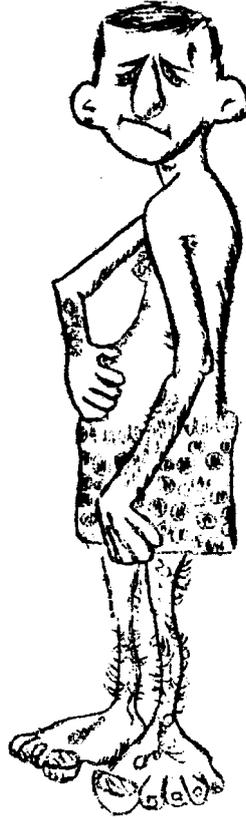


SOUTH PACIFIC UNDERWATER MEDICINE SOCIETY
NEWSLETTER



"MEDICAL STANDARDS FOR DIVERS"

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Vol. 2

No. 1

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SOUTH PACIFIC UNDERWATER MEDICINE SOCIETY
NEWSLETTER 1/72

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1. EDITORIAL

Your tolerant and benign Editor sometimes get annoyed about advice given by medical practitioners to divers. It must be remembered that there is no correlation between the size of a diver's mouth and the size of his brain. Indeed there could be a significant negative correlation. They are prone to devour, assimilate and regurgitate all bits of incorrect information, especially if given through an alcoholic haze. They then use these snippets to supports their preconceived notions. Although the diver may believe that the divine right of doctors descends below the sea, the aquatic hazards have no such respect.

In the last Newsletter it was reiterated that the companion diving drill was an essential part of safe diving practice. It was clearly, though not tactfully, pointed out that the only real way of ensuring that your companion diver is able to be rescued, is to have him on the end of a buddy line. This opinion has brought forward some adverse criticism, although notably not by those divers or medicos associated with the last 3 diving fatalities of 1971. Each diver would have survived had the companion diving principles been enforced. It is sobering to look down on the body of a young lad on the autopsy table, and know that he needed only one 9ft line between him and another diver to have prevented this idiotic accident. The absence of a buddy line between SCUBA divers constitutes negligence of the greatest degree.

I feel that it is about time that the medical officers associated with diving clubs stopped trying to pretend that they are rough, tough divers, and gave more thought to the safety of the members who respect them. It is important to appreciate that they are respected because of their medical qualification, not because of their diving prowess. The insistence of adhering to the companion diving techniques is axiomatic to those medical officers involved in full time diving or with professional divers, and they find difficulty in understanding the resistance from the part time diver/doctors. Unfortunately it is the latter who have the ears of the amateur diving clubs and organisations - the very groups that could benefit from authoritative advice on safety precautions of diving. The companion diver drill is the most neglected of these - and your Editor makes a plea for the use of buddy lines, or life lines.

2. SECOND GENERAL MEETING

A meeting was held in the library of the School of Underwater Medicine, at 4 pm, on 22nd November. Information was received from the Secretary, who was unable to attend, and the correspondence from the Postgraduate Federation in Medicine and the Commissioner for Taxation was exhibited.

The major decision at the meeting was the venue for the annual conference. It was decided, almost unanimously, that Heron Island would be the ideal location, it was proposed that we attempt to obtain a block booking for Heron Island, but allow the transport arrangements to be conducted separately by all members. It was decided that an early decision should be made by the Society as to whether sufficient members were interested, so that a reduction in accommodation could be achieved. With this in mind, it was decided to close applications for attendance by the end of February. It is estimated that the accommodation, including full board and lodging, will be a minimum \$70 per week, tax deductible in many cases. It was ascertained that most of the people present at the meeting would be bringing either family or friends. Dr I Unsworth was given the job of arranging the curriculum and itinerary, and Dr R Thomas is organising the accommodation.

Dr R Gray, Dr I Unsworth and Dr R Thomas were appointed as a sub-committee to ascertain the practicability of having a Diploma in Underwater Medicine, and also whether there should be a different status of membership categories for SPUMS. It is hoped that a report will be available at the annual meeting, for discussion.

Affiliation with the Undersea Medical Society was also considered, but because of the great discrepancy between the financial contributions to the UMS and SPUMS, it was decided that there would be some difficulty at this stage in having a reciprocal membership. It is considered likely that personal discussions will have to be held regarding this possibility.

