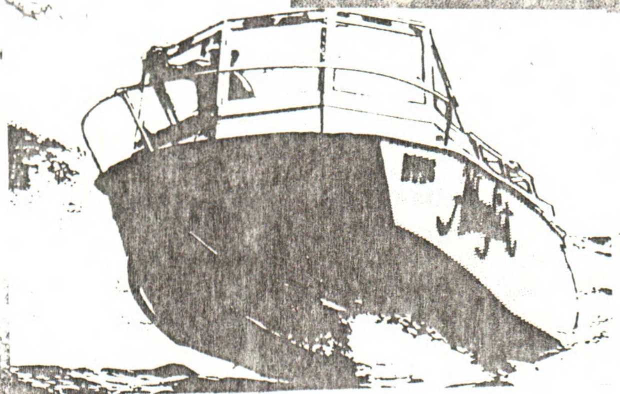
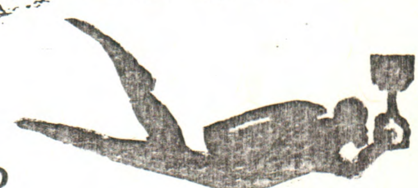
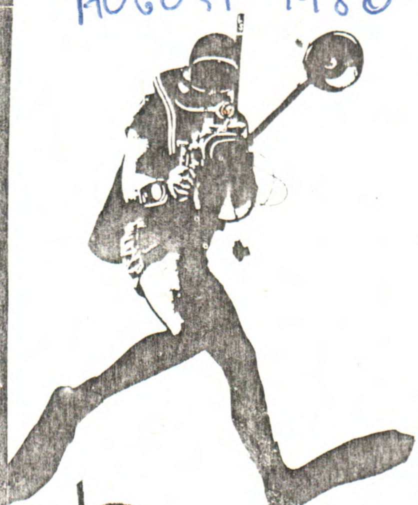


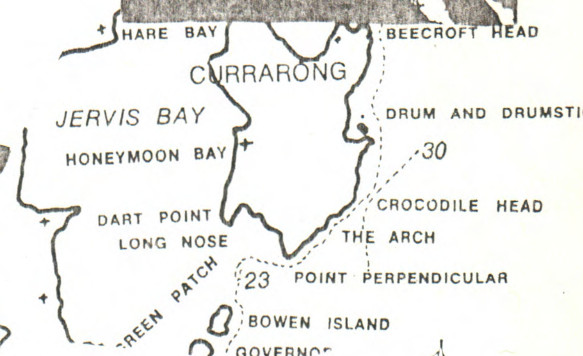
SOUTH PACIFIC DIVERS CLUB

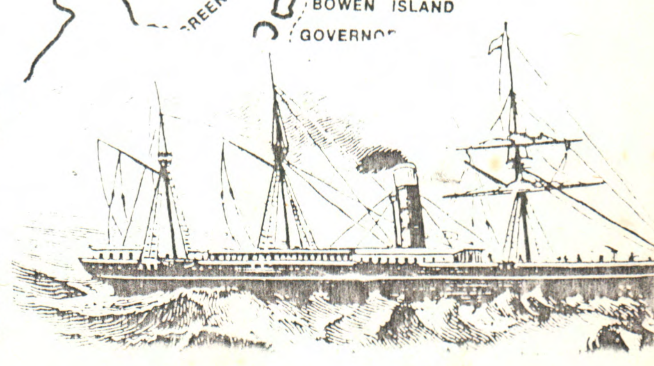


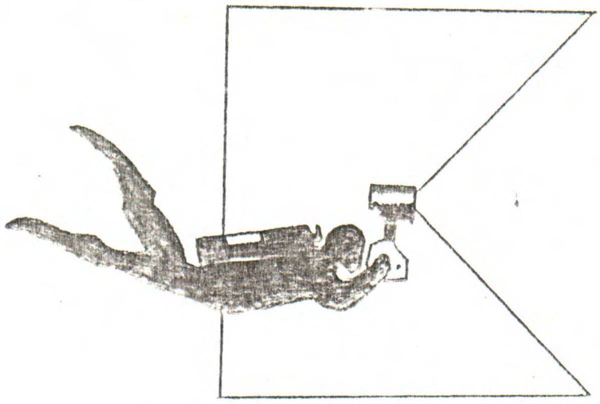
NEWSLETTER.

AUGUST 1980









AUGUST 1980

Well, if one has to reflect on the previous 12 months the outstanding event was the open photographic competition. It was a great success with 86 entries being received from all over the state. Congratulations to the winners and a big thanks to all those who assisted in its organization. The success of the competition and the presentation night should guarantee that it becomes an annual event. As most of you would know Rick Latimer is the new president, his energy and strong interest in diving should ensure that 80/81 will be a successful year.

As you can see the format of the newsletter has changed somewhat, the idea being to bring to member's attention articles, developments etc. which they might not be aware of or come across in diving magazines. The success of the new format depends on its contributors so if you come across any articles of interest or wish to submit an orginal article on diving experiences etc. Please do so, it will gratefully be accepted.

This edition is primarily concerned with electrical "gadgets" that are becoming increasingly popular in diver's boats. Both owners and crew should be aware of the equipment and how it works. The third article is concerned with the treatment of salt water wound infections.

The first article in this edition is concerned with marine radios. Radios have become a popular item of conversation since Gary and Andy took an unplanned overnight trip to New Zealand earlier this year. The motor break down resulted in a lot of damage to Gary's boat and much worry to friends and family. All of this could have been avoided if he had a radio. He ordered one the next day. So don't put marine radios in the C.B. "Rubber Duckie" class, they are a damn useful piece of equipment. Most base stations will moniter your movements when you undertake long journeys. Greenwell Point base station covers the Currarong/ Jervis Bay area and provides a good service. Anglerbase at Wollongong does the same. For $8.00 a year you can join Shellharbour Fishing Club, get a call sign, use Shellharbour boat ramp for free and enjoy good discounts on A.W.A. gear which includes radios and echo sounders. It's address is listed under Barrack Heights.

The second article concerns echo sounders. Having just purchased one I can tell you its a frustating experience finding one to exactly suit your own requirements. I nearly purchased a Furuno but was put off by the narrow beam angle (8.4°) and so it went on till I realised that you have to make a compromise. Maybe this article will help you understand how they work and what type suits our requirements. Prices vary tremendously from dealer to dealer but expect to pay between $270.00 and $675.00 for one if your thinking of buying. I ended up with an Aqua Probe 390 straight line recorder which operates on 200 Kz, has 600 watts of power, beam angle of 17° and has the service back up of A.W.A.

Gary Ryan

CALENDAR

31.8.80	Cape St. George/Stoney Creek area. Bob Smith and Bob Pratt will be dive leaders, this promises to be an exciting dive on a new spot. Meet adjacent to the new? boat ramp at Greenpatch at 9.00 a.m.
15.9.80	Club Meeting. Neil Vincent will screen slides taken on his recent trek along the Kokada Trail.
19.9.80	Theatre Party "Breaker Morant".
28.9.80	Birchgrove Park Wreck dive. Meet at Palm Beach boat ramp at 9.30 a.m.
4,5, & 6.10.80	Current suggestions for this weekend include diving with seals at Montague Island or wreck diving at Seal Rocks. Venue will be decided at September meeting.
20.10.80	Club Meeting. Mike Richards will give a lecture on the history and development of N.S.W. Coastal Shipping.
2.11.80	Reef and Wreck diving. Bass Point Shellharbour. Weather conditions permitting it is hoped to dive on a wreck near Bass Point, it's identity is not established but it is on the hush list and very accessable. It is also hoped to dive on the Church grounds and the Humps both excellent dive sites in 50' to 80' of water offering interesting fauna, flora and geographical characteristics. A B.B.Q. is planned for after the dive so bring the family. Every diver will get a boat ride. Meet at the Park opposite the Shellharbour Inn at 8.30 a.m.
17.11.80	Club Meeting. Pat Manly will give a short lecture on underwater night photography and screen slides taken on his familys Solomen Islands trip.
21.11.80	Night Dive Shiprock. Meet 7.30 p.m. in Shiprock Road. Slack water is about 8.45 p.m. A great opportunity for photographers.

30.11.80	Wreck and Reef Diving off Royal National Park. Another Family Day with an after dive B.B.Q. Great spot for the kids. Meet at Gunnamatta Bay boat ramp 8.30 a.m.
13.12.80	Christmas Party. Suggestions will be discussed at the next club meeting.
15.12.80	Club Meeting. Entries for Club Photographic Competions close. 5 slides per entrant will be accepted, slides should be at least 5 years young. Entries for both sections open and novice will be adjudicated on by an independant judge. Trophies and colour blow ups will be awarded to the winners.

SPECIAL FEATURE

Make no mistake about it, coastal seas can be as merciless to the small-boat fisherman as to a yachtsman sailing the Roaring Forties. A radio is the cheapest and best form of life insurance you can buy, and is often compulsory for participants in sport fishing competitions. But most of us regard the radio world as an impenetrable jungle, and without help we may end up wasting money on a set totally unsuited to our needs. To help the layman, Modern Fishing has produced the following guide to marine radios and how to use them. It can be digested in small doses and kept as a reference work on board, just in case you need a lifeline.

Radio: the boat fisherman's lifeline

Which radio transceiver?

In these days of cheap electronics there is absolutely no reason why anyone going offshore fishing should not carry a radio tranceiver. Engine failure or a medical emergency could cost a life, and on the water you have only two chances of getting help: visually through the use of flares or reflecting devices and by radio. The latter improves your chances enormously, and is the best form of life insurance you can buy.

Unfortunately, the radio world is an electronic jungle for the average fishing boat owner. To help you decide what type of radio transceiver is more suitable for your boating needs, ask yourself the following questions:

o Do you only fish in harbors or very close to the shore?
o Do you occasionally take offshore fishing trips of any distance?
o Do you often go on long offshore fishing trips in remote waters?

There are three main types of marine radio transceivers, and these can be roughly categorised by the use the boat is being put to:

o 27MHz: cheap, medium quality, short range, but without official watch on distress frequency.
o VHF: medium cost, medium range, high quality with constant watch on distress frequency.
o AM/SSB: expensive, variable quality, long range capability with constant watch on distress frequency.

A selection of radio transceivers. 27MHz: Westranz TX 66M, GME Kingston TX 80, hand-held Midland. VHF: Wagner SMT 55. SSB: Wagner 829M. (Courtesy of Nautilac, Sydney).

27MHz

The main advantage of 27MHz transceivers is their low cost. They are almost identical to the CB (Citizen's Band) sets owned (and often abused) by thousands of car and truck drivers, but they operate on different frequencies set aside for marine use. Unfortunately, many land based CB operators have marine frequencies illegally installed in their sets, and at weekends one can be battling to be heard among the heavy CB chatter.

