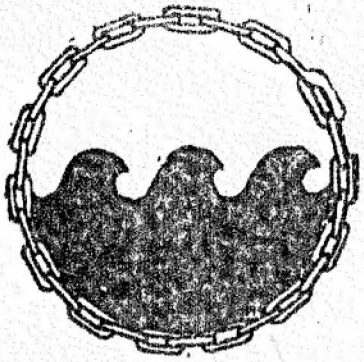

AN INTEGRATED UNIT

PHYSICAL EDUCATION

SCIENCE

AN INTRODUCTION TO SWIMMING UNDERWATER

GOSP GLADSTONE OCEANOGRAPHIC STUDIES PROGRAMME

SNORKELING

Written by

R. D. Moffatt

1979

CONTENTS

NOTE TO TEACHERS:

1. If copying PLEASE ACKNOWLEDGE.
2. The"learned so far" sections are to recap on main ideas.
3. Libary references and audiovisual material may be adapted to your school from your own resources.
4. The practical excercises are designed for a group of 8 - 10 in a pool.
5. The study excercises are optional.
6. The connecting excercises are written to connect with STANNARD AND WILLIAMSON " Exploring Science " Book 1. and are designed to be used by Science teachers in relating the Physical Education Curriculum with the Science.

R. D. Moffatt.

1979.

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NOTE TO PARENTS

The school will supply 8 pairs of flippers, face masks and snorkels. There is no need to go and buy these items for the course so don't be conned too quickly.

These notes have been prepared with funds supplied by the school levy scheme.

Chapter 1. INTRODUCTION

1-1 From the Deep

"Fifty Metres out and two strange looking creatures surface and swim slowly towards the beach. Their skin is covered with a shiny black coat and strange tubes poke out of their heads. The water splashes around their feet and they move uneasily in the surf. They reach the edge of the beach and are met by two companions."

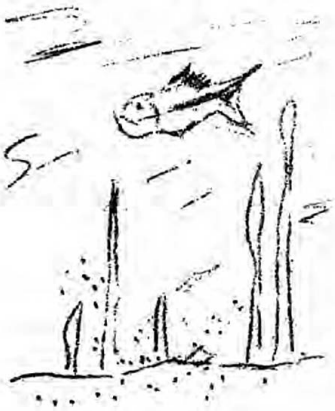
"What's the water like?" they ask eagerly. "Wonderful," comes a spluttered reply. "We've never seen so much life on the reef. It's teeming with fish. You'd better hurry up. There's only an hour left before the tide turns."

Quote from snorkeling for beginners

This scene is common enough these days. Snorkeling and Diving are a growing sport. However, anyone watching this scene could ask themselves, what makes people dive; the water looks so cold. Why on earth would anyone want to swim underwater?

1-2 Why People Go Under Water

Many peoples' jobs ar underwater. The diver on an oil platform welds huge steel plates together to hold up the Rig. A salvage diver works to recover valuable articles from ship wrecks. A Navy Diver checks out the superstructure of a destroyer for damage. A Pearl Diver off the West Coast of Australia plucks clam shells off the ocean floor hoping one will contain a valuable treasure.



To others underwater swimming is a fast growing sport and is not a bad way of spending a weekend in the hot Australian Summer. To the Marine Biologist, a dive provides him the opportunity to study marine life in its natural state.

The sea bed is still largely untouched by man. The only signs that he has been around are wrecks and rubbish that he has dumped there. The creatures of the sea are a lot different than on land; many are extremely beautiful, some are dangerous, but most are harmless.

In this unit you will learn how to get around the waters edge. We are concerned with diving with a SURFACE BREATHING TUBE (SNORKEL) and not with self contained underwater breathing apparatus (SCUBA). It concerns itself with those new to diving who are anxious to learn the basic facts about the sport and all that goes with it.

Chapter 2. USING YOUR EQUIPMENT.

2-1 About your Gear

A surface swimmer is at a considerable disadvantage. He has to use his arms and legs to get about in the water and has to lift his head every time he wants to take a breath. When he wants to look under water he can't see far and it's all blurred. The gear for snorkeling is designed to help you swim, breathe and see better in the water. What then will help you do this?

2-2 All the better to see you with My Dear!

Our eyes are not suited to looking underwater and it is only by using a face mask, and exposing our eyes to air, can we see properly.