The next meeting of SPUMS will be either late January or early February, and will be held at 6A Mistral Avenue, Mosman (with refreshments).

3. THIRD GENERAL MEETING

Minutes of the Third General Meeting of the South Pacific Underwater Medicine Society held at 6A Mistral Avenue, Mosman, Sydney on Thursday, 27th January, 1972 at 5 pm.

Present: Drs. C Deal, F Blackwood, C Edmonds, I Unsworth and W Rowe.

Apologies: Dr D Walker, Dr R Thomas and Mr F Ashmore.

A quorum of members was not present and an informal meeting was held to provide guidance for the Executive.

Business

1. Heron Island Conferences

- i. The accommodation available is of a very high standard of comfort and should cater for all tastes - in reply to a question regarding 'creature comforts'.
- ii. It was brought to notice that no regulators are in fact available for hire, although cylinders are. Therefore members and families without regulators who wish to use scuba gear should borrow or hire before arriving at the island.
- iii. The day-to-day programme for the meeting will be arranged in skeleton form shortly, assigning a topic to each scientific morning session, eg. underwater accidents, hyperbaric medicine, marine ecology, etc. One half day will be designated as a working session in which will be raised:
 1. subcommittee reports;
 2. next year's annual general meeting venue, amongst other matters.
- iv. It was generally agreed that the daily sessions be flexible in structure and length of presentation, thereby allowing maximum personal contact and discussion between the participating members.
- v. Other points raised concerning the Heron Island Conference included general agreement that national press coverage be sought for the scientific sessions, for the possibility that financial backing may be available for all or part of the costs of the conference from drug houses or commercial bodies. This was to be looked into further.

2. Newsletter

- i. The Editor of the Newsletter brought up the importance of maintaining a high standard of published items in the Newsletter and appealed for more members to supply material for inclusion, this to be regarded with the utmost urgency. Again the question of availability of sponsorship by a drug company was raised, with finance to improve the quality of printing and publication.
- ii. A list of air stations available for tank filling throughout Australia is to be published in the Newsletter.
- iii. Abstracts of all papers presented at the Heron Island Conference will be published in the SPUMS Newsletter.

3. Specialist Recognition and Qualifications

The possibility of establishing the status of Underwater Medicine Specialist through a Diploma of Underwater Medicine was raised. A certificate for non-medical personnel was also suggested. Two subcommittees to review the feasibility of specialist recognition and qualifications are to be set up - the membership of the medical specialist committee was to consist of Dr R Gray, Dr R Thomas and Dr I Unsworth, the membership of the non-medical subcommittee has not yet been finalised. The reports on the feasibility of both subcommittees are to be presented to the annual conference.

4. Underwater Accidents - Deaths

Dr D Walker has offered to receive reports on these occurrences and to collate all information for publication to members of SPUMS.

5. An International Diving Conference

An International Diving Conference, on or about 28th October, 1972, is to be organised by the SDAA in Sydney. Support has been promised by SPUMS for the second day of the conference on the medical and physiological aspects of diving.

6. Physical Requirements for Diving

- i. The Australian Standards Association has issued the physical requirements for diving, prior to the inception of SPUMS, but it is confirmed that the requirements as laid down are

fully accepted as satisfactory by the SPUMS and by the SDAA.

- ii. It has been suggested that copies of the medical certificate embodying the SDAA requirements be circulated to SPUMS members with the Newsletter. That the requirements be drawn to the attention of the SDAA through the SPUMS representative on the SDAA committee and finally copies circulated initially free of cost to all GP's provided sufficient funds for the printing can be raised through the interest of a commercial sponsor, for which CIG was suggested. This matter was to be looked into further.

There being no further business, the meeting closed at 7.15 pm.

IP Unsworth
Honorary Secretary
SPUMS

4. MEDICAL STANDARDS FOR DIVING

After seeing a few dozen formats of what should be examined medically, prior to a candidate attempting a diving course, I have great pleasure in presenting the Australian Standards Association medical certificate. It is concisely printed on one page, and covers most of the relevant medical items. It is understood that it would be performed prior to diver training, and then annually. The advantages of having all the medical examinations on one page appeals to those medicos engaged in the paper war. It goes without saying that the certificate, or a copy thereof, should be held by the diver concerned - so that it will be available to medical officers who have to treat him in an emergency. His club or organisation could also retain the other copy.