However, for the small boat fisherman who only fishes in harbors or very close to the shore, the 27MHz transceiver provides a measure of safety and convenience for very little money. A complete installation, including the fibreglass whip antenna costs around $100 to $200. Hand held units are even cheaper, and can be transferred to a dinghy or even a life raft.

These sets are only suitable for short range transmission, and have a reliable range of 10 to 15 nautical miles or line-of-sight operation. They are effective in open water areas but not so good in places like Sydney Harbor with its drowned river valleys giving areas in radio 'shadow'.

All the sets operate on 12v, and use very little power. Antennae can be mounted on the aft guard rail, or the more expensive type can be fixed to the mast head which may increase the range. There are numerous base stations scattered along the more populous coastal areas, many are operated by fishing co-operatives for contact with their fleets, or by fishing clubs.

Unfortunately, there are no official monitoring services, marine information or weather reports on 27MHz. All the available information and monitoring is done by organisations like the Coast and Coastal Patrol, who cannot provide round-the-clock service. It would be very unwise to rely on these services for safety on a winter weekday — there may not be anyone listening.

Interference is another big problem with this band. Apart from land CB users, ignition static from engines, sky-wave interference from distance stations and atmospheric noise (such as rain and lightning) are all sources of interference. However, a great deal of this can be cut down by purchasing a transceiver with what is known as a double conversion receiver. This more complex design costs more, but is far superior to the cheaper, single conversion design.

Do not confuse 27MHz marine transceivers with CB transceivers. Although both use the 27MHz band, certain channels have been set aside for marine use, and different ones for land use. The 27MHz transceiver should be able to transmit and receive the following frequencies: 27.86MHz, 27.88MHz (both reserved for distress use), 27.89MHz, 27.90MHz, 27.91MHz, 27.94MHz and 27.96MHz.

VHF

This type of radio transceiver provides clear, interference-free communication over 15 to 20 nautical miles. The distress frequency (channel 16) is constantly monitored by the Overseas Telecommunication Commission (OTC) in Sydney and Melbourne, and many other government stations keep watch on channel 16. Coverage will eventually be extended to all the major ports in Australia.

A complete installation, including antenna costs between $500 and $1400. The range is very dependent on transmitter power and antenna height. VHF is basically limited to line-of-sight, and inlets surrounded by hilly terrain may be in radio 'shadow'.

The clarity of reception is consistently very high; VHF sets are not affected by interference from engines, atmospheric noise and sky-wave interference from distant stations. A 'capture' effect allows only the strongest station to be heard, consequently two close stations can converse satisfactorily despite other operational stations nearby.

The sets have low-power (1 watt) switches enabling the user to save the battery and operate over short distances without unnecessarily interfering with other stations.

Another big advantage of VHF is the ability of the sets to use the **Seaphone** link. This allows boats within range of the Sydney and Melbourne OTC stations to be connected with the Australian and international telephone installations. Telephone calls can be made and received by boats in the Sydney area between Wyong and Kiama, and between Wonthaggi and Lorne in the Melbourne area. OTC hopes to extend this service to cover the eastern and southern coasts from Cairns to Adelaide and major regions of the west coast.

To participate in the Seaphone link, the set must be fitted with channels 23, 26 and, for future use, channel 27. These are known as **duplex** channels, and although each is listed as one channel, the transmission and receiving signals are on different frequencies. On channel 26, for example, the shore station transmits to ships on 161.90MHz, and the ship transmits to shore on 157.30MHz.

Many VHF sets on the market are fitted with a limited number of channels only, but extra channels can often be added. However, the cost of the crystals for the extra channels is very high — $50.00 and upwards per crystal. This should be borne in mind when comparing the prices of different sets. It is often cheaper in the long run to buy a set with all the channels you are likely to need already fitted.

Weather reports and navigation warnings are broadcast by OTC stations on channel 67 at regular intervals.

All large ocean-going merchant ships are fitted with VHF transceivers to communicate with harbor authorities and tugs, so one of the great advantages of VHF is the ability to contact passing merchant ships on the high seas.

VHF sets must be approved by the Department of Post and Telecommunications before they can be used on boats. Reputable marine electronics companies will give accurate advice on this and whether the set is suitable for participation in the Seaphone link. The set should operate within the frequency range 156 to 162 MHz.

AM/SSB

High Frequency Single Side Band transceivers are expensive long range sets suitable for the offshore fisherman who frequents remote areas or fishes along the edge of the continental shelf. The three distress frequencies — 2182, 4125 and 6215.5kHz — are monitored 24 hours a day by OTC stations around Australia. SSB sets are carried by all large ships, which maintain a listening watch on the distress frequencies.

A set costs between $1700 and $7000, not including antenna. The reliable maximum daytime range is 50 to 150 nautical miles using the 2MHz bands (2182 or 2524kHz, for example), and 200 to 1000 nautical miles using the 4 and 5MHz bands. The range depends very much on the power of the set, atmospheric conditions and interference. At night the range is increased and on the 2MHz band distances of 600 to 2000 nautical miles are not uncommon.

Interference can be a problem with SSB transceivers. They are susceptible to ignition static from engines and other electrical sources (such as fluorescent lights) on board. Hence all electrical equipment must be adequately suppressed. Skywave interference brings additional interference from vessels hundreds of miles away at night. Modern sets can, however, be fitted with a muting facility which cuts out 95 per cent of man-made interference.

One of the major problems with SSB sets is their power consumption. They may require a larger alternator or an extra battery to operate successfully.

Boats fitted with SSB sets are able to place and receive ship-to-shore telephone calls through the OTC's **Radfone** link. Calls can be connected into the local telephone network or extended to overseas countries. OTC stations around Australia offer the Radfone service.

The OTC stations also broadcast weather information, navigation warnings, medical information, and time checks.

SSB sets must be approved by the Department of Post and Telecommunications before they can be used on boats. New sets are fitted with a limited number of crystals. These are expensive — $50 or more each — and if the set does not have all the frequencies you need, you must buy the extra crystals.

Beware of Double Side Band (DSB) sets. After 1982 these sets will only legally be able transmit and receive on the distress frequency 2182kHz. This limitation could prevent you making contact during daylight hours when the range may be no more than 50 nautical miles. SSB sets give you the three international distress frequencies and consequently a much greater chance of making contact. □

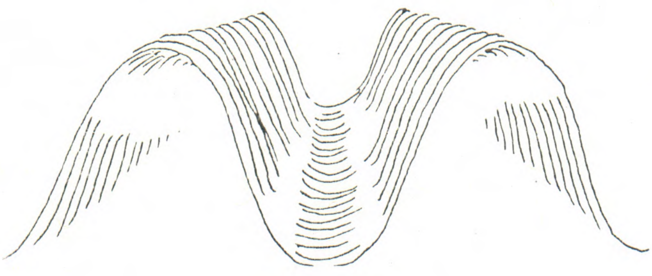
Coming to terms with terminology

Before considering the merits of different marine radios you should familiarise yourself with some of the terminology used by the industry. This may seem complicated at first, but you can get by without understanding too much of the underlying theory.

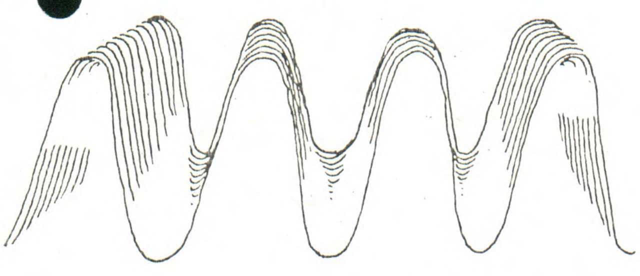
We are talking about radio equipment which can transmit and receive speech. This is known as transceiver or radiotelephone equipment. Large ships also use morse code as a fast, efficient, reliable means of communication.

Frequency

Radio is transmitted through space in the form of waves. These are produced by a transmitter that can be tuned to send out waves with a specific distance between their crests. A stationary receiver would therefore notice that a certain number of wave crests pass by every second, depending how the transmitter is tuned. The number of wave crests passing every second is known as the **frequency**, and is measured in cycles per second (cps), also called Hertz (Hz) after their discoverer.



LOW FREQUENCY RADIO WAVES



HIGH FREQUENCY RADIO WAVES

Radios can transmit from as few as 300 cps (300Hz) to 3000 million Hz. To avoid using large numbers, 1000 Hz is called one kiloHertz (1kHz) and 1 million Hz is called one megaHertz (1MHz).

Radios can therefore be tuned to transmit radio waves of particular frequences ranging from 3kHz to 3000MHz.

Channels

At the heart of the transmitter is a tiny crystal which can be made to vibrate and produce a radio wave of a precise frequency. Transmitters contain a number of crystals each capable of producing a different frequency. One transmitter may have, for example, crystals producing frequencies of 2182kHz, 2201kHz and 2524kHz,. These frequencies are known as radio **channels**. Some marine sets have 55 different channels, and these can be changed by changing the crystals.

Unlike telephones which have a private line for each caller, radio is broadcast directly into space, and can be received by anyone with a set tuned to that frequency and within the range of the transmitter.

There are thousands of radio stations in the world, and without some control over the frequencies being used it would be almost impossible to listen to one radio transmission without being interrupted by another transmitter using the same frequency.

Governments around the world have therefore agreed to allocate certain frequencies for particular purposes. The ones we are concerned with for marine use are: 2-3MHz, 4-5MHz, 6-7MHz, 27-28MHz and 156-162MHz. To simplify matters the 2-3MHz frequency range is called the 2MHz band, the 4-5MHz is called the 4MHz band and so on.

2, 4, 6MHz AM/SSB

The 2,4 and 6MHz bands are called **High Frequency** (HF) bands, and one way of translating speech into a suitable form for radio transmission is by varying the height of the radio wave. This method of transmission is called **Amplitude Modulation** (AM).

AM (also called **Double Side Band)** has now been superceded by a method of transmission known as **Single Side Band** (SSB) in which only a small part of the wave is transmitted, thus allowing for more channels within the wave bands.

Many old sets still function on AM, but these will be made obsolete in 1982, when the only legal AM frequency will be the international distress frequency of 2182MHz. Modern sets can be switched from AM to SSB

27MHz

The other HF band used by marine radios is the 27MHz band. This again uses the AM type of transmission.

Unfortunately, the 27MHz band is also used by vehicle owners in their CB radios,

VHF

Moving up the frequency range we come to the 156-162MHz band. This is called **Very High Frequency** (VHF), and the marine radio transmitters in this range use a type of transmission called **Frequency Modulation** (FM). In this case speech is translated into a suitable form for transmission by varying the frequency rather than the height of the wave. □

SPECIAL FEATURE

Installation & maintenance

All marine transceivers operate on 12 or 24 volts DC. The 27MHz sets are usually 12 volts, although they can be adapted to operate on 24 volts.

