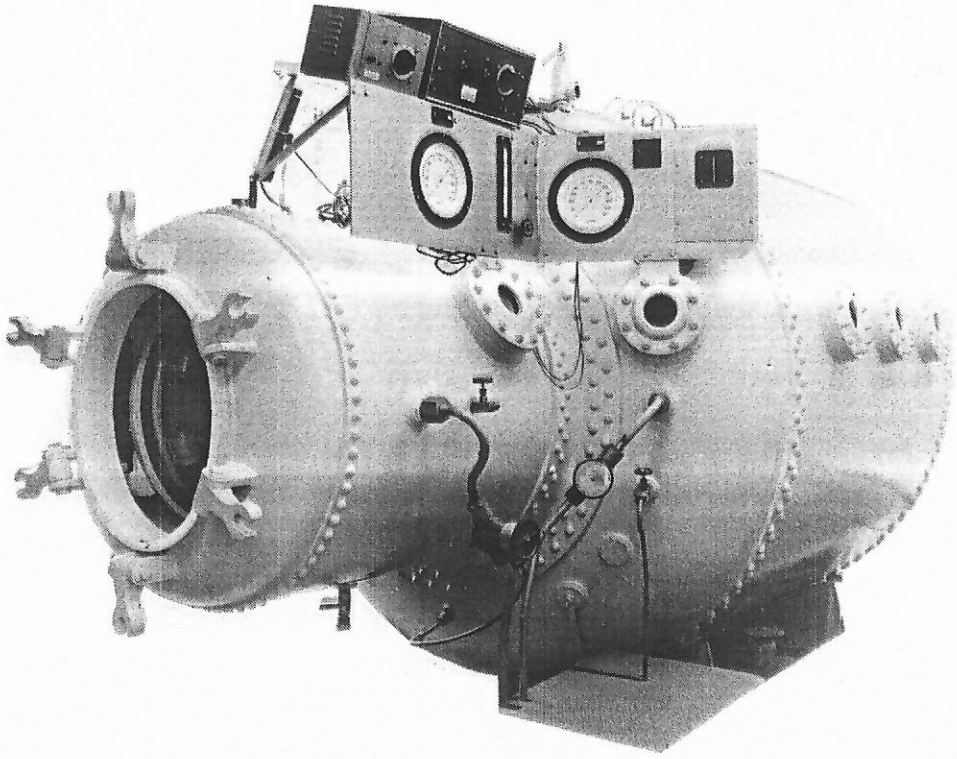
The Laboratory maintains close practical links with other researchers in the United Kingdom, with the manufacurers of diving equipment and diving contractors, and with researchers abroad, particularly in Canada, France, Norway and the USA.

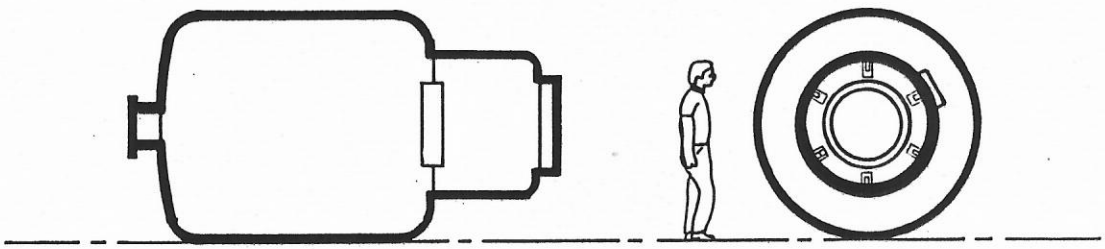
GENERAL LAYOUT OF
HIGH PRESSURE CAMBER UNIT



A. CHAMBER 2/100/16
B. CHAMBER 3/240/12
C. CHAMBER 2/690/10
D. GAS STORAGE ROOM
E. COMPRESSOR ROOM
F. VACUUM PUMP
G. WATER PUMP