The form has been based on that used by the navies for recording their diving medicals, but with the additions required for estimating occupational disorders of diver (simple respiratory function measurements, full scale audiometry, etc).

Two sample forms are enclosed with this copy of the Newsletter, and for those doctors involved with a diving company or club, photostats should be able to be obtained. Other copies are available from SPUMS, but not en masse.

Although organisations such as the Police, Navy, Army, etc., are probably able to maintain a central register of diving medicals, indexed and available for inspection, it is unlikely that the civilian diving groups will ever be so well organised. It is instructive to consider the number of pseudo national bodies who have made medical standards for divers, in isolation and with little knowledge of other diving groups. The promulgation of the enclosed medical examination form by the Australian Standards Association should put paid to the grandiose views of all those 'other' national bodies that bob up and down like corks.

It is necessary to realise that the medical examination certificate involves only basic standards, and clearly if there is any prolonged or deep diving, x-rays of the long bones, with gonadal protection, should be carried out periodically to exclude avascular necrosis of bone.

It is unfortunate that the development of SPUMS coincided or followed the initial decisions on the medical examination requirements. All doctors who were involved in this field had opportunity to approach the Standards Association - and many of them did. Taken as a whole, the certificate seems a reasonably good one and full congratulations go out to Dr Bob Thomas for the controlling part he played in the development of these standards.

If there are arguments against any of the standards set, then please make your objections in written form so that they can be aired in this Newsletter. Nowhere else will they be reviewed. I, personally, can see no real justification for including Box 18 (colour perception). I also feel that the Inoculations Box 50 should show the date of the inoculation - as whether it is 'current' or 'outdated' depends on one's medical prejudices as well as the time of viewing the certificate. I feel that any deterioration in hearing, whether it is above or below the arbitrary standards set, deserves investigation. Vestibular abnormalities are also verboten, for divers-to-be.

EDITOR

5. CASE REPORT - PULMONARY BAROTRAUMA by IP Unsworth

Introduction

Reduction of ambient pressure from depth in a pressure chamber or from underwater will cause intrapulmonary gas expansion according to Boyle's Law ($Vf(001,p)$). This expansion presents the possibility of overfilled lungs, either trapped locally or as a whole. The recognised consequences of pulmonary over-distension are: traumatic arterial air or gas embolism; interstitial and mediastinal emphysema, or pneumothorax usually under tension. Such as case of tension pneumothorax is described.

Case Report

A 55 year old female was referred to the Hyperbaric Unit, at Prince Henry Hospital, Sydney, for a course of hyperbaric oxygenation. This patient had a one year history of squamous cell carcinoma of the floor of the mouth treated by DXR, bilateral suprohyoid dissection with thoracic flap reconstruction, and permanent tracheostomy. Chest x-rays showed chronic obstructive airways disease with a circular opacity in the right middle lobe, thought to be inflammatory but neoplastic. During an aggressive episode the patient tore the pedicle from its oral attachment and came to require OHP to improve vascularisation of the floor of the mouth and pedicle.

The regime of oxygenation was 2 hours daily at 2.8 ATA (60 ft) on a semi-closed 100% O₂ absorber circuit connected to the tracheostomy whose cuff was inflated with water throughout the entire treatment. Decompression times were 5 minutes at 20 feet, 25 minutes at 10 feet, with a total decompression time of 41 minutes. Seven sessions were completed satisfactorily, though there was a tendency for tenacious bronchial mucous to develop.

On the 8th session at 10 feet, the patient indicated by gestures that she had right upper abdominal pain - no speech was possible because of the tracheostomy. This was thought to be due to gas-distended gut. She was recompressed to 15 feet, the pain disappeared, and a slow bleed to the surface commenced at 1 foot/minute. There was no change in colour of the patient who, as previously, was breathing 100% O₂ on the way to the surface. An increase in ventilation rate was noted, but associated with apprehension of the patient following her discomfort.