High power sets obviously drain more current, and the long range SSB sets with power outputs in the range of 50 to 130 watts require a sizeable electric current to transmit effectively. This may mean that the boat's generating capacity will have to be increased. It is better to operate SSB sets on 24 volts, to reduce the loss of power between the battery and transceiver. Alternatively, if a 12 volt system is used, extremely heavy wire should be fitted between the battery and transceiver, or the transceiver should be installed very close to the battery.

Hand-held VHF sets have a 1 watt power output, and console-mounted sets are fitted with a switch limiting the power output to 1 watt. The battery drain is quite small at this output, and the hand-held sets often have rechargeable batteries.

The maximum power output of 27 MHz sets is 5 watts, so these sets do not appreciably drain the batteries under normal use.

Positioning the transceiver

Careful thought should be given to the position of the transceiver on your boat. The set should be kept well away from spray and out of the sun. It should be in an accessible position so that in an emergency you don't have to fumble about trying to find the microphone or the controls. The ideal set-up allows the helmsman to use the transceiver while controlling the boat.

Both the set and microphone interfere with compasses, so make sure that the compass needle does not move when you are installing the set and microphone. Turn the boat through 90 degrees with your eye on the compass to make sure there is no needle deflection. Remember to return the microphone to its mount after use, many people have been put off course by leaving the microphone next to the compass.

Antennae

Even the most expensive transceiver will not operate without a suitable antenna. 27 MHz, VHF and SSB sets all need different antennae. Do not attempt to operate different types of tranceivers with the same antenna.

Antennae should always be mounted well away from any shielding metal object and as far away from the transceiver as possible. Cabin tops, mast-heads and guard rails are suitable positions. Coaxial cable must be used between the set and antenna tuner unit or antenna. If a tuner unit is fitted, do not cut or coil the leads from the antenna, so you should raise it as high as possible. Yachts usually mount the antenna on the mast-head.

The antennae for 27 MHz sets require a few more operations. GRP and timber boats need both an antenna and an antenna tuner unit or a large ground plate (the tuner is fairly cheap and much simpler to install). The antenna should need tuning only on the initial installation. Metal boats do not need a ground plate or antenna tuner permanently installed, but the antenna must be tuned on installation. This is done with an instrument called a standing wave ratio meter, which usually can be borrowed from a reputable dealer. The antenna must be cut down in approximately 4mm steps until the meter indicates that it is tuned. a suitable ground plane for G.R.P. boats is aluminium foil glued under the deck.

For SSB sets the antenna should be as long as possible in a straight line. Yachts often use part of the standing rigging as an antenna, but whip antennae give perfectly good results.

An antenna tuning unit is required, and this must be adjusted for each frequency transmitted. Manual and automatic tuning units are available. The manual ones are cheaper and have the advantage of flexibility if an emergency antenna has to be used.

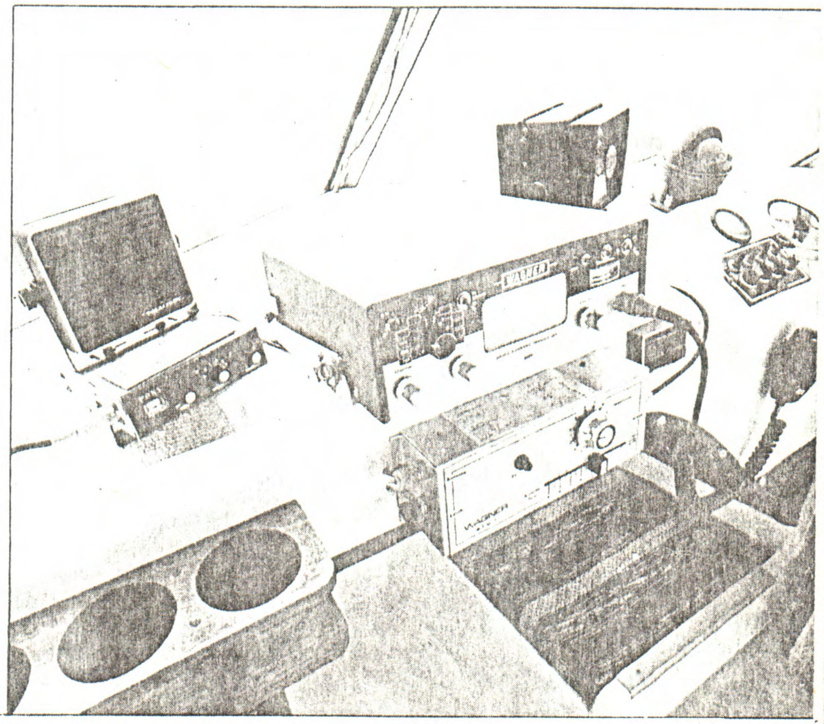
SSB sets are best installed by an experienced radio technician to make sure there is no loss of radiated power into rigging and wiring, and to see that the set is properly grounded.

Maintenance

The following routine maintenance should be undertaken:

- Make sure the batteries are up to full power before you take out your boat.
- If your transceiver must be exposed to the elements, wrap it in a plastic bag, and when you return after an outing wipe the surface with a damp cloth.
- Spray both the outside and inside regularly with a moisture inhibiting spray.
- Spray the antenna base and any other electrical connections.
- Clean the microphone with a damp cloth and spray the plug and socket. Don't spray into the mouthpiece.
- Make sure your equipment is operating correctly before taking the boat out by calling another vessel or shore station on a calling frequency, but make sure you listen to see that the frequency is clear before transmitting. □

The ideal installation allows the helmsman to use the transceiver while steering the boat.



27 MHz shore stations

Location	Base Station	Phone No.	Call Sign
NSW			
Ballina	AVCG	(066) 86-2070	VJ2NG
	Ballina Deep Sea Fishing Club		VJ2HC
	Ballina RSL Deep Sea Fishing Club	(066) 86-2544	VH2ASQ
Bankstown	Bankstown Blue Water Fishing Club	(02) 661-3670	VH2AZB
Bannister Head	Bannister Head Bluewater Club		VH20D
Barrack Heights	Shellharbor Fishing Club	(042) 96-6617	VN2AD
Bateman's Bay	Bateman's Bay Soldier's Club	(044) 72-4117	VH2DWI
	Clayton Marina	(044) 72-5168	VH2BQK
Belmont	Belmont 16' Sailing Club	(049) 45-0050	VH2DUE
	Belmont Sportsmen's Club	(049) 45-2008	VH2BSC
Bonny Hills	Wauchope RSL Fishing Club		VH2QJ
Botany	Towra Anglers Club	(02) 666-6405	VN2QT
Brighton-le-Sands	Brighton-le-Sands AFA	(02) 59-5806	VH2AFV
Broken Bay	AVCP		VH2AOZ
	RVCP	(02) 99-3554	VH2DXH6
	Rocky Point Base	(02) 997-3732	VH2CP
Byron Bay	Byron Bay Deep Sea Fishing Club		VH2AUT
Cambridge Park	Sharp Base	(047) 21-5791	VH2NG
Canberra	Canberra Yacht Club	(062) 73-1784	VH1LS
	Marine Operations Centre	(062) 47-5244	
Canley Vale	Western Base	(02) 726-1464	VH2EOA
Caringbah	Church Fellowship of Fishing Base	(02) 523-0227	VN2HY
Casino	Casino & District Fishing Club	(066) 82-4412	VH2ANU
	Casino & District Small Craft Fishing Club		VM2ANU
Chifley	Slipway Base	(02) 661-2711	VH2APB
Coffs Harbour	Coffs Harbour Deep Sea Fishing Club		VH2UB
	RVCP	(066) 52-3155	VJ2RV
Coledale	Illawarra Angler's Club	(042) 67-2216	VM2JC
Connels Point	Connels Point Rescue Base	(02) 546-6185	VH2VY
Corrimal	Illawarra Angler's Club	(042) 84-4657	VH2MT
Cottage Point	AVCP	(02) 456-3055	VH2AOJ
Crescent Head	Crescent Head Bluewater Club		VN2SA
Cronulla	AVCP	(02) 523-6121	VH2AOO
	Cronulla Labor & Workingmen's Club	(02) 523-3717	VJ2KZ
Crowdy Head	Crowdy Head Bluewater Fishing Club	(065) 56-1206	VH2BVL
Dapto	Illawarra Motor Club Co-op	(042) 61-5175	VN2XK
Davistown	RSL Fishing Club		VJ21Q
Eden	Eden-Pambulla Fishing Club		VH2MU
Elivina Bay	TV Sports Fishing & Boating Club		VJ2TP
The Entrance	The Entrance Bluewater Fishing Club	(043) 32-2568	VH2DIK
	The Entrance District Anglers Club	(043) 32-5739	VM2PM
Evans Head	AVCP	(066) 82-4282	VH2CCK
Gerroa	Gerroa Boat Fishermen's Club	(042) 34-1004	VH2DTT
Gosford	Penta Fishing Club	(043) 24-4644	VM2PC
Green Cape L/House	Green Cape Base		VH2GA
Greenwell Point	RVCP	(044) 47-1666	VH2QH
	Shoalhaven Angling Club	(044) 47-1381	VJ2MZ
Hat Head	RVCP	(065) 65-3536	VH2DXH
	Hat Head Bowling & Recreation Club	(065) 65-7507	VJ2AN
Kiama	Kiama Boat Club	(042) 32-1990	VH2DVP
Kilcare	Kilcare SLS Club	(043) 60-1150	VJ2YP
Lake Macquarie	RVCP		VH2DXH
Laurieton	AVCG	(065) 59-9167	VM2CG
Lilli Pilli	Elena Base	(02) 525-3764	VM2FM
Lismore	Lismore Deep Sea Fishing Club	(066) 21-5315	VH2UD
Liverpool	Macquarie Base	(02) 602-1731	VH2EEU
Long Reef	Dee Why RSL Fishing Club	(02) 98-6939	VH2BVB
Macmasters Beach	Macmasters Beach RSL Club	(043) 82-1767	VH2ACI
Maianbar	Maianbar Social Fishing Club	(02) 523-3609	VN2RY
Malabar	Malabar Boatowner's Club	(02) 661-2150	VM2LM
Manly	Manly-Warringah SLSA		VH2UX
Maroubra Beach	South Maroubra SLS Club	(02) 349-7748	VJ2SA
Mascot	RVCP	(02) 669-6859	VH2DXH3
Matraville	Matraville RSL Fishing Club	(02) 661-1993	VJ2PE
Merrimbula	Merrimbula Big Game Fishing Club	(0649) 5146	VH2DWC
Mollymook	Marlin Fishing Club		VH2AWJ
Mona Vale	Ku-ring-gai-Hornsby AFC	(02) 99-2308	VJ2KC
Montague Island	Bruce Conley	(044) 76-2542	VJ2LA
Moruya Heads	Golf Base	(044) 74-2770	VN2ME
Mystery Bay	Mt. Pleasant Sports & Social Club		VJ2KH
Narooma	Narooma Sport Fishing Club		VJ2LA
Nelson Bay	Nelson Bay RSL Fishing Club	(049) 81-1887	VH2RT
Newcastle	Newcastle, Bluewater Fishing Club		VM2CP
Norah Head	Norah Head Boat & Angling Club		VH2ATH
Pambula	Pambula Boating & Fishing Club		VH2AGO
	Eden-Pambula Boating & Fishing Club		VH2EA
Penrith	Penrith Rugby Leagues Club	(047) 56-1108	VH2AUH
Petersham	Sea Rescue Base	(02) 569-7241	VN2TU
Port Hacking	Royal Motor Yacht Club	(02) 523-9131	VN2AV
Port Macquarie	Port Macquarie Bluewater Club	(065) 83-1283	VH2SB
Port Stephens	Myall Boat Club	(049) 97-0378	VH2BSD
	Mayll Lakes Yacht Club	(049) 970307	VH2FGY
Port Jackson	AVCG	(02) 680-1220	VH2BEF
Redhead	Redhead Bowling Club Anglers' Club	(049) 49-8042	VH2AGQ
Sandringham	Georges River Sailing Club	(02) 529-6584	VH2ZM
Sans Souci	St George Motor Boat Club	(02) 529-7276	VH2OF
	St George Sailing Club	(02) 529-7962	VH2DTL
Seal Rocks	Toronto RSL Fishing Club	(049) 59-2411	VH2DCX
Scotts Head	Macksville-Scotts Head DSFC		VH2DOY
South West Rocks	South West Rocks Fishing Club	(065) 66-6252	VH2CPK
Speers Point	Speers Point Amateur Sailing Club	(049) 58-3510	VJ2JD
	Speers Point RSL Club	(049) 58-1161	VJ2AL
Sussex Inlet	Shoalhaven Angling Club	(044) 41-2034	VH2ADO
Sutherland	Waratah Masonic Bowling Club	(02) 521-1667	VH2BQL
Swansea	Lake Macquarie Game Fishing Club	(049) 71-1285	VJ2JA
	AVCG	(049) 71-1517	VN2UJ
	Wales Helicopter Service	(02)-349-7748	VH2SA
Sydney	AVCG, The Spit	(02) 960-2943	VH2AOL
	Dockyard Base, Cockatoo Docks	(02) 827-9294	VH2EUU
	Greenwich Base, West Sydney Harbor	(02) 43-2378	VH2GES
	RVCP, The Spit	(02) 969-3270	VH2DXH
	Sydney Command, Maroubra Beach	(02) 349-7748	VJ2SA
	Sydney Eastern Suburbs Anglers, North Bondi	(02) 30-8729	VJ2RA
	Sydney Metropolitan NSWAFCA, Matraville	(02) 661-1108	VH2DGT
	Sydney North Division NSWAFCA, Beacon Hill	(02) 451-0075	VH2CZK
	Woollhara Sailing Club	(02) 371-9805	VN2SX
Taree	Taree RSL Fishing Club	(065) 53-7323	VH2CZB
Taren Point	Endeavour Base	(02) 525-0978	VH2ADZ
	Taren Point Fishing Club		VNZST
Tathra	Tathra Amateur Fishing Club	(0649) 41310	VH2CVG
Tempe	Cooks River Motor Boat Club	(02) 55-5522	VH2AIB
Terrigal	RVCP		VH2DXH
Toronto	Royal Motor Yacht Club	(049) 59-2051	VM2RY
Tuncurry	Forster-Tuncurry Bluewater Fishing Club	(065) 54-6151	VH2CPJ
Tweed Heads	Tweed Bluewater Boat Club	(075) 36-2533	VH2BCJ
	Tweed Coolangatta Air Sea Rescue		VN2RL
Umina	Umina Aquatic Club	(02) 41-4127	VH2DZG
Urunga	Urunga Amateur Deep Sea Angling Club	(066) 55-6161	VM2UM