CHAMBER 2/100/16

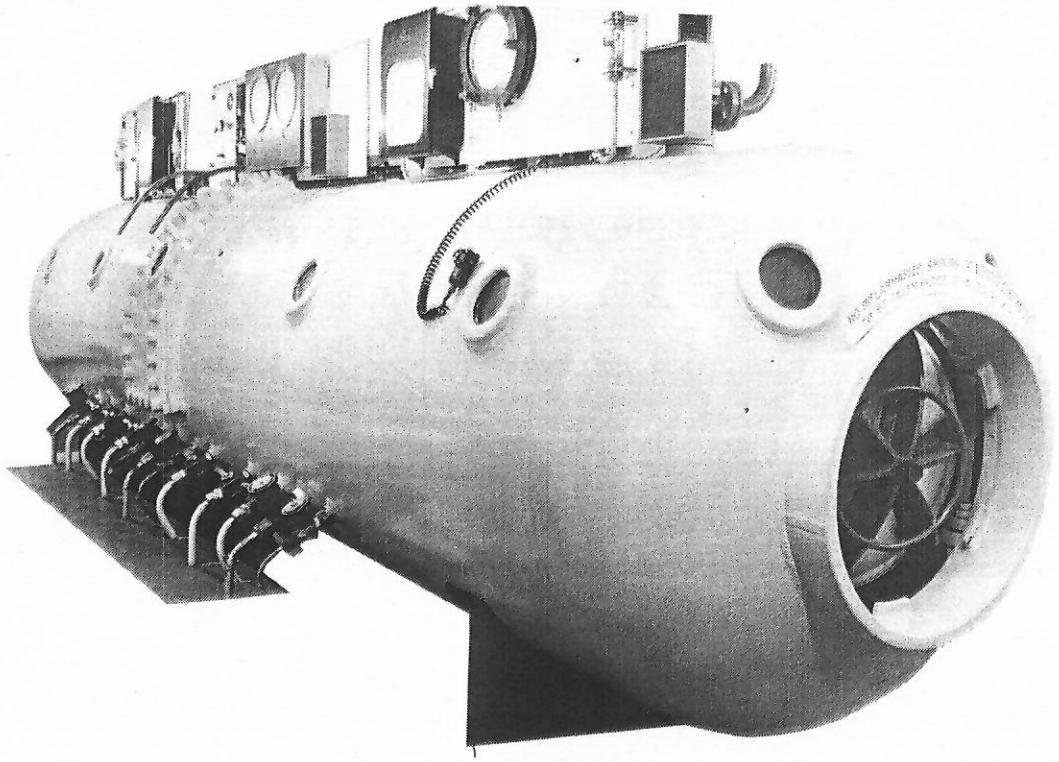


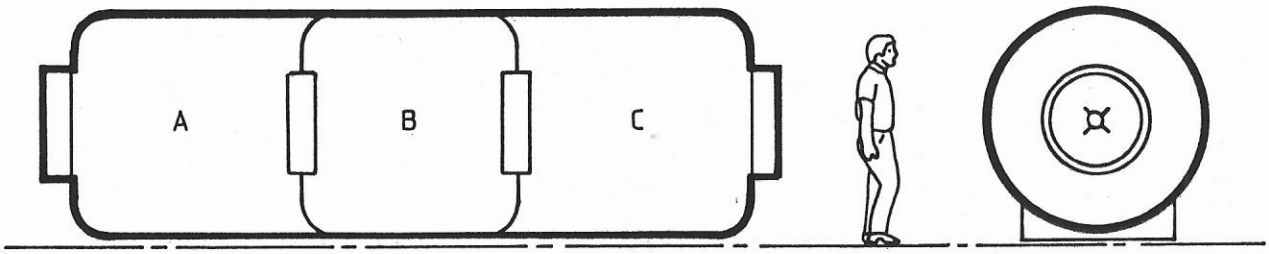


TECHNICAL DATA 2/100/16

INNER LENGTH (MAN LOCK)	1130 mm
INNER DIAMETER (MAN LOCK)	1220 mm
INNER LENGTH (MAIN CHAMBER)	3225 mm
INNER DIAMETER (MAIN CHAMBER)	2425 mm
TOTAL VOLUME	16 M^3
MAX. WORKING DEPTH	100 M
MAX. WORKING PRESSURE	11 bar
2 DOORS - ELLIPTICAL	750 x 620 mm
1 HAND LOCK (IN MAIN CHAMBER)	
No. OF ELECTRICAL PENETRATIONS	35 APPROX.
No. OF OTHER PENETRATIONS	35 APPROX.

CHAMBER 3/240/12

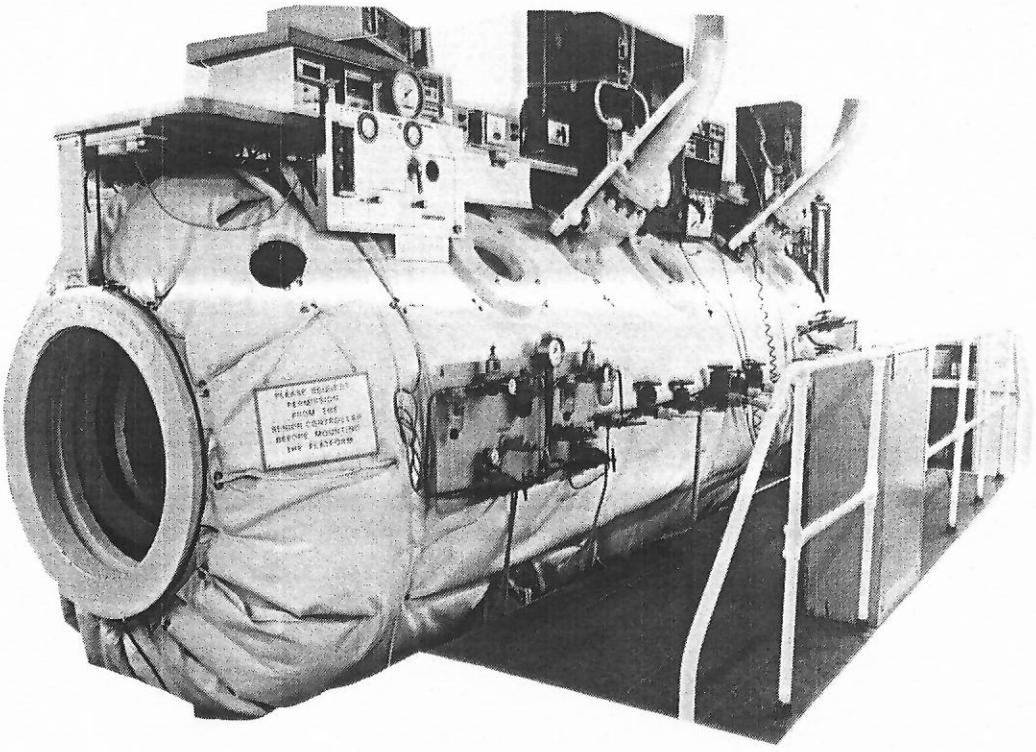


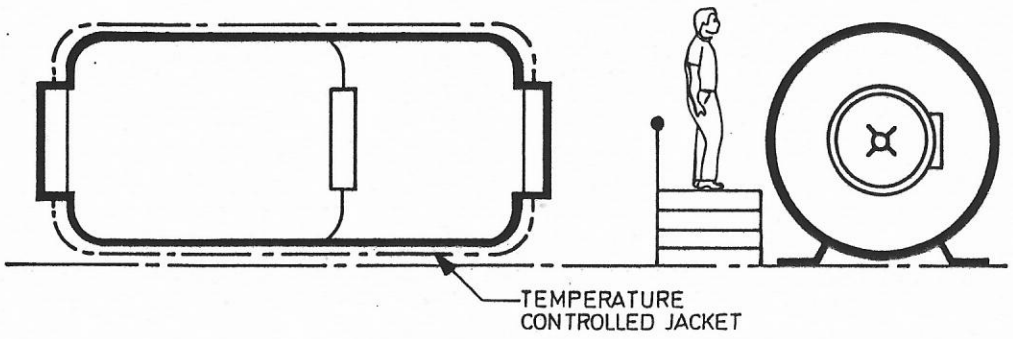


TECHNICAL DATA 3/240/12

INNER LENGTH CHAMBER 'A'	2400 mm
INNER LENGTH CHAMBER 'B'	1980 mm
INNER LENGTH CHAMBER 'C'	2400 mm
INNER DIAMETER (ALL CHAMBERS)	1525 mm
TOTAL VOLUME	$12M^3$
MAX. WORKING DEPTH	240 M
MAX. WORKING PRESSURE	25 bar
4 DOORS	700 mm DIA
No. OF ELECTRICAL PENETRATIONS	75 APPROX.
No. OF OTHER PENETRATIONS	20 APPROX.