Fig I

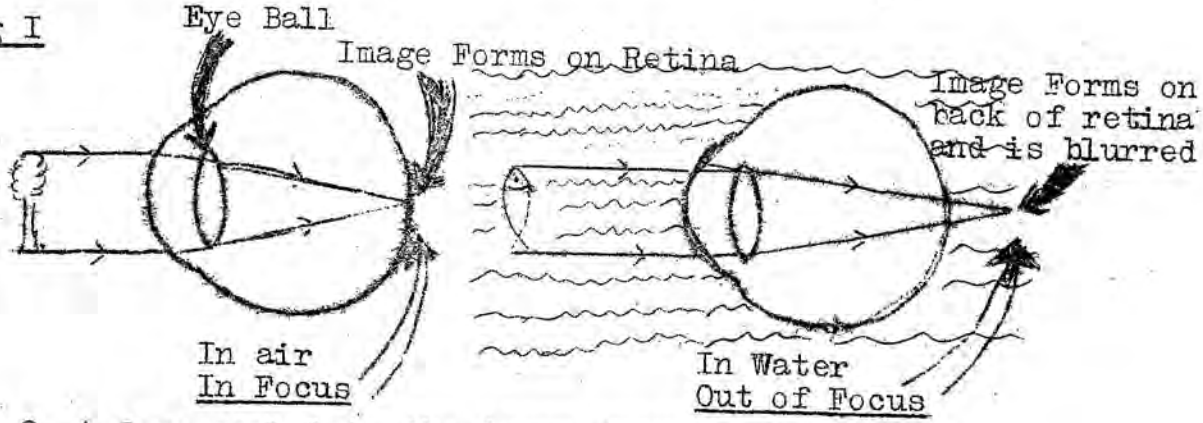
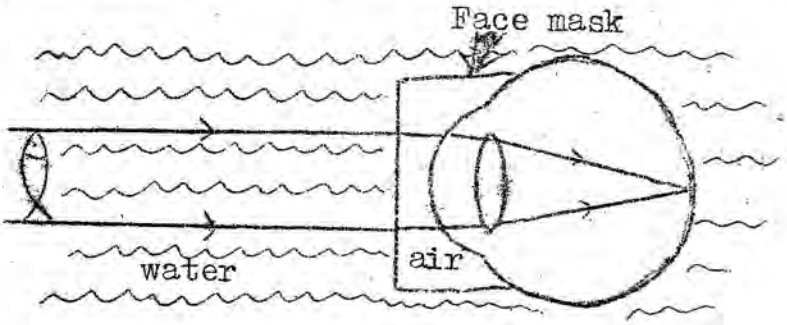
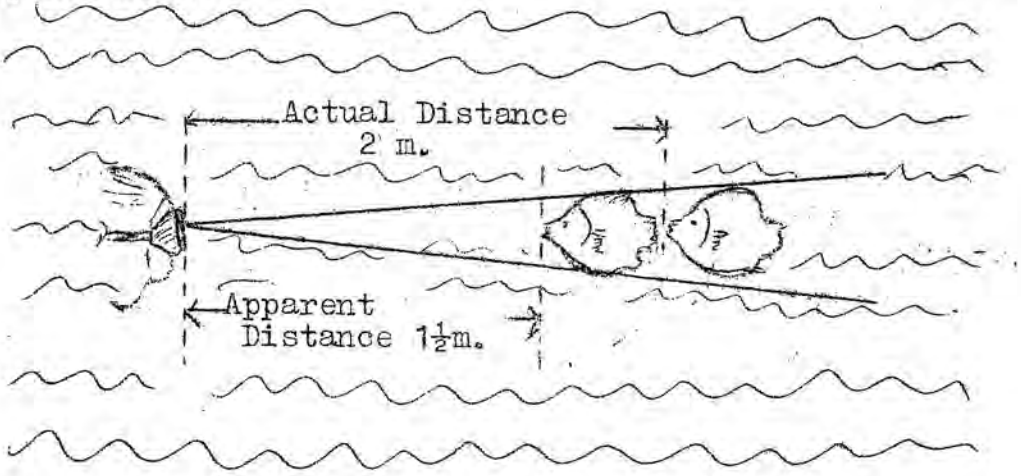


Fig 2 A face mask lets the image focus on the retina



Your face mask however will play tricks on you. Water has a magnifying effect. Things seem through a face mask under water are about a third bigger than they really are. Things also appear closer.