Sydney Metropolitan NSWAFCA is one of the best-known base stations along the NSW coastline.

SPECIAL FEATURE

Location	Base Station	Phone No.	Call Sign
Warriewood	Warringah Angler's Club	(02) 948-8107	VH2BXQ
Werri Beach	Gerringong Boat Fishermen's Club	(042) 34-1414	VH2WP
Wollongong	AVCP	(042) 84-8822	VH2ARE
	Illawarra Yacht Club	(042) 74-6622	VH2DAL
	RVCP	(042) 29-3434	VH2DXH5
Woolgoolga	Woolgoola Volunteer Rescue Organisation	(066) 54-1373	VM2MN
Woy Woy	Gosford Yacht Club	(043) 41-1738	VM2GY
Yamba	Grafton Districts Anglers Club		VN2RG
	Yamba Fishing Club		VH2BUB
Yarra Bay	Yarra Bay Sailing Club	(048) 661-2592	VN2CZ
Queensland			
Airlie Beach	AVCG	(079) 45-1826	VH4AFZ
Alva Beach	Air Sea Rescue Club		VN4SR
Bargara	Bundaberg SLS Club		VH4AWF
Bowen	Chrysler Crew Club		VM4TT
	Air Sea Rescue		VJ4VS
	Marine Sports Club		VH4AVL
Bundaberg	Ceratodus Fishing Club		VH4ATI
	Bundaberg & District Air Sea Rescue		VN4BF
	Qld Commercial Fishermans Assoc.		VH4AKK
ett Heads	Bundaberg Blue Water		VH4WDA
ie Island	Bribie Island Boating and Fishing Club	(075) 48-1696	VH4AQM
Cairns	Naval Reserve Cadets		VH4AYL
	Chrysler Crew Club of Cairns		VH4ADQ
	Cairns Yacht Club		VH4AYS
	Cairns Cruising Yacht Squadron		VJ41B
	Cairns Marine Radio Club	(070) 51-1870	VH4AYE
	AVCG	(070) 51-2192	VM4UE
Caloundra	AVCG	(071) 91-1995	VH4AOG
Cleveland	Oyster Pt Amateur Fishing Club		VM4KJ
	Redland RSL Fishing Club		VH4BDP
Coomera	Coomera		VJ4ET
Currumbin	Currumbin Air Sea Rescue		VN4RU
Dunwich	Little Ships Boat Club		VH4ASF
Elliott Heads	Elliott Heads SLS Club		VN4RG
	Bundaberg Marine Radio Club	(071) 79-2289	WH4ATT
Gladstone	Port Curtis Air Sea Rescue	(079) 72-3508	VM4RG
Gympie	AVCG	(071) 86-4186	VM4CC
Heron Island	Heron Island Resort		VH4AIV
Hinchinbrook Island	AVCG	(077) 77-8110	VH4KX
Home Hill	Family Boat Club		VH4AVR
Loganholme	Beenleigh & Districts Sundowners Amateur Fishing & Boating Club		VH4BD
Keppel Island	Park View Keppel Pty Ltd		VJ4GK
Kurrimine Beach	AVCG		VN4DA
Lucinda	AVCG		VN4KX
Mackay	Cruising Yacht Club		VH4AHD
	Sea Rescue Squad	(079) 57-2244	VJ4BH
	Mackay Sailing Club		VN40G
Manly	Bayside Fishing Club		VN4YR
	Trailer Sailer Club		VH4BGY
	AVCG	(07) 396-5911	VM4PQ
	Moreton Bay Trailer Boat Club		VN4RO
	VHF Club		VH4ASK
Mooloolaba	AVCG	(071) 43-3461	VH4ANW
Mossman	Boat Club		VH4AQU
Mourilyan Heads	AVCG	(070) 63-2396	VN4DA
Nashville	St Helens Sport Fishing Club		VM4FL
Pialba	Hervey Bay Air Sea Rescue	(071) 28-2886	VN4HV
Pt Douglas	AVCG	(070) 98-5192	VM4RM
Pt Vernon	P & L aquatic Social Club		VH4ASC
Redcliffe	Humbong Yacht Club		VN4KK
Redland Bay	Redlands Boat Club		VN4ED
Rockhampton	AVCG	(079) 27-3523	VH4BAR
Rosslyn Bay	Qld Fish Board		VH4BAB
	Markwell Fisheries		VJ4KV
Rundles Beach	AVCG		VH4BAJ
Sandgate	Sandgate Yacht Club		VN4YC
Sarina	Sarina Beach Fishing Club		VH4BFW
Scarborough	AVCG	(07) 203-5522	VN4GX
	Moreton Bay Boat Club		VJ4MT
Scarness	Maryborough Power Boat Club		VH4AME
Shute Harbour	Whitsunday Air Sea Rescue		VJ4TF
Southport	AVCG	(075) 31-1421	VJ4RE
	Southport Amateur Fishing Club		VH4TN
	Southport Air Sea Rescue	(075) 323-417	VH4AO
Stradbroke Island	Boat Club South Stardbroke		VM4VW
	Goldcoast Boat Club		VJ4QB
	North Stradbroke Island VRS		VH4BIH
Tewantin	AVCG	(071) 47-1703	VM4GW
Tin Can Bay	AVCG		VM4OC
	Qld Commercial Fisherman		VH4AXC
	Gympie Boat Club		VH4AWQ
Townsville	Cleveland Bay 16' Skiff Club		VN4SK
	AVCG	(077)71-4831	VH4PP
	Townsville Sports Fishing Club		VH4AVO
	Townsville Combined Fishing & Boating Club		VH4AFC
Tully	AVCG	(070) 69-9300	VN4TU
	AVCG		VN4ZB
Urangan	Qld Commercial Fishermen		VH4AXK
Weipa	Weipa Boating & Rescue Assoc.		VN4OK
Yeppoon	AVCG	(079) 39-2222	VJ4YN
	Yeppoon Surf Life Saving Club		VH4HO
	Keppel Bay Sailing Club		VN4QM
	Capricorn Master Fishing Assoc.		VM4ZC
SA			
Norwood	AVCG	(08)49-4272	VJ5NX
Port Lincoln			VM5KI
Tumby Bay			VH5RC
Tasmania			
Arthur Lakes			VH7XP
Binalong Bay			VH7NV
Bridport			VH7LX
Burnie			VH7XS
	Surf Clubs		VH7EZ
Coles Bay			VH7YD
Devonport	Air Sea Rescue	(004) 27-8649	VH7FJ
Dunalley	Tasmanian Small Craft Radio Group		VH7ZZ
Great Lakes			VH7ZL
King Island			VH7XE
Kingston			VH7KG
Launceston			VH7ZB
Lake Sorrel			VH7WZ
Low Head			VH7ZM
Margate			VH7MH
Midway Point	Tasmanian Small Craft Radio Group	(002) 67-2259	VH7WH
Mersey			VH7BH
	Mersey Yacht Club	(004) 27-8649	VH7WV
Musselroe Bay			
Penguin			VH7TQ
St Helens			VH7GF
Swansea			VH7XC
Tamar	Tamar Yacht Club		VH7YD
Toombs Lake			VH7YC
Triabunna			VH7XP
Ulverstone			VH7SU
Waterhouse Point			VH7DM
Weymouth			VH7YE
			VH7PI
Victoria			
Apollo Bay	AVCG		VH3AHU
Carrum	AVCG		VH3AR
Corinella	AVCG		VH3AIT
Mt Elisa	RVCP		VH3AHR
Franktson	AVCG	(03) 783-1381	VH30P
Geelong	AVCG	(052) 78-8440	VH3FI
Gippsland	Gippsland Safety Council		VH3AAR
Ocean Grove	Coast Watch	(052) 55273	VH3ADE
Paynesville	AVCG	(051) 56-6421	VH3ADS
Queenscliff	AVCG		VH3AAA
Pt Welshpool	AVCG		VH3ADN
Werribee	AVCG		VH3AGR
Westernport	Westernport Safety Council		VJ3WV
WA			
Albany	Albany Air Sea Rescue		VN6GG
Bunbury	Bunbury Power Boat Club	(097) 21-3431	VM6FN
Dampier			VN6AA
Exmouth	Albany Princes Royal Yacht Club		VN6EV
Fremantle	East Fremantle Yacht Club		VJ6GQ
	Fremantle Sailing Club		VJ6LS
Freshwater Bay	Royal Freshwater Bay Yacht Club		VH6PW
King Bay			VN6AG
Koombana Bay	Koombana Bay Yacht Club		VJ6XO
Mandura	Mandura Police		VH61K
	Charlie Lamb	(095) 35-1389	VM6DC
Marmion			VH6FC
Peaceful Bay			VN6BJ
Perth	Perth Flying Squadron		VJ6IP
	Royal Perth Yacht Club		VJ6RP
	South of Perth Yacht Club		VJ6LF
Safety Bay	Safety Bay Yacht Club		VM6BB
Whitford	Whitford Sea Rescue		VJ6LQ