On arrival at the surface, she was taken off oxygen, the chamber vacated and 2 to 3 minutes later increasing respiratory distress and

cyanosis were noted, the BP 90/50, then the patient appeared to lose consciousness. IPPR by ambu bag with external cardiac massage were begun. The tracheostomy was aspirated as the patient had a history of two previous cardiac arrests at the referring hospital, following blockage of the tracheostomy by mucous. Examination of the chest then showed absent air entry on the right with an increased percussion note, trachea deviated to the left and a CXR showed complete right lung collapse with the mediastinum shifted hard over and the right diaphragm pushed well below the left. ECG showed only sinus tachycardia.

The diagnosis was of a right sided tension pneumothorax with virtually 100% oxygen as the intrapleural gas. This can be fairly certain as the patient was on oxygen to the surface and thus after the barotrauma had occurred. Treatment consisted of the insertion of a wide bore polythene intercostal underwater drain and in 12 hours there was complete re-expansion, aided by the rapid absorption of oxygen from the intrapleural reservoir.

Discussion

Lung damage resulting from over-inflation (pulmonary barotrauma) may present as one or more of three entities:

- i. Gas embolism
- ii. Mediastinal emphysema
- iii. Tension pneumothorax

Of these, the most severe is embolization in which gaseous emboli enter the arterial circulation. Mediastinal emphysema can impede venous return and myocardial action by distension of the mediastinum while a tension pneumothorax can impede venous return through raised intrathoracic pressure.

Local trapping of air is unlikely to be prevented by such actions as continuous voluntary exhalation during pressure reduction. The aetiology of pulmonary barotrauma presupposes that the lung region involved was able to equalise (equate) with the inhaled gas (air or oxygen) while at pressure, but was unable to vent the gas sufficiently rapidly during ascent. Such regions considered are obstructed segments, lung cysts or bullae (Golding, 1960) and as a rarity, a tuberculous bronchololith acting as ball valve (Liebow, 1959). Other authors (Dermksian and Lamb, 1959) suggest congenital cysts, scar-tissue vesicles and emphysematous valve vesicles may function as air

trapping sacs.

Prevention of these accidents due to local overinflation must depend largely on excluding from pressure those individuals in whom airway obstruction is likely to occur. This is not a simple task in Hyperbaric Medicine as often the patients most requiring OHP are those with susceptible pulmonary lesions and thus a calculated risk must be taken. However, the question of pulmonary barotrauma must also be of concern, not only to submarine and diving medical officers, but also to every doctor who examines prospective sports divers. Some candidates and patients may be eliminated on history or physical examination alone, plus chest x-rays. Apart from these, pulmonary function studies using spirometry and nitrogen or helium washout patterns may be of some value. In Hyperbaric Medicine, prospective patients fall into two groups, those in whom the risk is not justified, and those in whom the value and benefit of OHP is greater than the risk involved.

Treatment of pulmonary barotrauma varies slightly, dependent on the type. Arterial embolisation requires immediate recompression and the use of a full therapeutic decompression table plus ancillary treatment such as intravenous fluids, vasopressors, steroids, IPPV or even hypothermia for cerebral manifestations (Winter, 1971). Mediastinal emphysema may require prolonged inhalation of oxygen at atmospheric pressure, with possible retrosternal take-off being considered. Treatment of a pressure-induced pneumothorax differs in no way from that of a normo-baric pneumothorax, viz. release of gas by intrathoracic wide bore underwater drainage and pulmonary reinflation, with bronchoscopy if necessary.

In conclusion, the unusual feature of this case is tension pneumothorax due to pulmonary rupture with the main gaseous component being oxygen and thus representing an 'oxythorax'. The possibility that this lady also suffered a small oxygen arterial embolus resulting in a change of consciousness should also be considered but which was absorbed very rapidly and required no treatment.

REFERENCES

1. Golding FC et al. *British Medical Journal* 1960; 17: 167
2. Liebow AA et al. *US Armed Forces Medical Journal* 1959; 10: 265
3. Dermksian G and Lamb LE *Ann. Int. Med.* 1959; 51: 31
4. Winter PM et al. *JAMA.* 1971; 215: 1786

ACKNOWLEDGEMENTS

My thanks are due to Dr Mick Packham whose patient this is, and Dr Tom Torta for resuscitative assistance.