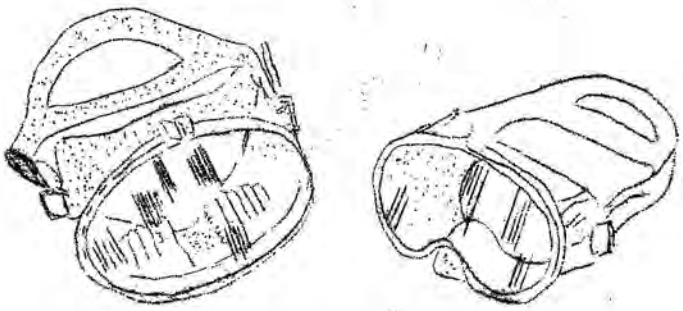
Fig 3.



So be careful and don't be fooled if you can't reach things at first, and don't be disappointed if things that you collect are smaller than you thought.

Your mask is made of Rubber and Glass and fits over your nose so that you can breathe through your mouth.

Fig. 4.



Masks

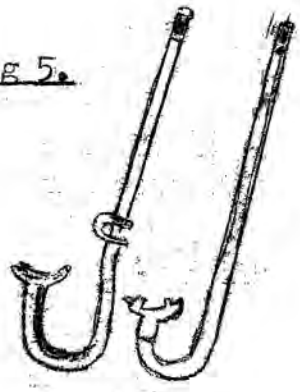
Most masks have two rubber pieces which fit beside the nose. These are Compensators (com - pen- say- terz) and are used to equalize pressures. Some masks have a one-way valve which is used to clear water from the mask by exhaling through your nose.

2 - 3 Breathing under Water

The snorkel tube lets you breathe while looking down from the surface. It has a red strip at one end to let others see you. The mouth piece is usually adjustable and consists of a rubber flange which fits between the gums and the lips. The two rubber spriggots projecting from the flange are clenched between the teeth.

Some snorkels will have a rubber clip which will allow you to connect your snorkel to the strap of your face mask.

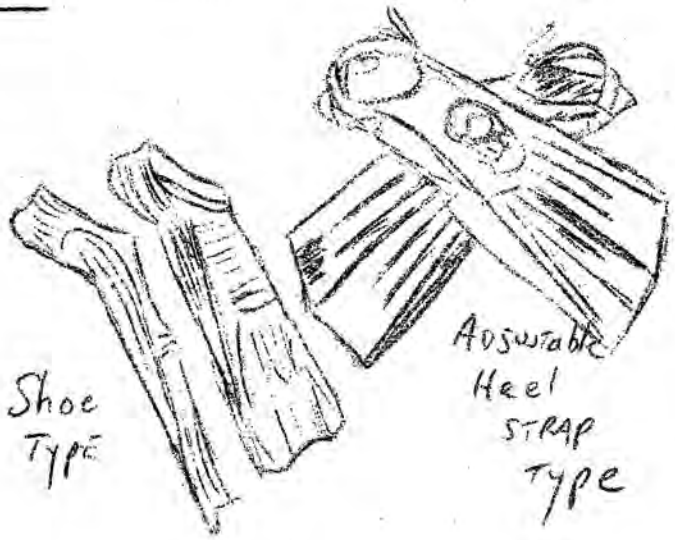
Fig 5.



Snorkels

2 - 4 FINS

Fig. 6.



These are designed to help you swim faster so that you don't get puffed out. They are made of rubber and have either a solid shoe or one adjustable strap.

2 - 5 Using your Gear

To properly test and become familiar with your gear, it's best to start in the pool. Make sure you have another swimmer in the pool near by - just in case.

First start with your flippers. Its best to wet your feet and flippers first before putting them on.

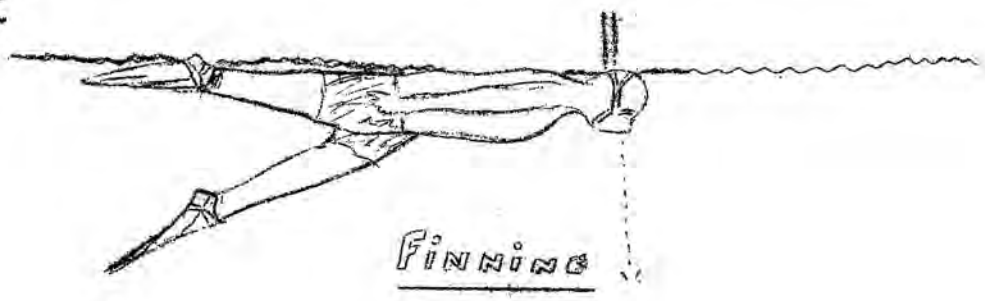
Now have a go with your face mask. You don't have to have a tight fit - adjust it so that it fits comfortably. It's best if you get used to breathing through your mouth on land before trying it out in water. When you feel confident, try the snorkel. The spriggots are clenched between the teeth and the tube is adjusted so that when your head is down, it points directly upwards. Don't forget to spit into your mask first and then wash it out. This stops fogging.