SPECIAL FEATURE

Transceivers on the market

Model	Type	Channels	Cost	Power Output	Design
[illegible] At-102	27MHz	2, all fitted	$53.94	3w	Single Conversion
AWA AT-051	27MHz	1, fitted	$61.18 pr	1w	Single
AWA AT-503	27MHz	3, 1 fitted	$90.64	1w	Single
AWA AC-516	27MHz	6, all fitted	$135	5w	Single
GME Electrophone 275A	27MHz	10, 7 fitted	$148	5w	Double
GME Electrophone 277	27MHz	7, all fitted	$160	5w	Double
GME Kingston 77	27MHz	10, 7 fitted	$150	5w	Double
GME Kingston TX80	27MHz	7, all fitted	$165	5w	Single
GME WT273	27MHz	3, 1 fitted	$69	2w	Single
Mars Contact Mariner	27MHz	6, all fitted	$149	5w	Single
Mars PSC-161	27MHz	6, all fitted	$199	5w	Single
Tokai TC5038B	27MHz	3, 1 fitted	$99	5w	Single
Westranz TX66M	27MHz	6, all fitted	$150	3.2w	Double
AWA Pilotphone V1	VHF	24, all fitted	$650	25w	
AWA Pilotphone V11	VHF	55, all fitted	$825.94	25w	
Dancom RT108	VHF	99, 11 fitted	$1200	25w	
GME Electrophone 551	VHF	10, 4 fitted	$590	25w	
Phillips SM828-3	VHF	3, all fitted	$750	25w	
Phillips SM828-10	VHF	10, 7 fitted	$950	25w	
Sailor RT144C	VHF	55, all fitted	$1350	25w	
Wagner SMT-55	VHF	55, 10 fitted	$995	25w	
Willis C2	VHF	10, 5 fitted	$772	25w	
Dancom HF1200	SSB	258, all fitted	$10,500	1200w	
Findlay Stingray 120	SSB	10, 1 fitted	$1270	100w	
GME Electrophone SSB MHF90	SSB	8, non fitted	$1440	90w	
Kestrel Marine	SSB	20, 1 fitted	$1250	130w	
Sailor T124/R110	SSB	31, 1 fitted	$4311	140w	

Which frequency?

	27MHz	VHF	SSB
Distress, safety and initial calling	27.88MHz 27.86MHz	Channel 16 (156.80MHz)	2182MHz 4125MHz 6215.5MHz
Weather, navigation, telegrams and ship-shore-ship		Channel 67 (156.375MHz)	2201MHz 4134.3/44.28.7MHz
Ship-shore-ship working for long range			6206.2/6512.6MHz
Ship-shore-ship (27MHz only)	27.90MHz 27.91MHz 27.94MHz		
Ship-ship	27.94MHz 27.96MHz	Channel 70 (156.525MHz)	2112MHz 2164MHz 2524MHz
Club events	27.94MHz	Channel 73 (156.675MHz)	1725MHz 2032MHz
Seaphone		Channel 26 (157.30MHz) Channel 23) (157.15MHz)	
[illegible]tone			2760/2056MHz

Adapted from the original feature first published in the U.S. in "Salt Water Sportsman" and re-produced here by special arrangement with the author and publisher.

Understanding Depth Finders

Probe the Deep

What does the word "sonar" conjure up in your mind? It could be a World War II movie. The tincan *Pilotfish* has just made an emergency dive to avoid a Japanese destroyer. The scene flashes to a radioman, with earphones in place, working a cumbersome bank of dials. "All engines, stop", comes the command. "Bong, bing, bong, bing." The sonar plays its monotonous tune. "Japanese destroyer 2000 yards and closing."

Or, it could bring the vision of a modern sport-fishing boat searching the depths for a certain wreck or hump that provided hot action on the last trip.

In either case the vision would be right. Sonar simply means the use of high frequency sound waves in water to measure the distance from a known point to another object, be it the bottom, a 20kg black kingfish or a fully-fledged nuclear submarine.

If the average user of fishfinding equipment is anything like me, and he is probably a lot smarter; he knows basically how his boat's engine runs, but he stands in awe of the little black box that flashes and records its strange hieroglyphics.

It does take some fairly sophisticated electronic equipment to make a modern fishfinder, and most of that is beyond my capability to explain. There are a number of things that we can learn about these electronic gadgets which will help to remove them from the "little black box" status.

Remember the first time you heard the echo of your voice? I'll bet that you tried it several times, maybe even in rapid succession. Whether you knew it or not, you were for a brief moment a human version of a very simple fishfinder.

At sea level, the speed of sound in air is 1100 feet per second. If you had a stop watch and could time how long it took for your echo to return, you could find out the distance to the object it bounded back from. For ease let's say that it took two seconds — one second to get there and one second to return. Then you know that the object was 1100 feet away.

The fishfinder works in the same manner, but the signal output and returning echo are electronically timed and displayed by means of a flasher and/or a paper graph. One major difference from the air is that water is denser and, believe it or not, sound travels faster, much faster. In salt water sound will move at a speed of about 4900 feet per second. No big deal as long as the speed is known and constant, and the machine is calibrated to measure that speed.

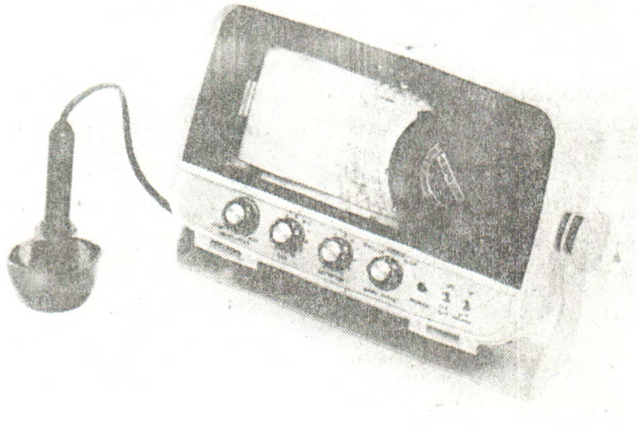
There are a lot of technical terms that sales people, electronics specialists and self-professed experts bandy about when discussing these machines. In many cases the unknowing customer stands in nodding approval as the expert explains that this machine has an adjustable thingamabob and an anti-discombobulator. Great, this machine has a feature that another doesn't, but what does this do for you? Obviously, this means that one has to have some idea of what the variables are and what they do. Understanding these things will not only help in the selection of the right machine, but also greatly aid in its use and in interpreting the output.

The first term that we'll look at is power. Babe Ruth had a lot of power when it came to slugging that white pellet out of the park. My little sister can hold her own when she puts the wood to a softball. She certainly doesn't have the umph of The Babe, but when each played ball they did the job in their own league.

What has baseball got to do with sonar? Abolutely nothing, but it does point out that different power ratings have their place. You don't need a major leaguer's slugging power to get the job done in the corner softball game. So too, you do not need to have the most powerful fishfinder set available if you are only going to use it in relatively shallow water.

In sonar terms, power is measure in watts. This is just like the standard light bulbs found in your house. A 15-watt bulb will not put out as bright a light as a 150-watt bulb. It should also be noted that the greater the wattage, the greater the consumption of electricity. There are other factors that can cause variation, however.

The range in power for the generally available fish-finders run from 10-watts up to 740-watts. There are no doubt some on either side of this range. Basically the greater the power, the greater the depth penetration and the stronger the return echo. Due to the density and other physical characteristics of water, an increase in power will not mean an equal increase in depth



"Understanding these things will not only help in the selection of the right machine, but also greatly aid in its use and in interpreting the output."

capability. The fading or absorption of the signal increases geometrically with the distance, in this case the depth.

Understanding how this power works for you is also very important. I have heard all sorts of ideas to explain what comes out of the transducer, from laser beams to electronic shocks. No, it is just sound at a frequency too high for any human ear to distinguish.

Inside the protective transducer housing is a crystal. This crystal is shocked by the power from the machine causing it to vibrate at its natural frequency. Vibration is the high pitch output from the machine at a frequency beyond the capability of most living things to sense. Although there has been some discussion of late that certain fish are sensitive to this vibration, it has yet to be proven on either side.

The sound emanates from the transducer and as it moves toward the bottom it spreads out in all directions forming a shape like an inverted ice cream cone. An easy way to envision this is to use a flashlight in a dark room. Hold the light close to the wall and it makes a very small circle, not much bigger than the circumference of the flashlight. As you move back from the wall, the circle increases in size. This is the same thing that will take place with the cone of noise coming from the transducer. Another way of visualising this is to shine a light off into a foggy night. Then you can actually see the whole cone. You will also begin to see that the machine may be reading fish that are not directly under your boat. It is possible that a fish on the outside edge of the cone would appear on the machine's readout, but as we will learn, it is possible to figure out which readings are where, to some degree.