CHAMBER 2/690/10





TECHNICAL DATA 2/690/10

INNER LENGTH (MAN LOCK)	1300 mm
INNER LENGTH (MAIN CHAMBER)	3275 mm
INNER DIAMETER (BOTH CHAMBERS)	1675 mm
TOTAL VOLUME	10 M^3
MAX. WORKING DEPTH	690 M
MAX. WORKING PRESSURE	70 bar
3 DOORS	750 mm DIA
1 HAND LOCK (IN MAIN CHAMBER)	
No. OF ELECTRICAL PENETRATIONS	150 APPROX.
No. OF OTHER PENETRATIONS	40 APPROX.
CONTROLLABLE TEMPERATURE	$\pm$ 0.2°C
STANDBY CARBON DIOXIDE SCRUBBERS	
HELIUM SPEED DE-SCRAMBLER	

GAS STORAGE ROOM

MIXED GAS SYSTEM

60 CYLINDERS CONTAINING BREATHING GAS MIXTURE	
MAXIMUM STORAGE PRESSURE	270 bar
CAPACITY (PER CYLINDER)	0.25 M^3

INERT GAS FIRE BLANKET SYSTEM

2 CYLINDERS CONTAINING HELIUM	
MAXIMUM STORAGE PRESSURE	270 bar
CAPACITY (PER CYLINDER)	0.25 M^3

HIGH PRESSURE WATER SYSTEM

2 CYLINDERS CONTAINING WATER	
MAXIMUM STORAGE PRESSURE	270 bar
CAPACITY (PER CYLINDER)	0.25 M^3

EXTERNAL LIFE SUPPORT SYSTEM

4 CYLINDERS	
WORKING PRESSURE	70 bar
CAPACITY (PER CYLINDER)	0.10 M^3
CONTROLS HUMIDITY AND TEMPERATURE	
REMOVE HYDROCARBONS AND CO^2	