6. RECOMPRESSION CHAMBERS IN QUEENSLAND

Information supplied by Dr Peter Nicoll, 26 January 1972

- A. 1. SUBMARINE ENGINEERS
(Main branch - Perth). Local operators - Alan CARR
Jack LAWSON.
2. At present sited at 5 Jobson Street, BREAKFAST CREEK, but is portable and taken to diving sites around the state. Portable on skids (1 ton approx.)
3. Rated at 133 WP which we presume to be 133 psi.
4. Internal Dimensions
2 chambers. Doors open in "O" ring seals
Internal diameter 4 feet.
5. One major lock only as shown.
6. The operators state inner chamber will hold four at a "squeeze" but I think even two people would be a little cramped.
7. Manufacturer: "Downey Welding and Manufacturing Coy of California".
Date: 9/1966
8. Chamber can be operational in an hour or two, dependent on supplies of medical air and oxygen. There is a small compressor adequate for maintenance and venting but not sufficient for rapid recompression.
- B. 1. THE HORNIBROOK GROUP
2. Brisbane
3. Current rating is being investigated, but might be only 100 feet.
4. Size similar to URGO chamber.

5. Remaining information and more detailed information on above to follow if and when available.

This chamber would need about 2 weeks' work to renew all perishables. It is possible that this group might set up the chamber (if in fact it would go deep enough) but would move it to job sites when necessary approximately six months in every five years.

Editor's note: Thanks Peter. When we have the information from each state, we shall prepare an appendix to the Newsletter showing sites and conditions of all Australian Chambers.

7. CORRESPONDENCE

- Nil for publication
- Dr Peter Nicoll supplied information on RCCs in Australia, and requested information on satisfactory reasonably cheap RCCs available for purchase in Australia. I shall print the 'handout', prepared for State Governments interested in supplying hyperbaric facilities for diving accidents, in the next Newsletter.
- Undersea Medical Association

This organisation has presented the result of its widespread survey on attitudes of the members. Summary is as follows:

- 83% of members regard the Society as an International one.
 - 53% wish to break with the Aerospace Medicine Society.
 - About half wish to receive a bimonthly Newsletter, but don't wish to pay higher dues.
 - About half wish for an abstracting service.
 - Most do not wish the Undersea Medical Society to organise a board of examiners to license or certify special qualifications for members.
 - 52% felt the Undersea Medical Society should sponsor international professional trips, utilising charter rates.
 - Two thirds want their own independent journal.
- 5th International Underwater Physiology Symposium

This is to be held in Freeport, Grand Bahama, August, 1972.

Closure date for acceptance of papers was 1st February.

- Past issues - SPUMS Newsletter

No more issues of the 1971 Newsletters are available. We regret that we underestimated the number of 'late entries' to the South Pacific Underwater Medicine Society. We have doubled our production numbers for 1972.

8. BUBBLES

DIVING DEATH INVESTIGATIONS

Over the last five years there have been, to my personal knowledge, five different self or club appointed investigators proposed to follow up reports of diving deaths in Australia. Each does a lot of talking up to, or immediately after, his first 'death'. The absence of any adequate or comprehensive reports have made your editor a little jaded and bitter - as he is usually called in to 'assist' in the investigation. Not once has the promised report eventuated!

Never daunted, we try again. Dr Douglas Walker has been proposed by the SPUMS meeting as the compiler of information on diving deaths. Any information, especially the site and date of the accident, together with the diver's name, should be sent to:

Dr Douglas Walker
1423 Pittwater Road
NARRABEEN NSW 2101

He will do the rest, and report the cases for the South Pacific Underwater Medicine Society Newsletter.

AUSTRALIA DAY DEATHS

Two cave divers died in separate incidents over the Australia Day holiday weekend. They will be reported in detail when Dr Douglas Walker obtains the diving and autopsy details. While waiting on this report, some requirements of cave diving deserve reiteration:

1. A line to the surface outside must be attached to the diver. Finding the way out can be harder than finding the way in.
2. All essential equipment must be duplicated in toto. This means two diving sets. No point in having a reserve supply of gas available only through a non-functioning regulator or demand valve. Two lights too.
3. The positive buoyancy - by inflatable life jackets or ditching weights - which is so valuable though neglected, in open sea diving, can be a real hazard in caves.
4. Diver companion drills and buddy lines are still essential.