When the echo returns to the transducer it causes the crystal to vibrate again. An impulse is sent to the inner workings of the black box and in turn is displayed on the flasher or graph. One of the hardest things to visualise about the readout of the machine, is the fact that the cone effect will cause some averaging of the readout. This happens because the large area [illegible] the cone must be read out in one line on the graph. It is the continuous readings that give the picture of what the cross-section of the bottom is generally like.

Cone angle is another variable that can cause confusion. This is the stated angle which the signals emanate from the transducer. The wide the angle, the more area is covered and conversely the smaller the angle, the less area. This might lead one to think a wide angle would cover more area and give a better idea of what was down there. However, we get back to the fact [illegible] the machine interprets all it sees in the cone into one [illegible]. Bringing everything together in one line means that resolution is lost. On the other hand, a very narrow cone angle will be too restrictive.

There are other factors which dictate the proper selection of a cone angle to fit one's needs and it should become clear that individual need is crucial as the selection process is one of compromise and trade-off. Signal attenuation or fading is increased with the increase of the angle of the cone. Narrower cones have better penetration and thus are better for getting down deep. A cone angle in the range of 15° to 30° would be the best. For shallower use an angle more towards the 30° mark should be selected. Closer to the narrow end would do well for big depths.

On fishfinders with good sensitivity, a single fish reading will appear as an inverted "V". Sometimes the upside-down V is rounded and flat. This indicated that the fish is out near the edge of the cone and not directly under the boat. What it doesn't tell you is *where* in the 360° arc of the cone circle the fish is. If, on the other hand, the readout is very pointed, the fish is more directly under the boat. Another problem arises from the fact that the sound moving down in the theoretical cone area doesn't do so in a straight line. It is curved like the wave caused by dropping a rock in a puddle. The effect of the curve makes fish near the outside of the cone show up on the output as being deeper than they actually are. Those near the centre will show up at the correct depth.

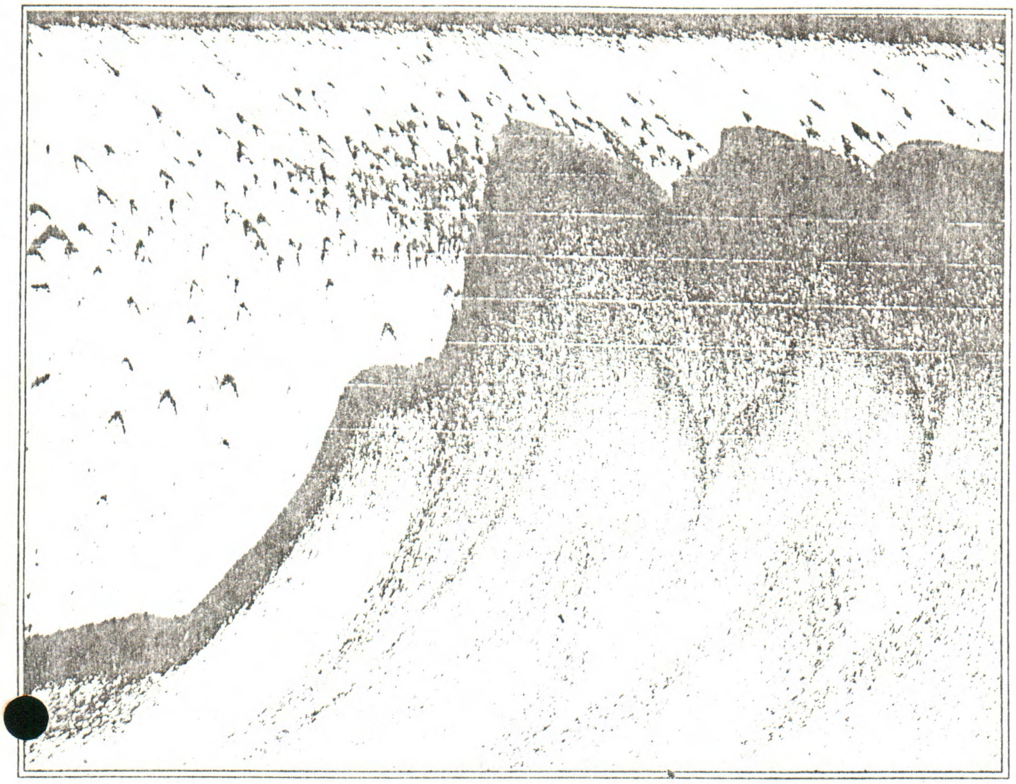
Many have probably seen someone who can read the output from his machine and say, "These are snapper over here and that reading down here is yellowfin." And you know what? He could be very correct, but I'll wager he has spent hours looking at the machine and comparing it to what comes over the rail and what depth people are fishing. Since various fish are structurally different, some have large air bladders and others don't, the readings will be different. In most cases it will take a well-trained eye to see this difference. It is a good idea to mark the paper with the identifcation of the fish, and before the roll of paper hits the trash heap give it a second going-over.

As we mentioned earlier, the crystal has a natural frequency at which it vibrates after getting shocked into action. The frequency is not just a determination of Lady Luck. On the contrary, it is one of the important factors in determining the capability of a machine. We indicated that power influences the depth penetration of a machine. The other factor is the frequency of the signal coming from the crystal. The frequency is measured in terms of kHz, kilo-Hertz.

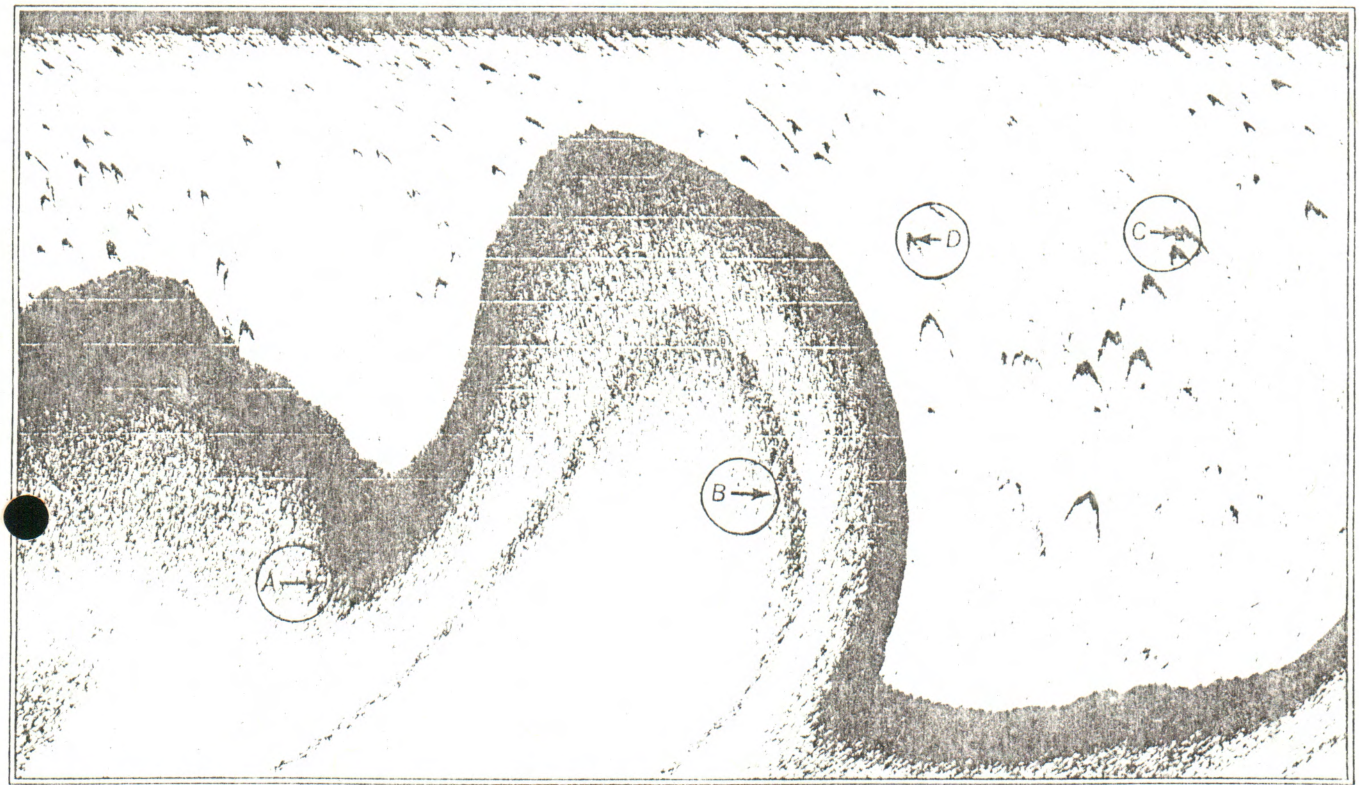
Unlike the power-to-depth relation, the frequency-to-depth relationship is inverse. The higher the frequency the less the ability to penetrate the depth, given equal amounts of power. The higher frequencies tend to dissipate more rapidly, whereas the lower ones will reach greater distance. The Navy has learned this fact and radio stations that transmit to submarines use [illegible] frequencies that penetrate right through the [illegible]arines around the globe.

Great, you say, my machine will have a low-frequency and I'll be able to get good deep readings. It would be nice if this were always true, but there are more complications involved. Yes, you get better penetration, but definition of smaller objects is lost. It is possible, then, to determine what variables will do the required job? I think it is.

First, one has to figure out what the machine is going to be used for. If bottom readings at great depth as well as large concentrations of fish are the objective, then a machine with lower frequency output will be fine. If definition of single fish down deep is important, then higher frequency and power will be required. Other factors to consider can be complicated by water conditions. In areas where there are heavy plankton concentrations, high frequency machines will get a reading off the plankton. The same holds true for areas where there are strong sub-surface currents and abrupt thermal variations. Most of the available machines will fall into a range of 50kHz to 200kHz. Most of those in the lower end will have a better application for commercial uses. Those on the higher end will be better for the sportfisherman as they will give better definition



(left) After many hours of using a unit, it is possible to differentiate between types of fish. (below) These readings show smaller fish up high and bigger ones down below. There are also several things it is saying. A—The wide dark bottom reading and lack of second echo below it indicates a soft bottom area. B—The second bottom reading indicates the sensitivity is turned up for optimum reading and also a hard bottom. C—The round flatter readings indicate that the fish were not directly under the boat. D—The pointed readings indicate that fish are directly under the boat.