When you have all this mastered you are ready for Finning.

The correct finning action starts from the hips and consists of alternating up and down movements of the legs and feet.

The whole leg moves from the hip down but is kept fairly straight with a slight flexing at the knees.

Fig. 7.

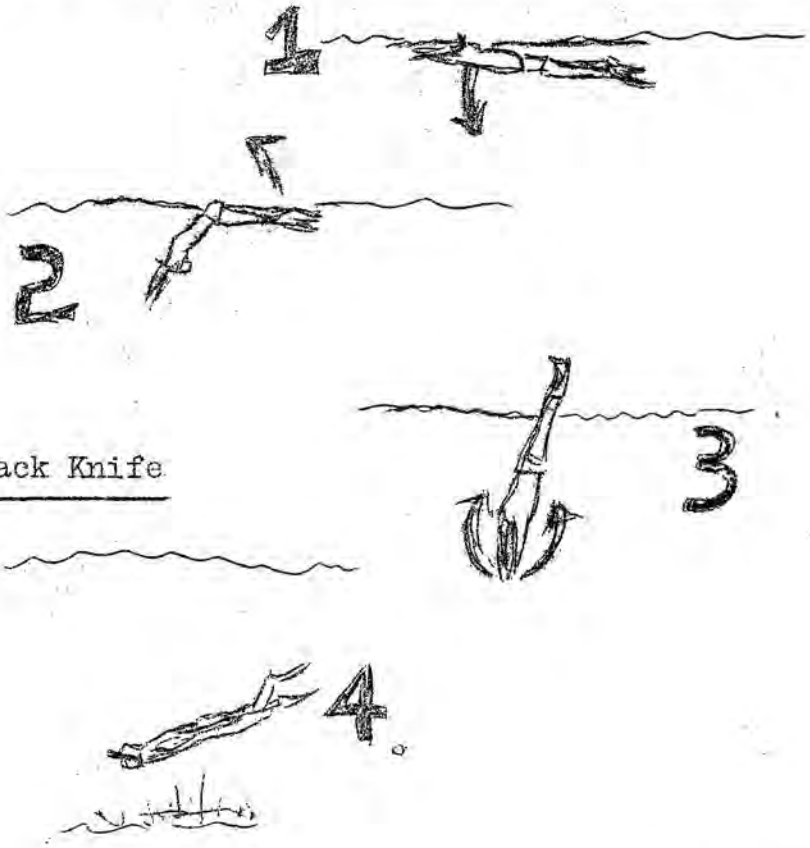


Avoid bending the knees too much as this develops an inefficient 'cycling' action. Also avoid wasting energy by rolling the body; this is usually cured by keeping your backside down in the water.

2 - 6 Surface Dives

There are two ways. In the Jack-Knife, the snorkel swimmer takes a breath. Dives as shown in Fig. 8.

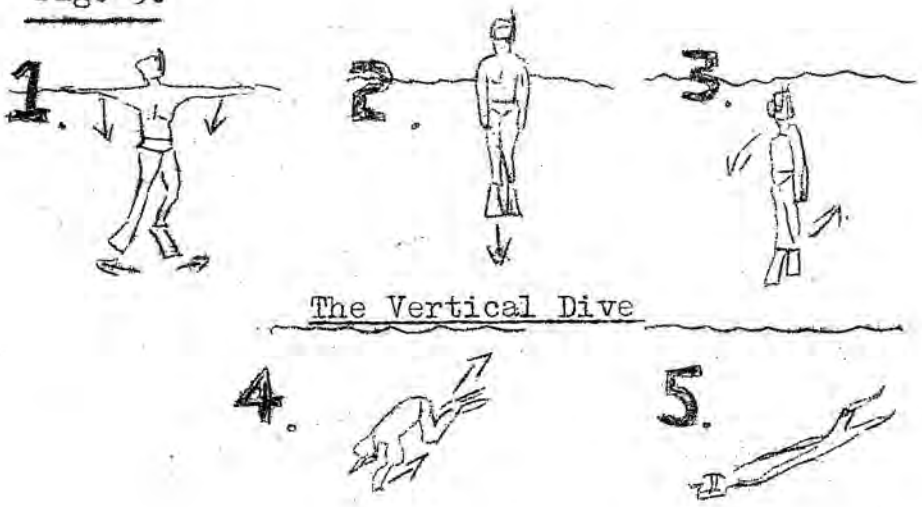
Fig. 8.