WAYWARD AUSTRALIANS

Geoff Bayliss has arrived back in Sydney after a couple of years exploiting the UK. He had one year at Royal Naval Physiological Laboratories, before a successful attack on the post graduate circus. he has acquired a 4.2 litre Jaguar, 2 daughters, a bushy beard and a MRCP. He was also an observer of the 1500 foot RCC dive at RNPL.

Dr Terry Horgan has just completed a tour through European diving centres, and will give a report on these in the Newsletter at a later date.

Other expatriate Australians making names for themselves in the Underwater Medicine world include John Miller and Brian Hills (both at RNPL now), and Barry Fowler in the USA. Perhaps one day we will be able to utilise the expertise of these knowledgeable men - in Australia. This nonsense about us being a small and parasitic nation, in scientific terms requires reassessment. We have one of the largest continental shelves of any nation, with all the mineral and oil implications of this. It is about time we did our own research and development. Other countries are unlikely to do more than exploit us for their own interests.

In the meantime, we must rely on our expatriate Australians to keep us in personal contact with the large diving units.

FAMOUS LAST WORDS

"Pass me a probe, and I'll get some fish" - Bob Thomas

"It looked much bigger underwater" - Bob Thomas

"I will just hop underwater and take some movie shots" - Paul Green

"Could I borrow your ambulance for a few moments" - Carl Edmonds

"Certainly not! The Barrier Reef has good weather in January"
- Peter Hamlyn, December 1971

"We are going north in January. The rainy season does not start till March" - Cedric Deal, December 1971

"Why don't you write up your diving accident cases" - Underwater Medicine candidate (failed)

"No one sent me the latest Newsletter" - unfinancial member

9. DIVING DOCTOR'S DIARY

DIVING DETAILS - Trainee divers, performing buddy breathing at depth of 10 and directional signals of 30 feet.

Duration - 90 minutes.

Time - 1030 hours.

Presenting Symptom - Gross shivering at 1130 hours

(CORRECT DIAGNOSIS - 100%)

MEDIC: Are there any other symptoms?

DIVER: Yes. I feel cold, the shivering comes on whenever I stand up, walk or when I go into the cold (outside temperature = 70° F!). I feel better when I rest, and especially with a hot shower.

(CORRECT DIAGNOSIS - 80%)

DIVER: I also get very breathless and feel faint whenever I exercise. it was not noticeable after the dive, but it probably started about the same time as the shivering.

MEDIC: Any cough?

DIVER: I coughed up some white sputum immediately on ascent. I am coughing a bit now. I also feel a bit nauseated now. There are aches in my back and thighs, but these are not related to movement - I feel as if I had a bad attack of influenza.

(CORRECT DIAGNOSIS - 60%)

MEDIC (at 1430): Let's have a look at the lab results:

- Chest X-ray - patchy consolidation areas in both lungs
- FEV_{1.0}/VC - both decreased by 1.0-1.2 litres compared to normal
- white cell count - 14,000 with polymorphonuclear leucocytosis
- lactic dehydrogenase - 500 IU
- arterial O₂ - 60mm Hg, CO₂ 40mm Hg, pH 7.35 at 1145 hours.

MEDIC:How are you now?

DIVER:Much better. When you let me breathe 100% O₂ at 1200 hours I felt completely normal. Even without it, I know I am getting better.

(CORRECT DIAGNOSIS - 50%)

MEDIC: (at 1830 hours) Your lung function (FEV_{1.0} and VC) are now back to normal. Your TPR is 3.70/86/18, and your lungs sound normal.

DIVER: Yes, I am much better. I cannot understand what happened. It was a normal dive, and I had no trouble.

MEDIC: How about the buddy breathing?

DIVER: I did not do any emergency ascents. I took in a bit of water - otherwise things were OK.

(CORRECT DIAGNOSIS - if not, give up)

DIVING MEDIC: This is a fairly typical case of salt water aspiration, and is a common accompaniment of 'buddy breathing'.