COMPRESSOR ROOM

TYPE OF COMPRESSOR - BURTON CORBLIN MODEL ASCL250	
2 STAGE COMPRESSOR - HIGH	250 bar
- LOW	15 bar

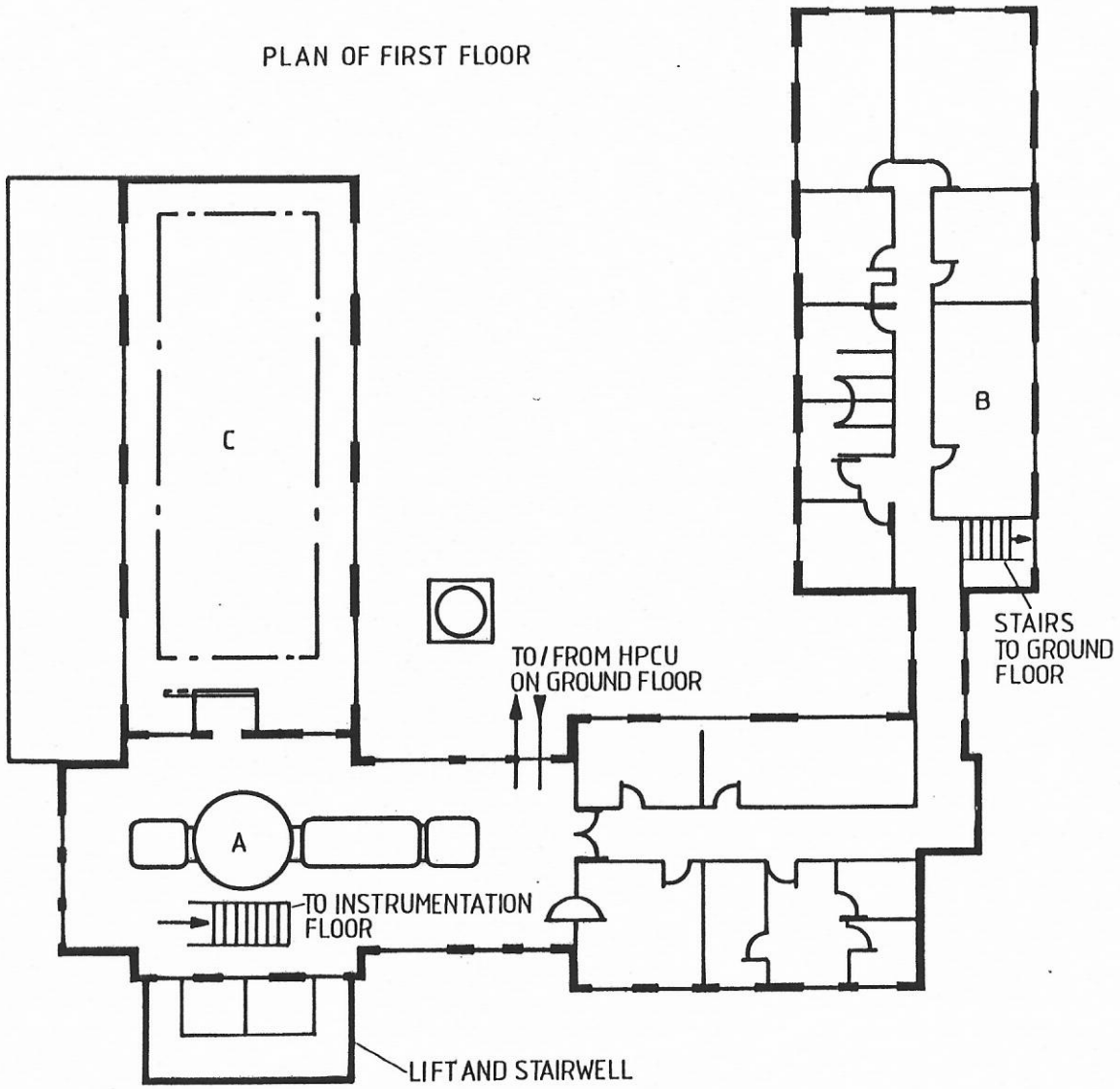
VACUUM PUMP

PRESSURE	— Ve TO 0.8 bar
CAPACITY	0.83 M^2/MIN

WATER PUMP

TYPE OF PUMP - AIRHYDRO POWER UNIT	MK 7
AIR TO HYDRO RATIO	1:284

GENERAL LAYOUT OF DEEP TRAILS UNIT

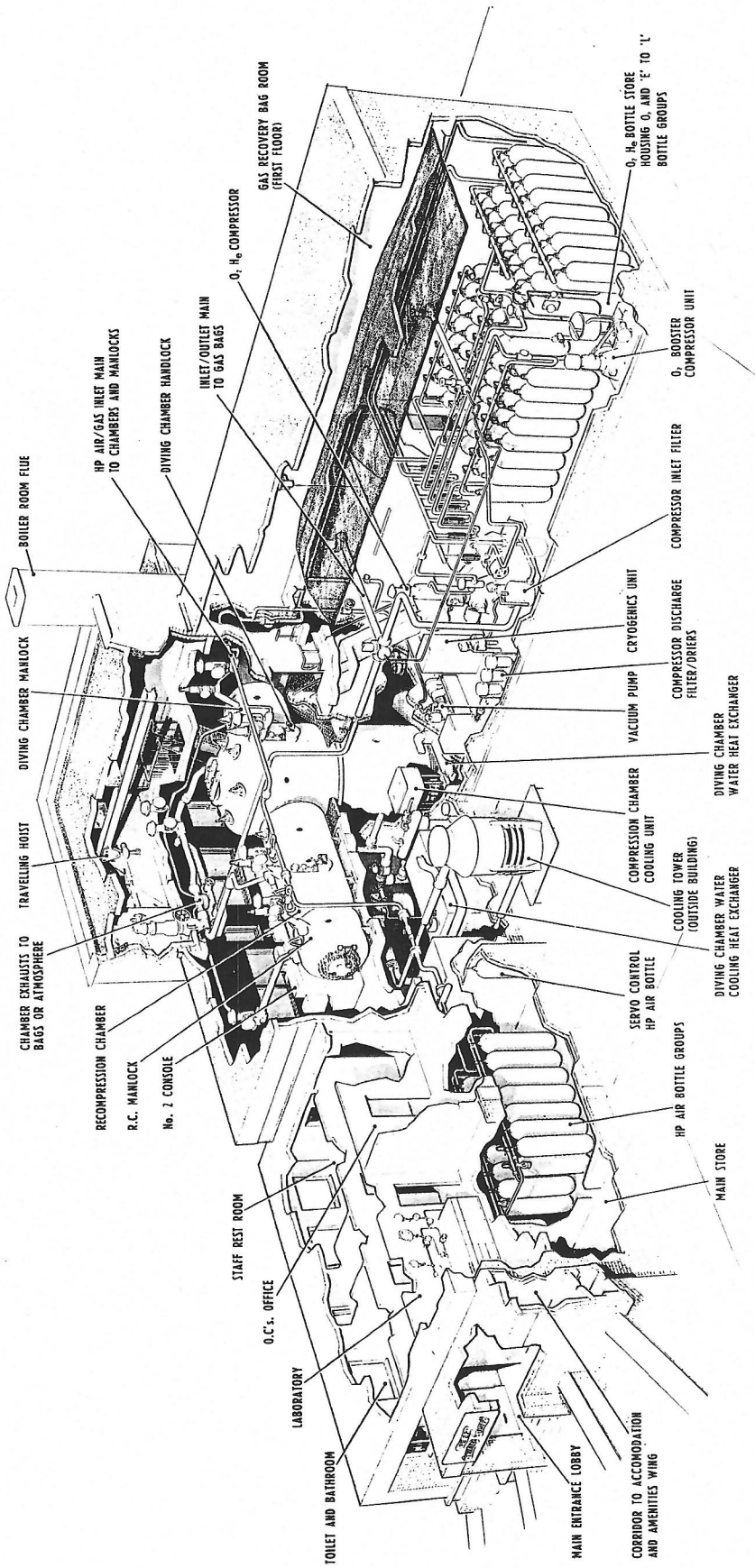


A. DEEP TRIALS CHAMBER

B. ACCOMODATION AREA

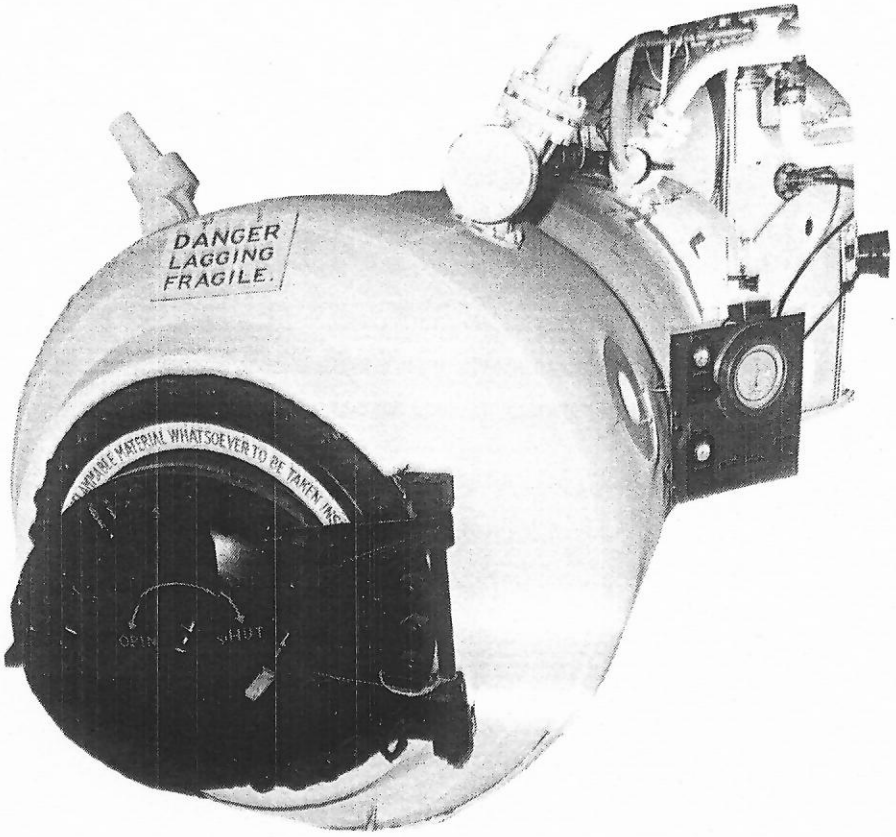
C. GAS STORAGE & RECLAMATION

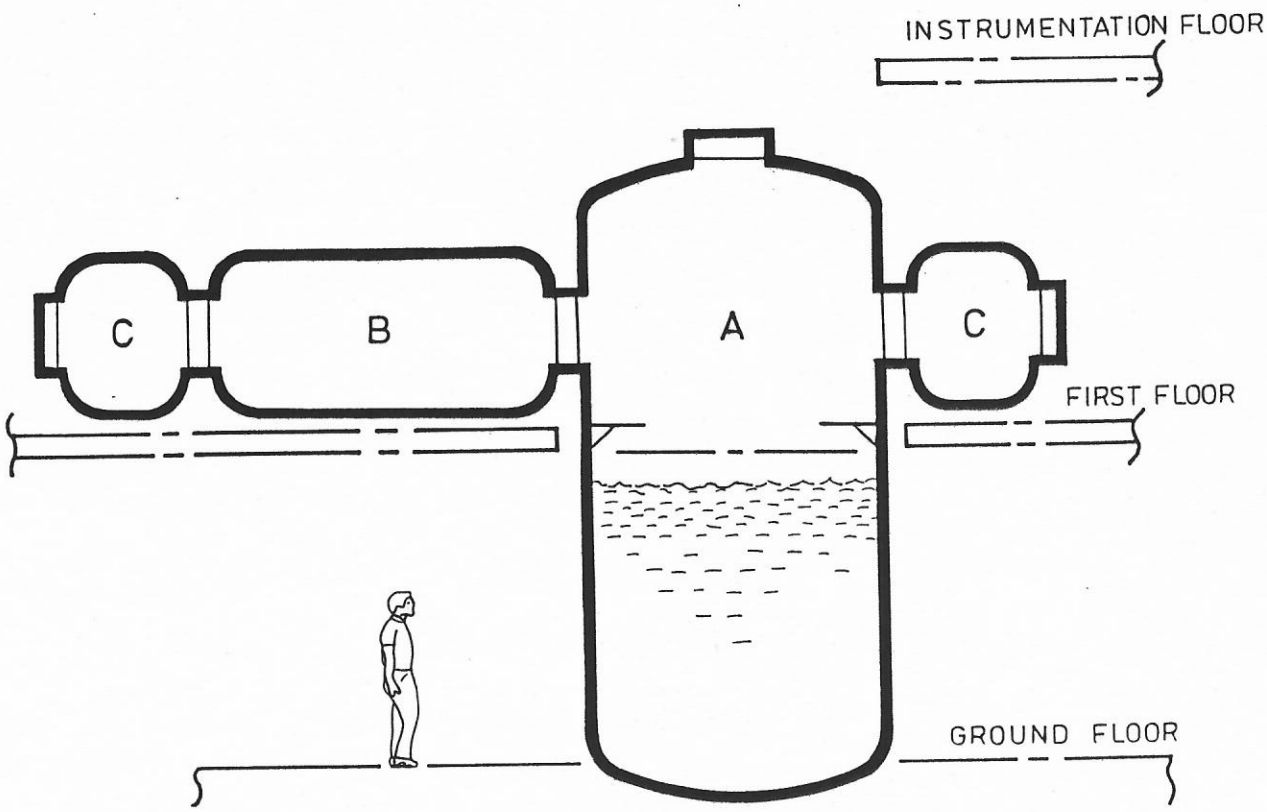
CUT-AWAY DRAWING OF THE DEEP TRAILS UNIT



DEEP TRIALS UNIT - NORTH EAST ELEVATION

DEEP TRAILS UNIT





DEEP TRAILS UNIT

TECHNICAL DATA 4/300/-

WORKING DEPTH (WET OR DRY)	300 M
WORKING PRESSURE	3.1 bar

DIVE CHAMBER 'A'

INNER LENGTH	7200 mm
INNER DIAMETER	3000 mm
DEPTH OF WATER	3500 mm
WATER TEMPERATURE CONTROLLABLE	0 TO 30°C

BACTERIOLOGICAL TREATMENT AND PRESSURE FILTERING
ATMOSPHERIC CONTROL AND CHAMBER HEATING
SAFETY PLATFORM TO SURFACE DIVERS IN DIFFICULTIES
SWIM ERGOMETER AND WEIGHT-LIFTING APPARATUS
DIVING BELL GAS CONTROL AND COMMUNICATIONS
STANDBY CARBON DIOXIDE SCRUBBERS

COMPRESSION CHAMBER 'B' (DECK DECOMPRESSION CHAMBER)

INNER LENGTH	4000 mm
INNER DIAMETER	2000 mm

BUNKS FOR 3 DIVERS
FULL ATMOSPHERIC CONDITIONING FOR
OXYGEN, CARBON DIOXIDE, HUMIDITY AND HYDROCARBONS

MANLOCKS 'C'