The Jack Knife

The other less common method, is the Vertical surface dive. By treading water vigorously, you can raise yourself out of the water (1), suddenly stop (2), turn (3), crouch (4), and then dive (5), as in Fig 9.

Fig. 9.



The Vertical Dive

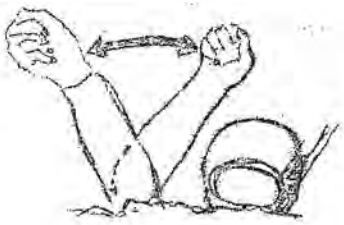
Above all you must realize that when you dive under water, your snorkel will fill up with water. On surfacing, you must get rid of this water by having enough air left to blow it out. You'll probably come out spluttering the first few times but don't worry, it will soon become 2nd nature to you.

2 - 7 Some Safety Hints

Before going out into the Sea its best to know a few of the common hand signals so that you need not pull your snorkel out of your mouth every time you wish to talk.

" of these are shown in Fig. 10 below.

O.K. AT SURFACE



DISTRESS AT SURFACE

DANGER

STOP

O.K. ALL'S WELL

Entering the water can be a hazard especially if you are on a rocky slope. "Check the area out" for the best possible entry. Look at the rocks for dangerous objects and make a plan of entry. Avoid rocks with sharp barnacles and areas where waves crash on rocks. Never snorkel around rocks in heavy surf. From a boat is relatively easy however look around first. Don't dive in and watch any loose ropes inside the boat. Don't climb down ladders with flippers, get your face mask and snorkel in position and put your flippers on in the water. When you get into a boat, take your flippers off in the water and toss them into the boat and then climb in. Never dive head first into the water while wearing a mask.

The length of time you can stay under water depends on many factors. Body temperature, water temperature, physical fitness are but a few. The desire to breath is caused by carbon dioxide build up in the lungs. This desire can be reduced by taking deep breaths in quick succession -- This lessons the amount of carbon dioxide and is called HYPERVENTILATION. It is practiced by many spear fishermen so that they can stay underwater longer. By HYPERVENTILATING they no longer have natures safety valve. IT'S A DANGEROUS THING TO DO. If you don't breath in when your body wants more oxygen can cause you to blackout!

This could kill you if it happened under water. It's no big deal to stay under water the longest so use your common sense and listen to your body telling you when to surface and take a breath.

Learned so far

* Objects can be seen better in water with a face mask and appear bigger and closer than in real life.
* Snorkeling along the surface is called FINNING.
* Two dives a snorkler can do are the Jack Knife and Vertical dive.
* There are a set of universally used signals in communicating in water.
* Know your safety rules before entering the water.

I. REVIEW EXERCISES

1. What are two things that a face mask does to fool you about objects under water?
2. What is the name of the two rubber pieces in a face mask which allow you to clear your ears?
3. True or False

   (1) You can breathe through your snorkel underwater.
   (2) It's best to wet both your feet and your flippers before putting your flippers on.
   (3) The SPRIGGOTS are clamped in your teeth when snorkeling.
   (4) Finning is when you collect rocks from the sea bottom.
   (5) Snorkeling in heavy surf is OK.

4. Name two ways a snorkler can dive under water.
5. Grab a partner and get him to demonstrate the following signals to you. Distress at surface, O.K. all's well; Stop, O.K. at surface.

II. CONNECTING EXCERCISES.

1. Read pages 27 to34 of your Grade 8 Science Text Book. Exploring the Sciences 1. Stannard and Williamson and answer Q 1 and 2 on page 42.
2. Perform Investigation 2, page 35 Exploring Science 1,
3. Read Pages 36 to39 Exploring Sciences 1. and answer questions3 to 10 om page 42.

III. LIBRARY REFERENCES.

Busuttili, M. Underwater Swimming 794.23 Bus.

Dobbs., H, E., Underwater Swimming 797.23 Dob.

Or any of the 700 Series in the TownLibrary

IV. Practical Exercises

ON LAND EXERCISES

(a) Exercise 1 - Hold your nose and breath through your mouth for 30 seconds.