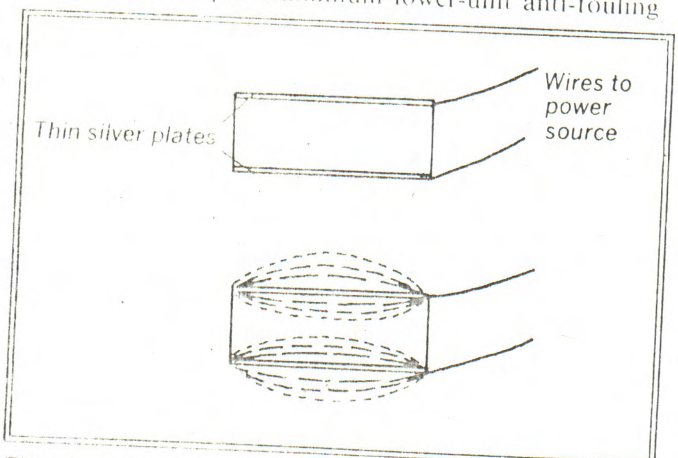


of bottom structure and individual fish.

While we are on the subject of power and frequency, let's talk a little about proper installation of the transducer. As we discussed earlier, the returning echo is sensed by the crystal and this is interpreted by the machine in terms of readout. So the whole sensitivity of the machine is determined by the capability of the crystal to feel the returning vibrations. This simply means that the transducer should be placed where it will be the least affected or hampered by other things.

Some manufacturers sell transducers that are designed to be mounted inside the hull and send the signal through the solid hull material. At the other end, the echo must return through the hull again. If properly installed, this method will work. However, my feeling is that this set-up will hamper the quality of the reading. To prove this, make believe your ear is a transducer and place it against a wall, where there is some sort of constant noise on the other side. You can hear what is going on, but couldn't you hear better if you were standing in an open doorway to the room?

If you want to shoot the signal through the hull, there are several things to remember. Let's go back to the ear and wall example. Listen with your ear placed firmly against the wall. Then move your ear away so there is just a very small airspace. The amount that you can hear drops off drastically. This will also happen with the transducer if you do not make sure there are no air pockets between the hull and transducer face. A good hard adhesive, such as two-part epoxy, should be used to affix the transducer. The hull construction is also very important. It must be a solid non-porous material, and fibreglass hulls with any type of core or sandwich construction are definitely out. Solid fibreglass or Kevlar hulls will give the best results. I always mount a transducer so that it has direct contact with the water, either through-hull or transom mount. Also, don't put any type of anti-fouling paint on it, although it is possible to put aluminium lower-unit anti-fouling



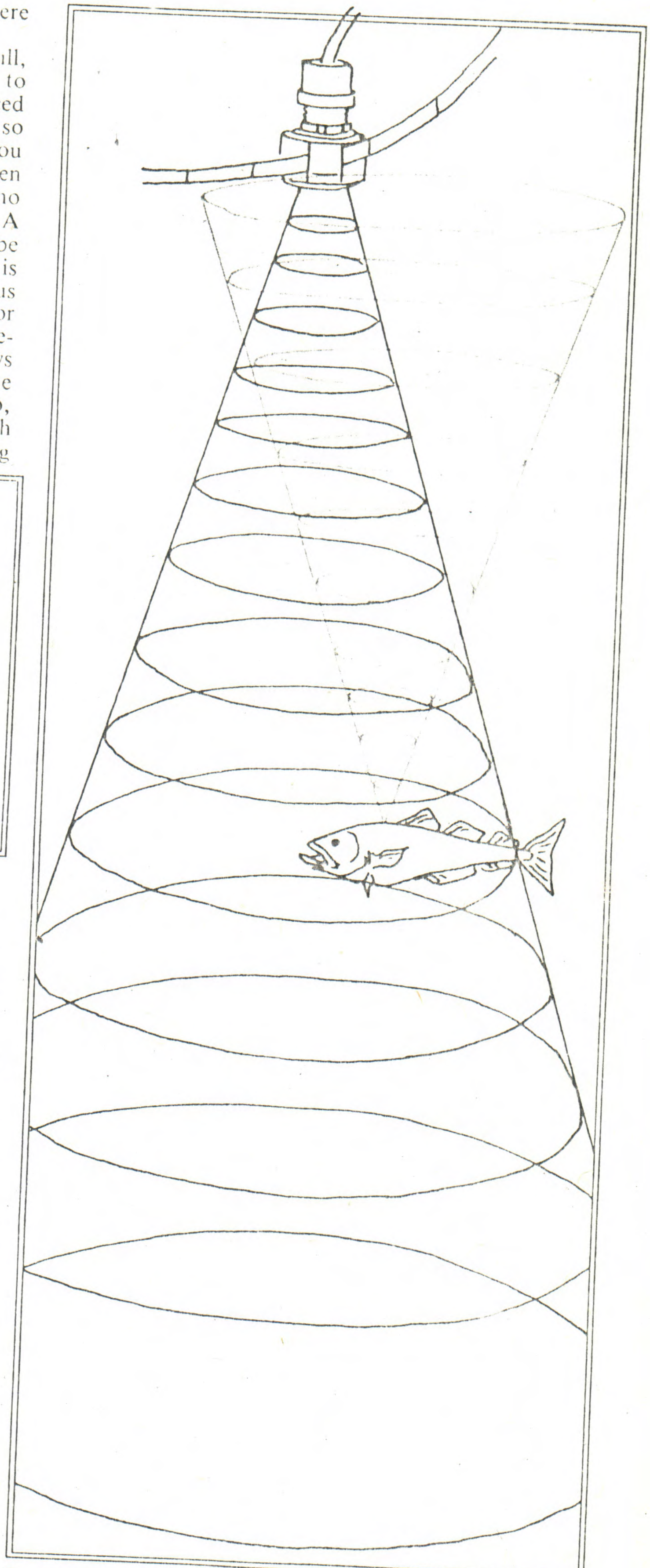
The vibrations of the thin silver plates of the transducer crystal create the high frequency signal.

paint on the face with little adverse effect. Copper (cuprous oxide) anti-foulding paint will really botch up the reading, so that is a no-no. A bare face will get some growth but hitting it with a scrub brush every now and then will solve the problem.

Now that we have the transducer properly installed we come to one more potential problem. Since the cable that goes from the machine to the transducer is basically a conduit for electric impulses, care should be taken that it is not influenced by other electrical fields. The cable itself is shielded, but if it is routed too close to anything else that is setting up its own electrical field, there can be unwanted "noise" on the graphic output.

Just to confuse the situation a little more, we are going to throw in a few more terms. However, we do think that they are important to the proper operation of the fishfinder.

The first is sensitivity. Sensitivity is generally manually adjustable on all fishfinders, although it may be called "gain" on some. The best way to think of the sensitivity control is to liken it to the volume knob on your radio. The more you turn up the volume, the more you will hear. However, there is a point where the noise gets so loud that it block all recognition of what is coming out. With an increase in sensitivity, the output from the machine will indicate more in the way of bottom contour and composition and, of course, fish. In general the sensitivity should be turned up until a second echo is displayed below the first bottom reading, thus giving the optimum output. Some machines may



The sound coming from the transducer forms a cone shape. So does the echo returning back to the transducer.

Continued Page 61

differ, but this should be a good rule-of-thumb. Like a radio's volume, sensitivity can be turned up too high.

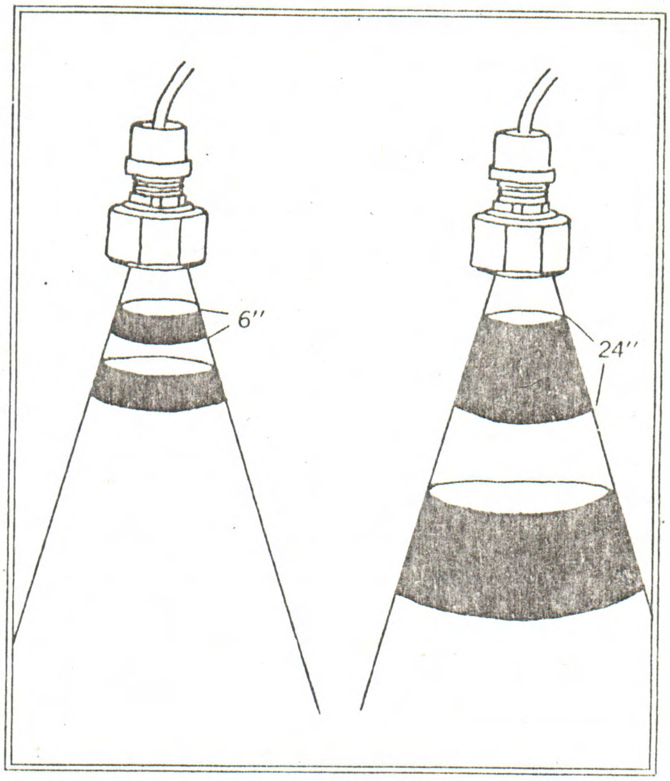
Suppression in some ways is the opposite from sensitivity, although it is trying to get to the same goal. Sensitivity trys to optimize the readout by making it as detailed as possible. Suppression tries to optimize the picture by eliminating unwanted signals. Not all machines have suppression. Others have it, yet there is no control for suppression, which also may be called the noise eliminator.

Suppression can be controlled by many means. Some units use sensitivity as a control and others use a variation in power. Filters that eliminate unwanted noise are also used. On the more sophisticated end of the spectrum an electronically co-ordinated transmitting and receiving system will automatically eliminate any signal which doesn't have the same characteristics of that transmitted, within certain tolerances. Certainly the latter of these systems would appear to be the best, but we think that some sort of eliminator should be considered a must.

Where does this unwanted noise come from? There are basically two sources. One is electrostatic engine noise. The other is cavitational noise. These are measured in terms of microseconds. Engine noise is in the area of 30 microseconds and cavitational noise runs around 400 microseconds. The reason that these cause problems has to do with pulse length.

Pulse length is the amount of time the crystal is shocked with each hit of power. This determines the width of the band of sound which leaves the transducer and is also measured in microseconds. A pulse length of 200 microseconds would give a band of sound six inches wide. This would mean that it would be able to discriminate a fish six inches off the bottom from the bottom reading and show it separately on the flasher or graph. If the pulse length was increased to 800 microseconds, then the band of sound would be two feet wide. Anything less than two feet off the bottom would appear to be part of the bottom in the signal. So obviously it is important to have a narrow band of sound emanating from the transducer, yet it will be harder to eliminate the cavitational noises while running without jeopardising the receipt of desired signals. One of the best systems we have come across is one which allows the manual adjustment of the pulse length and automatically screens out any noise that is a set number of microseconds below that of the transmitted signal.

Most good quality fish finders are now equipped with a "White-line" circuit, a separate electronic circuit that enables the set to discriminate between the sea bed and fish feeding or schooling on the bottom — and that is a facility worth paying the extra to have.