2 MANLOCKS ONE IN EACH END OF COMPLEX

HANDLOCKS

2 HANDLOCKS ONE IN DIVE CHAMBER THE OTHER IN THE COMPRESSION CHAMBER

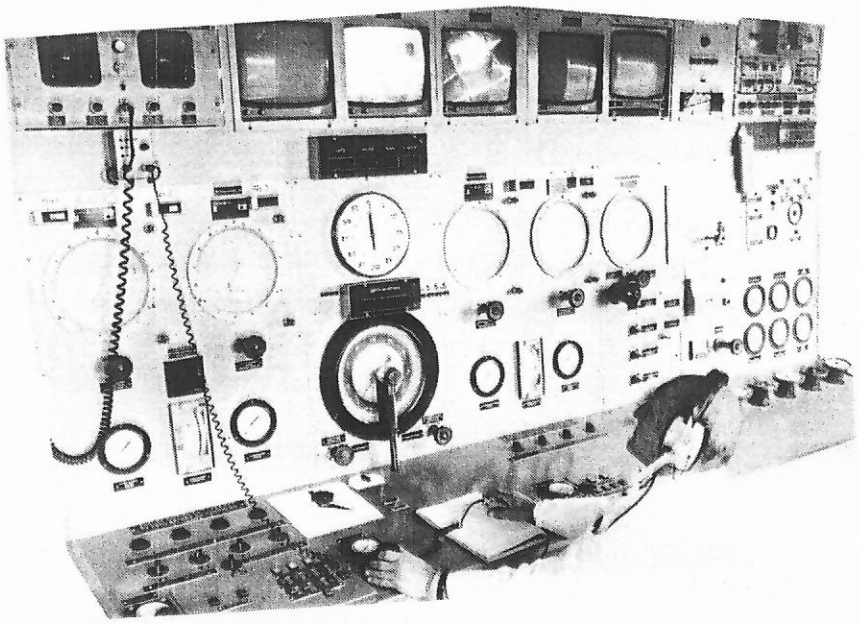
ACCESS DOORS

There are five connecting doors in the chanber complex each 0.762 m, two way and quick acting. There is a further conventional strong-backed elliptical (1.2 m x 0.8 m) hatch is situated at the top of the Diving Chamber and is used for loading equipment into the chamber using a 0.5 ton lift and traverse.

ENTERTAINMENT

For dives involving long decompression times, radio and live colour television programmes are available to the divers.

CONTROL CONSOLE FOR THE DEEP TRAILS UNIT



CONTROL

Depth is controlled to an accuracy of	0.1 M
Rate of Ascent/Descent	0-300 M/MIN

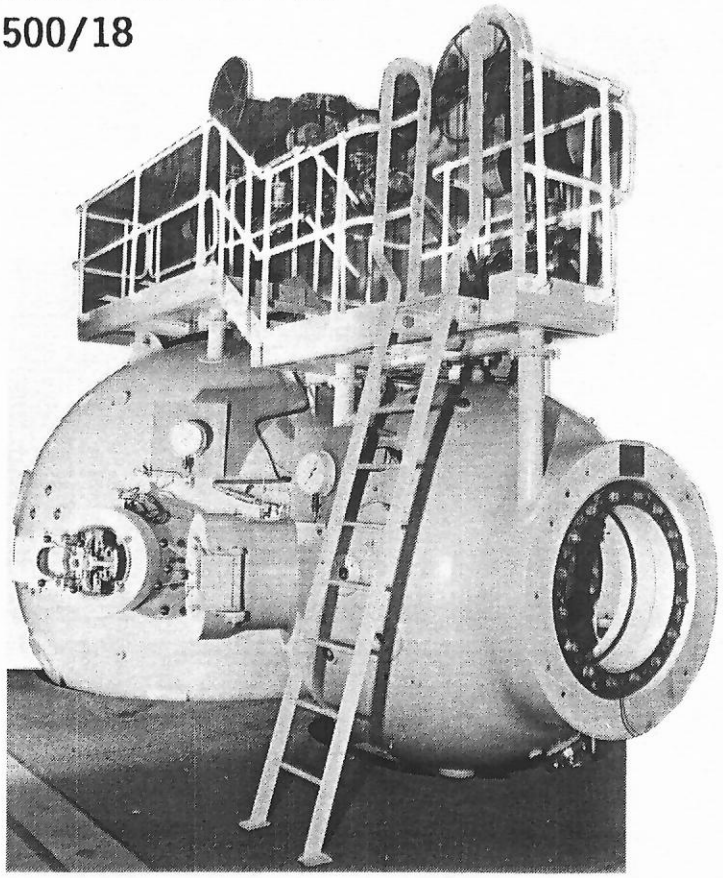
Gas Supply to divers and/or chambers may be Air, Oxygen or any Oxy-helium mixture. The Carbon Dioxide content of the chamber atmosphere is normally maintained at less than 0.5% surface equivalent and any prescribed Oxygen level can be adhered to, although from the fire risk aspect this is never allowed to above 25% of the total chamber volume.

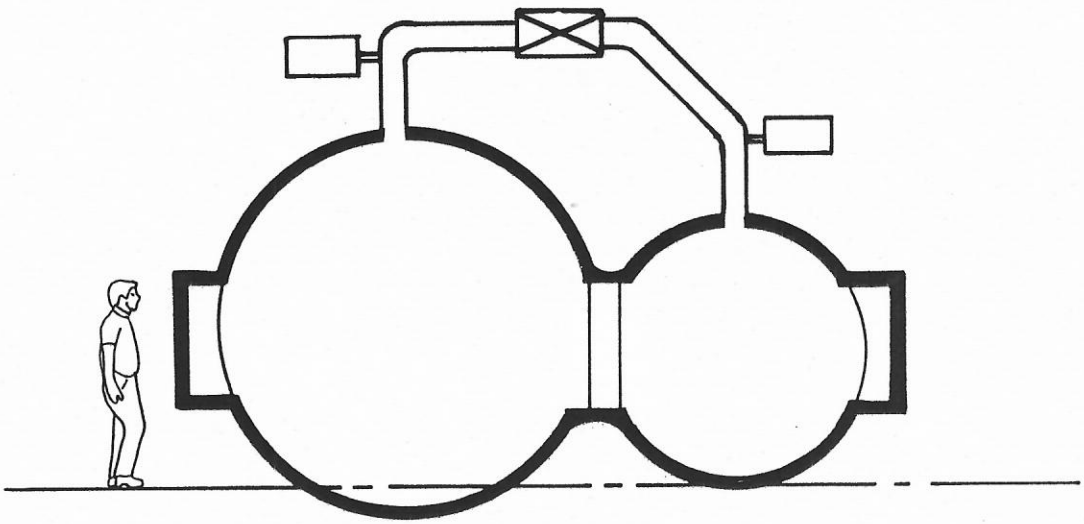
Monitoring. All chambers are continously monitored for Oxygen, Carbon Dioxide, Temperature and Humidity. EEG, ECG and Ultrasonic recording facilities are also available.