(b) Exercise 2 - Put on a face mask and breath through your mouth for 30 seconds.

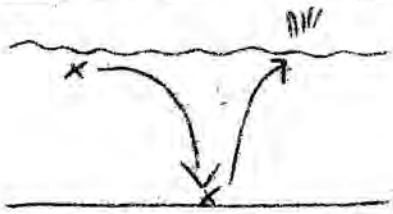
(c) Exercise 3 - Put on a face mask, snorkel and breath through the snorkel for 30 seconds.

WATER EXERCISES — If your mask gets cloudy - spit in it -

(a) Exercise 1 - Finning

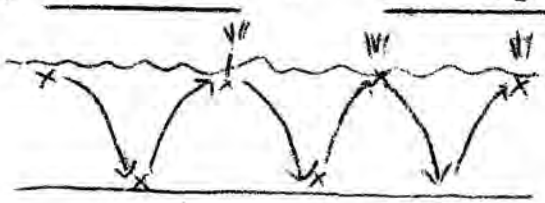
* Enter the water
* Snorkel the width of the pool

(b) Exercise 2 - The Dive



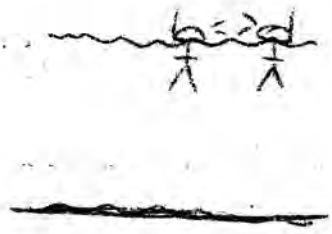
* Enter the water
* Surface snorkel and dive to recover a rock.
* Surface and exhail the water trapped in the snorkel.

(c) Exercise 3 - The Porpoise (Optional)



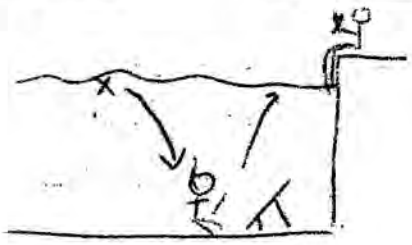
Surface
* Snorkel
* Dive, surface, exhail
* Surface snorkle
* Dive, surface

(d) Exercise 4 - The Talking Jellyfish



* Float with snorkel and face mask on head.
* Tread water for 30 seconds and tell your neighbour your name and when you were born and say Susy says slimy sharks see.

(e) Exercise 5 - The Shakespeare



* Dive Down
* Copy onto a special board a poem written on the bottom of the pool.
* Surface with poem.

The aims of the exercises are to enable you

(a) Breathe through a snorkel: Ex's. 1,2,3 land.

(b) Adjust a face mask, snorkel and pair of flippers to fit comfortably and safely: Ex. 1.

(c) Snorkel on the surface for looking at animals: Ex. 1.

(d) Snorkel to a depth, compensate for pressure and surface to get rid of water in the snorkel: Ex's. 2, 3.

(e) Communicate with a friend in case of emergency: Ex. 4.

(f) Draw under water: Ex. 5.

V. AUDIO VISUAL MATERIAL/REFERENCES

Slide set; Snorkeling Techniques: Science Department Series.

Video Tape: A coral Reef; Science V.C.R.

Wall Charts: McMillian Series " The Sea" Set showing Early diving Methods Also Flash cards are available See Science DepARtment.

VI. Study Assignments.

1. Prepare a report on the history of Diving and comment on the problems early divers experienced.

2. You may like to join a local Diving Club or Play Underwater hockey.

   Further Details available From Lavers Sports Store, Goondoon Street Gladstone.

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Chapter 3. PROBLEMS WITH SNORKELING

3 - 1 EQUAL PRESSURES

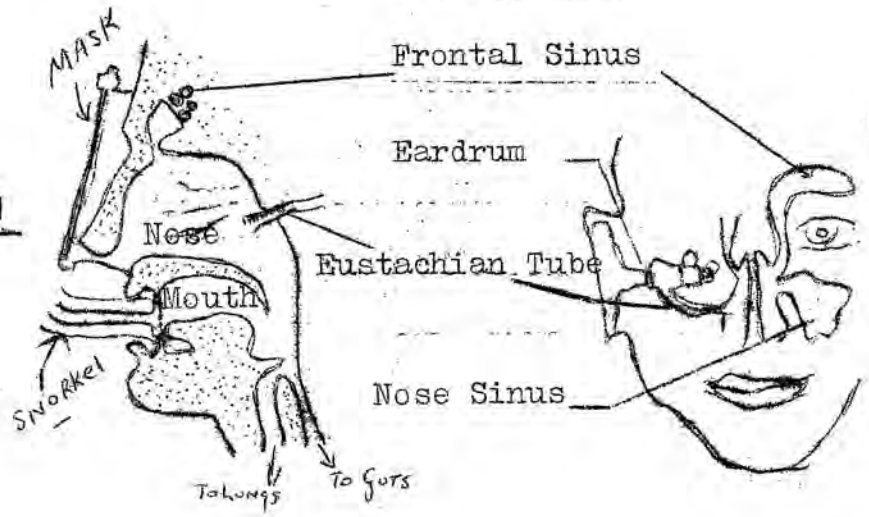
As you swim down, even if it is to a depth of the deep end of the pool there are two important things to do.