ANNUAL AND INITIAL MEDICAL EXAMINATION (BASIC STANDARDS OVERLEAF)

1. SURNAME		OTHER NAMES		2. AGE	3. SEX	4. OCCUPATION
5. ADDRESS - private		business		6. NEXT OF KIN		7. ADDRESS OF N.O.K.
8. BUILD	9. HT. ins	10. WT. lbs.	11. CHEST exp. insp.	12. COLOUR eyes hair complexion		13. RESP. FUNCTION TESTS v.c. f.e.v.1 percentage
14. CHEST X-RAY date	film no.	place	normal	15. BLOOD PRESSURE systolic	16. URINALYSIS albumin	sugar
17. AUDIOMETRIC EXAMINATION		I.S.O. STANDARDS		18. COLOUR PERCEPTION		
cycles	500	1000	2000	4000	6000	8000
decibel loss rt.						
decibel loss lt.						
19. Head, face, neck, scalp		norm.	abnorm.	51. NOTES ON ANY ABNORMALITIES DETECTED		
20. Nose and sinuses				43. Gait	norm.	abnorm.
21. Mouth, throat, speech				44. Lymphatic system		
22. Teeth, gums				45. Emotional stability		
23. Ears general				46. Mental capacity		
24. Tympanic membranes				47. Identifying marks		
25. Eustachian tubes				48. Nervous system reflexes		
26. Eyes general				cranial n's		
27. Visual field				sensation		
28. Eye movement				cerebellar funct.		
29. Ophthalmoscopy				49. VISION		
30. Chest, lungs				distant R6 -	corr 6 -	
31. Heart general				I6 -	to 6 -	
32. E.C.G. Rest & Exercise				near RD = 0	corr 0	
33. Vascular system				ID = 0	to 0.	
34. Abdomen (incl. H.O.s)				50. INNOCULATIONS	current	outdated
35. Anus				tetanus		
36. Endocrine system				smallpox		
37. External genitalia				cholera		
38. Upper extremities				typhoid		
39. Lower extremities				polio		
40. Feet				yellow fever		
41. Spine				b.c.c.q.		
42. Posture (standing)						
				52. FITNESS TO FIT UNFIT		
				(May be continued over-leaf)		
				NAME OF M.O. -		
				ADDRESS -		
				QUALIFICATIONS -		
				DATE -		
				SIGNATURE -		

BASIC STANDARDS REQUIRED

(1) Respiratory

- (a) Good respiratory function tests
V.C. > 4 litres (males) or 3 litres (females)
% FEV_{1.0} must not be < 75% of the VC
- (b) D-Ray of chest must be full plate (PA)
- (c) A history of severe respiratory obstructive
airway disease (asthma, bronchitis,
emphysema) unless all is completely normal,
must be unacceptable.
- (d) Any acute resp. condition will restrict
diving until cleared.

(2) VISUAL

- (a) Distant vision should not be worse than
6/12 (both eyes) or 6/24 (worse eye)
- (b) Hypermetropia present in each eye (without
mydiatics) should not exceed 5.0 dioptres
- (c) Colour vision, unless grossly abnormal, is
not of great importance
- (d) Near vision should not exceed N 5/6 in both
eyes.

(3) AUDITORY

- (a) The maximum allowable decibel loss in the worst
ear using I.S.O. standards is

500cps	1000cps	2000cps	4000cps	6000cps	8000cps
40 db	35 db	35 db	45 db	50 db	50 db

- (b) A history of severe chronic otitis media or
mastoid operation will preclude diving. Any
acute infection will restrict diving activities
until cleared
- (c) Both tympanic membranes must be intact and
mobile. Eustachian tube patency (Valsalva
test) is essential

(4) CARDIOVASCULAR SYSTEM

- (a) Blood pressure should not exceed
140 mm Hg systolic and 90 mm Hg
diastolic
- (b) Persons over the age of 35 should
be advised not to take up diving
activities
- (c) Weights should be within 20% of the
average for height and build (see
tables)
- (d) Harvard step test is useful.

(5) NEUROLOGICAL

- (a) No serious signs or symptoms are
acceptable.
- (b) Migraine is acceptable but this may
be precipitated more frequently by
diving.

51. (Continued)