Closed Circuit Television Coverage is provided for the two main chambers including the underwater situation.

Communications. Complete two-way coverage is provided between control, all chambers and the divers.

SUBMARINE ESCAPE SIMULATOR
CHAMBER 2/1500/18

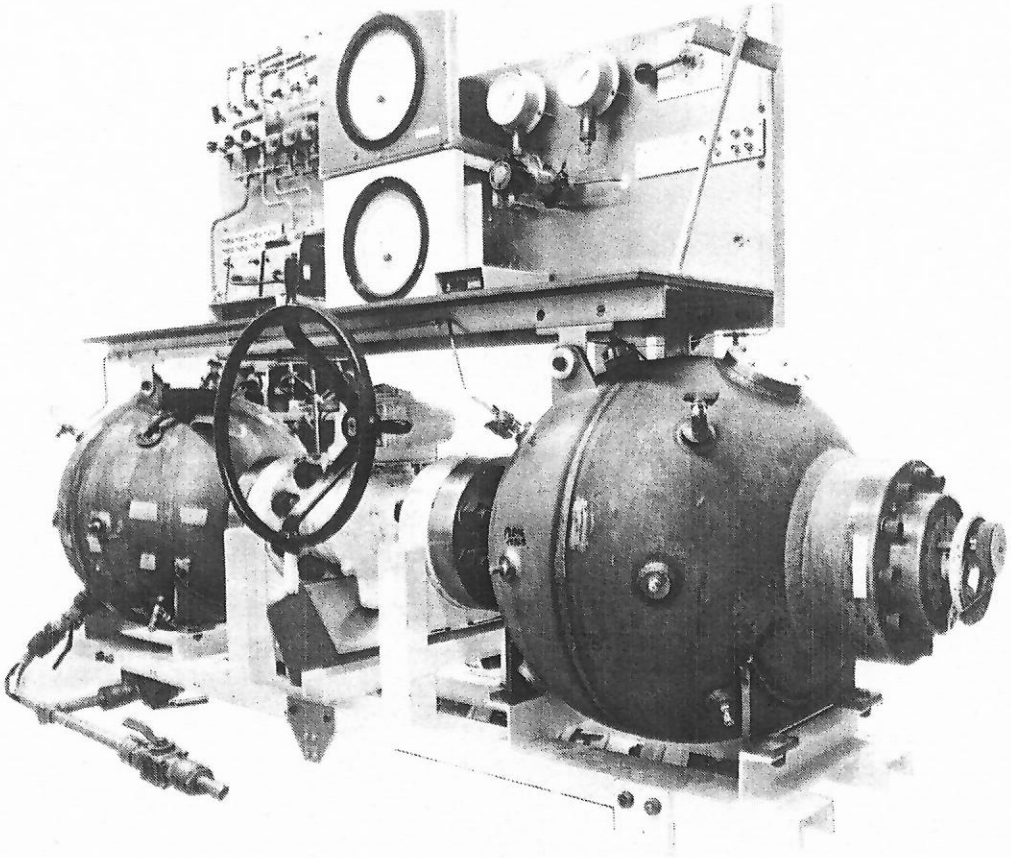


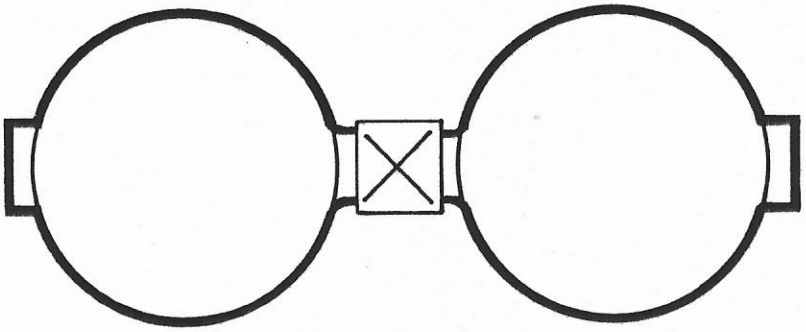


TECHNICAL DATA 2/1500/18

INNER DIAMETER (LARGE SPHERE)	3000 mm
INNER DIAMETER (SMALL SPHERE)	2000 mm
TOTAL VOLUME (LARGE SPHERE)	14 M^3
TOTAL VOLUME (SMALL SPHERE)	4 M^3
MAX. WORKING DEPTH	1500 M
MAX. WORKING PRESSURE	151 bar
3 DOORS 2 EXTERNAL 1 INTERNAL	750 mm DIA
2 HANDLOCK ONE FOR EACH CHAMBER	