1. Equalise the Pressure between inside and outside your face-mask.

As you dive deeper the pressure in the outside of your mask will increase. If this is not corrected then eventually this would push the face plate into your eye. To avoid this, you need only to breathe gently into your mask through your nose. This will increase the air pressure inside and balance it out-side.

Snorkeling Physiology

Fig. 11



2. Equalise the pressure inside or outside your eardrum.

Secondly, you may feel pain in your ears as you dive down. This is because the pressure on the outside of your eardrum is greater than the pressure inside. This can be fixed up by allowing air from your lungs to pass into your middle ear through your Eustachian (U-station) tube. This makes the pressures on both sides of your eardrum the same and stops the pain.

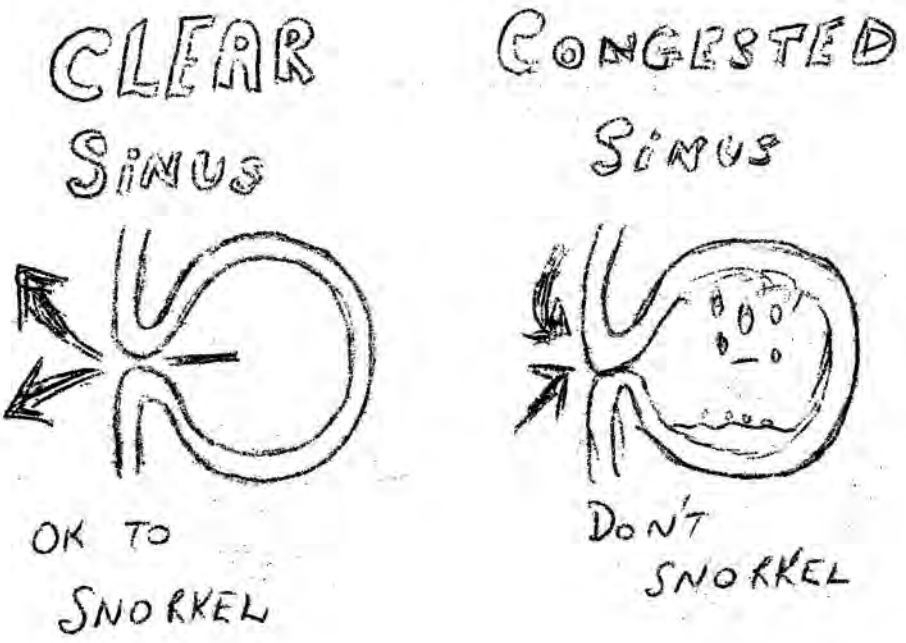
3 - 2 PINCH AND BLOW!!

You can do this by using the Compensator. Pinch your nose and blow until your ears pop. Another way is to swallow hard. Chewing gum an hour before snorkeling also helps clear the Eustachian Tube. It is necessary to clear

your ears whenever you dive down. If you feel a pain this means that you have gone too far before clearing your ears and you should come up and start again. If you can't clear your ears - don't dive.

3 - 3 YOUR SINUSES ARE IMPORTANT ALSO

Apart from the ears there are other air spaces in the head which need attention. Look back at Fig. 11 and find the sinuses. There are two main ones - below and above the eye. The sinuses are spaces in the skull so as to make the head lighter and are connected to the nose by small tubes. When these tubes are open, the pressure inside and outside them is the same but when they are closed or congested they can be painful.



If you feel pain or you have a cold, don't dive - just fin at the surface. If you do, you could force mucous into the sinuses and cause infection. Never use ear plugs under water.

3 - 4 HOW DEEP CAN YOU GO?

Apart from the air spaces in your bones, your body will not shrink in water. The limiting factor in deep snorkel diving is how much your rib cage can be squeezed due to pressure.

3 - 4 (Cont'd)

In theory, the depth limit is about 30 metres (100 ft) but the record is almost 60 metres (200 ft). Don't attempt deep dives as they are extremely dangerous. Don't take deep breaths (hyperventilation) so you can stay under water longer. Blackouts are caused by doing this and even the experts can blackout. Most clubs would consider a snorkel dive of 7 - 10 metres (20 - 30 ft) a reasonable standard.

3 - 5 HOT AND COLD

Also watch out for sunburn while snorkling and down at the water's edge. Find a good waterproof sunburn cream and use it every time in the Queensland sun. You can also wear a tight fitting shirt underwater and don't forget the back of your legs when finning.

In cold weather a rubber wet suit is terrific but if you can't afford it, a tight fitting jumper is not bad. The idea is to get a layer of water close to the skin which can be warmed up. If you get too cold you will get cramps or suffer from exposure.

Learned so far

* when diving underwater you must equalize pressure in your mask and ears
* never dive underwater if your sinuses cannot be cleared
* never use ear plugs underwater
* never hyperventilate or compete to see how long you can stay under water
* use a sunburn cream in hot weather and a wet suit or similar protector in cold

I.
REVIEW EXERCISES

1. Name the following parts on a set of snorkeling gear: mouth piece, glass window, snorkle clip, face mask strap, adjustment points for (flippers, face mask, snorkel).
2. What are compensators in the face mask used for? Why are they important?
3. What can happen if your face mask and flippers are too tight?
4. Why should you be able to talk while floating?
5. Why is it necessary to be able to draw under water?

II.
STUDY ASSIGNMENTS

1. You may like to look up in the library about Jacques Cousteau or James Piccard.
2. Find out about S.C.U.B.A. and skin diving. What other water sports are there in the sea?
3. What is hyperventilation and why is it dangerous?
4. Why should sunburn cream be used on a boat and in the water? If you were snorkling all day, would you have to use sunburn cream in the water?
5. Make a list of the clothing you would need to take on a snorkling trip.
6. Why is spear fishing dangerous?
7. What is the observer's job in a boat?

III.
AUDIO VISUAL

1. Chart of dangerous marine life available from Science Section.
2. Underwater drawing boards and paper.
3. Marine specimens of stone fish and stinger.
5. VCR Video Tapes on Physiology.
6. Audio tape of stonefish victim interview.

IV.
DIRECTED TOPICS (Note to teachers)

The aim to gain confidence. Like bushwalking, snorkeling has its dangers but with one supervising teacher in the water and one as observer, a calm sea and well drilled students, very little can go wrong.

V.
EXAMINATION

A check list and certificate are issued.

THE GLADSTONE OCEANOGRAPHIC STUDIES PROGRAMME.

GRADE 8. SNORKELING

EXAMINATION CHECKLIST

NAME:.....

FORMCLASS:.....

1. Exhibits confidence in the water
2. Can adjust face mask, snorkel and a pair of flippers to fit comfortably
3. Clear ears underwater so that sinuses are clear
4. Snorkel for a width of the pool
5. Dive to a depth of 2 m. to recover an object and upon surfacing, clear the snorkle tube by exhaling air from the lungs
6. Talk while treading water
7.

About the Gladstone Oceanographic studies Programme.

The aims of the program [illegible] enable the school children of Gladstone to study the sea [illegible] to learn of it's wonders and importance to Man.

The equipment and services the programme has are for the use of all Gladstone School Children and it is hoped that educational units such as this one will enable them to gain a better understanding of the Marine environment.

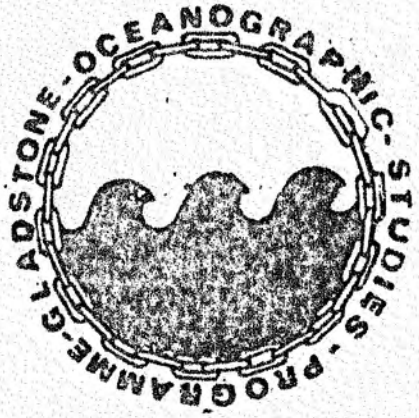
For Further information about the program contact:

The Director
Gladstone Oceanographic Studies Programme
P.O. BOX 260
GLADSTONE, Q, 4680.

This is to CERTIFY that.....
CAN participate in the Grade 8 SNORKELING PROGRAM on FACING ISLAND

.....

Class Teacher



P. O. Box 260
GLADSTONE, 4680.