TWIN SPHERE CHAMBER 2/1000/.06

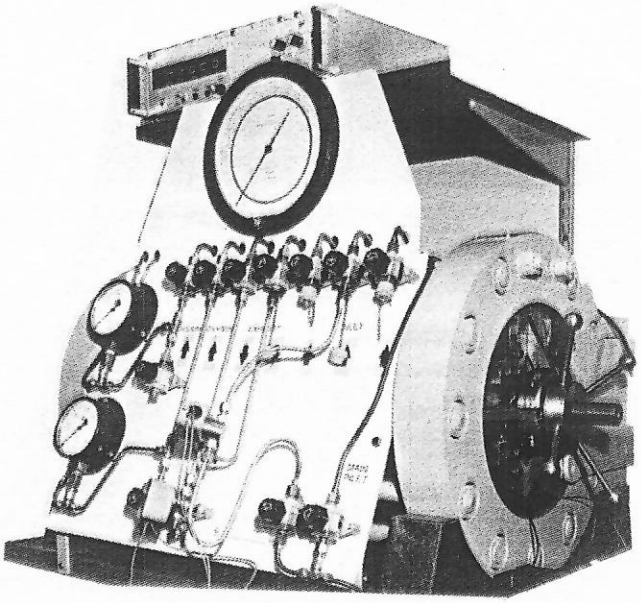


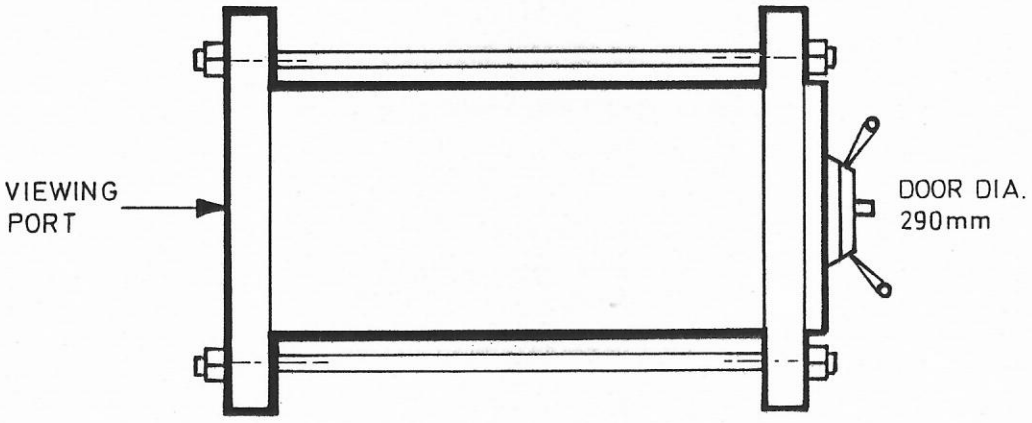


TECHNICAL DATA 2/1000/.06

INNER DIAMETER (EACH SPHERE)	500 mm
TOTAL VOLUME (EACH SPHERE)	0.06 M^3
MAX. WORKING DEPTH	1000 M
MAX. WORKING PRESSURE	101 bar
2 PORTS (1 IN EACH SPHERE)	140 mm

INSTRUMENT CHAMBER 1/345/.04





TECHNICAL DATA 1/345/.04

INNER LENGTH	600 mm
INNER DIAMETER	300 mm
TOTAL VOLUME	0.04 M^3
MAX. WORKING DEPTH	345 M
MAX. WORKING PRESSURE	35.5 bar
1 DOOR	290 mm DIA
No. OF ELECTRICAL PENETRATIONS	7
No. OF OTHER PENETRATIONS	9

ORKSHOP

TRODUCTION

gineering Services supplies Engineering and Site Services support to all ientific Divisions of the ARE PL site. This support extends to other UK D sites and establishments throughout the UK and abroad.

ECIALIST ACTIVITIES

DESCRIPTION

a. Manufacture of equipment, instrumentation and test rigs for use by the scientific staff in furtherence of their line of research.

b. Modification and maintenance of the same.

c. Maintenance, modification and adaption of compression chamber facilities and ancillary equipment.

d. Construction, modification and maintenance of establishment high pressure air distribution system, and gas supply systems to laboratories.

e. Experimental preparation, eg gas mixing.

f. Engineering support during experiments.

Responsible for statutory testing and inspection of all relevant equipment, eg pressure vessels, slings etc.

Supply of compressed air to local establishments.

EDULE OF CAPABILITIES — WORKSHOPS

ivity	Capacity (maximum)	Remarks
ning	460 mm swing 1280 mm bed	Butler 460 (with hydraulic copying attachment); Boley & Leinen; Harison M300, 12" swing; Pultra (watchmakers); Smart & Brown; Colchester Master 6.5
ling	Table size 1219 mm x 279 mm	Richmond Universal '3'; Elliott Vertical 'V2'; Christon Universal (bench), Bridgeport Series
lling	4 Morse taper Floating, table 380 mm x 635 mm	Elliott Pillar '5E'; Progress No 3A Pillar, Peerless bench, Grafton bench
ing	Power 208 mm dia band 450 mm throat 600 mm throat for wood 340 mm throat	Qualters & Smith; Startrite 'SP148' (band) Dominion (band) Startrite
nding	Lathe, modified attachment	
nding	(1) Wheel size 254 mm dia x 25.4 mm thick (2) Diamond Lap	Harrison pedestal Wolf pedestal Wolf pedestal with wire/ buffing wheel Wickman & Nevin Diamond Lap
	Tool grinder Surface grinder	Jones & Shipman Model 310 Jones & Shipman Model 540

SCHEDULE OF CAPABILITES — WORKSHOPS

ACTIVITY	CAPACITY (MAXIMUM)	REMARKS
Sheet Metal Work	Length Thickness	
a. Rolling	915 mm 1.5 mm)	Keston
b. Shear Cutting	588 mm 0.5 mm)M/S	Besck
c. Folding	915 mm 1.5 mm)	Oliver
Fly Press	254 mm Fall	Norton 2A Bench
Welding	a. Gas	BCC
	b. Argon Arc	BOC Transtig AC/DC
	c. Electric Arc	
	All metals inc stainless steel and aluminium	
Flame Cutting	Hand, ½"M/S	Madan
Weld Preparation and Cleaning	Finishing Band 250 mm x 600 mm	
Heat Treatment Ovens	Capacity Max Temp	
	0.75 m^3 500°C	
	0.009 m^3 980°C	
Pipe Bending	Hydraulic 50 mm	
	Hand 12 mm	
Pipe Threading	Hand 50 mm	
Hydraulic Testing Pumps	1700 bar	Madan, Haskel

SCHEDULE OF CAPABILITIES **WORKSHOPS**

ACTIVITY	CAPACITY (MAXIMUM)	REMARKS
Wood Machining	Circular Saw 250 mm Planer 260 mm x 180 mm, Spindle	Lurem C260 Universal Woodworking Centre
DeadLoad Tester	2 - 400 bar	Desganges Et Juot 5206
Engraving	Table 355 mm x 518 mm	Rank 'K' Mk 2