Pulse length determines the width of the band of sound coming from the transducer. Left, a 200 microsecond impulse makes a band of sound 6 inches wide. Right, an 800 microsecond impulse forms a band of sound of 24 inches wide.

There are a number of other features that should be considered when a unit is being purchased, but too much information on one subject at a time makes it hard to digest anything. The major manufacturers of fishfinding equipment put out comprehensive booklets on the operation of their equipment. Obviously, they tout their product, but some also give good information on the operation of units in general. They also give many of the vital statistics of their equipment. Viewing a number of these pamphlets will yield valuable information.

It should be remembered that selecting a fishfinder is like trying to choose a boat. To gain one thing you must sacrifice something else. Sometimes, it is very hard to compromise, but this can be made easier by figuring out how the unit will be used the most and then fitting the technical aspects to best fit the need.

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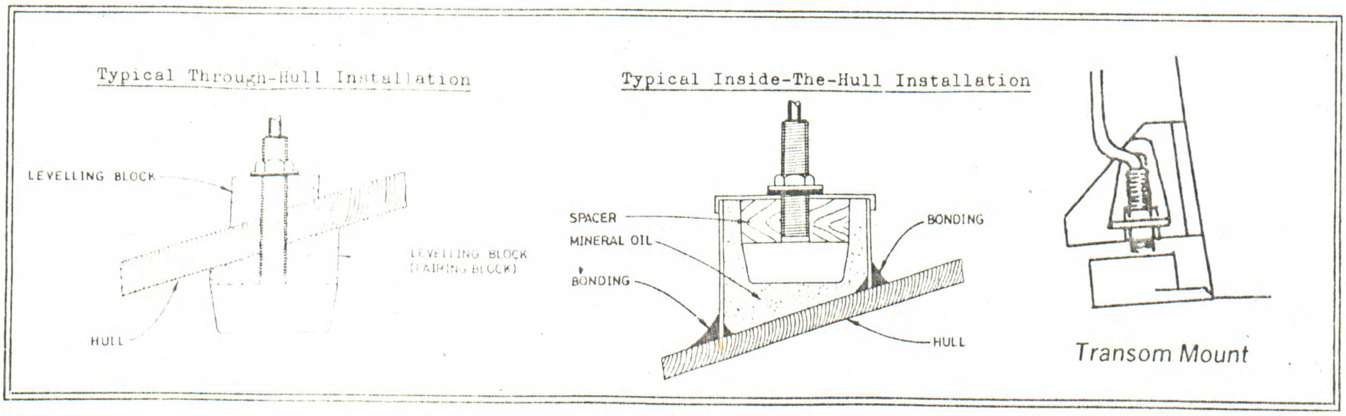

Transducers can be mounted in many ways. All the alternatives should be explored before making a decision.

Bacteria involved in marine-derived wound infections

by John L. Reichelt*

PEOPLE working near the sea in tropical areas are familiar with the fact that minor wounds from coral or other marine animals frequently become infected, forming persistent ulcers. In some marine industries, marine-derived ulcers are a significant problem. Recent studies in microbiology laboratories have shown that these ulcers are most frequently due to a small group of marine bacteria.

Properties of the ulcer-forming marine bacteria

The bacteria isolated from marine-derived ulcers have been found to be uniquely marine bacteria, needing salt to survive. Because of this salt requirement, these marine bacteria do not occur outside of the marine environment, but human tissues contain sufficient salt for their growth.

A second consequence of the salt requirement is that conventional medical procedures have frequently failed to isolate the causative organism from marine-derived ulcers because of an inadequate level of salt in the bacteriological media.

These marine bacteria have been found to grow over a temperature range of 10° to 40°C and, at the higher temperatures, growth is extremely rapid. In fact cell division times of 10 to 15 minutes under optimal conditions make these bacteria some of the fastest-growing living organisms.

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Consistent with these properties, marine-derived infections are observed to be more severe in tropical areas, while in temperate areas most cases occur during the summer months. In tropical areas the rapid growth rates of these marine bacteria confer the ability to establish infection with unusual rapidity.

Ecological studies have shown that the ulcer-forming marine bacteria occur as a significant proportion of the total bacterial flora of coastal seawater in most parts of the world. Increased numbers are observed in the summer months in temperate waters and larger numbers of these marine bacteria are found in coastal waters than in the open ocean.

Although these marine bacteria have been found to occur in marine sediments and in association with marine animals, the numbers observed are not significantly enhanced over those seen free in the seawater.

Taxonomic studies of the marine ulcer-forming bacteria have shown the infecting organisms to belong to at least three closely related species. The most common species causes ear infections and infections of wounds. Another relatively common species is generally associated with gastroenteritis from seafood, but is occasionally associated with wound infections. The third species, which is much less commonly observed, has a greater tendency to cause blood poisoning. (These bacteria are most often obtained for identification from blood samples.)

Prevention and cure of marine bacterial ulcers

The old adage that salt water will heal wounds is completely false in this case. Because the ulcer-forming marine bacteria are present in seawater, rinsing wounds in seawater may lead to infection rather than prevent it.

In many marine industries frequent exposure of minor wounds to seawater is unavoidable. Under these circumstances preventive measures must take into account the extremely rapid growth rate of the marine ulcer-forming bacteria. An effective disinfectant should be applied within two to three hours, rather than at the end of the day.

Chlorhexidine gluconate (its trade name is 'Hibiclens' and it is marketed by I.C.I.) is an example of an inexpensive, readily-available disinfectant which is effective on these marine bacteria while being safe to apply frequently; it is widely used in hospitals as a daily skin-cleanser.

Where a marine-derived infection has become established, a doctor should be consulted. Two important facts should be noted.

Firstly, untreated marine bacterial ulcers can have very severe consequences, including serious blood poisoning and hospitalisation.

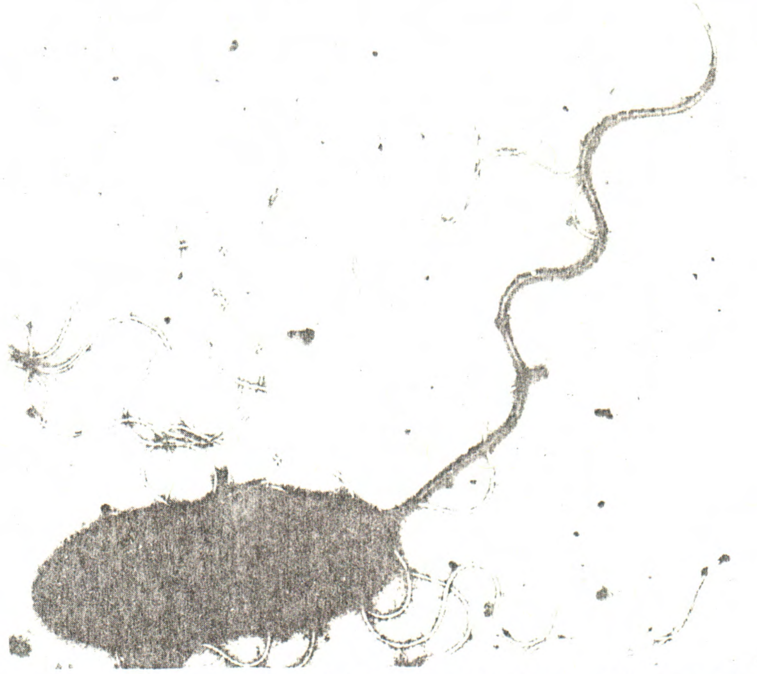
Secondly, these marine bacteria are not sensitive to penicillin, ampicillin, carbenicillin or related antibiotics which are widely considered to be the logical first choice for treatment of such infections from non-marine sources.

However these marine bacteria are sensitive to topical applications containing polymyxin (for example, 'Neosporin' marketed by the firm Burroughs-Wellcome) and to the antibiotics tetracycline and erythromycin. Most of the medical reports of severe marine-derived wound infections have involved initial, ineffective treatment with one of the penicillins followed by effective treatment with a tetracycline.

Problem of awareness of marine bacteria

The major problem with marine bacterial infections has been a lack of awareness of the nature of the infection. There has been a lack of awareness of seawater as a source of serious human infection, of the rapid growth rates of the infecting bacteria, and of the resistance of these bacteria to penicillins.

Increasing knowledge of these facts and, in tropical areas, more widespread use of suitable disinfectants soon after infection should greatly reduce the incidence of marine bacterial infections.



This is a single bacterial cell of the species of bacteria most commonly associated with marine-derived infection of wounds. It has been enlarged about 10 000 times under an electron microscope.

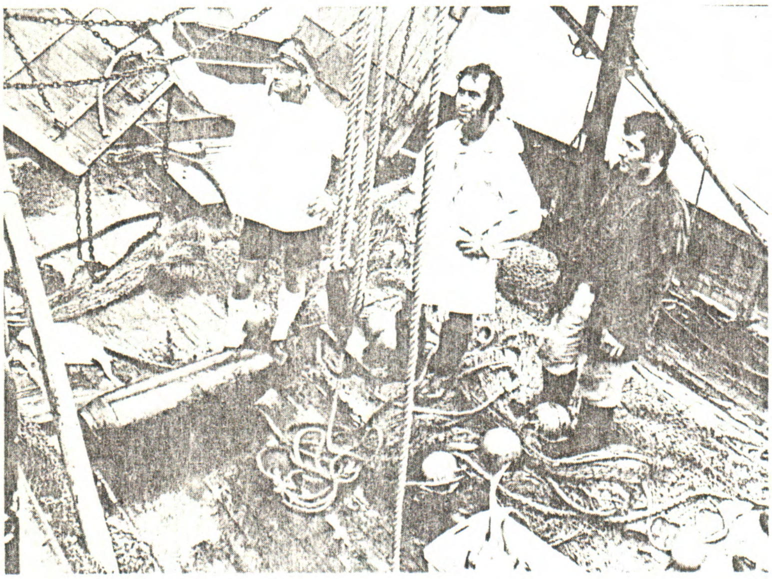
Further reading:

McSweeney, R.J. and Forgan-Smith, W.R. (1977). 'Wound infections in Australia from halophilic vibrios'. *Med. J. Aust.* 1977, 1:896-897.

Von Graevenitz, A. and Carrington, G.O. (1973). 'Halophilic vibrios from extra-intestinal lesions in man.' (1973), *Infection 1*:54-58.

Baumann, P., Baumann, L. and Reichelt, J.L. (1973). 'Taxonomy of marine bacteria: *Beneckea parahaemolytica* and *Beneckea alginolytica*.' *J. Bacteriol. 113*, 1144-1155.

Police advise: 'Don't bring explosives to port'



POLICE and naval officers have warned fishermen who recover mines or other explosives while trawling not to bring them into port. Rewards formerly paid for such recoveries had been discontinued they said.

A New South Wales Water Police spokesman said recently the Navy Clearance Diving Squad had recorded six recoveries by trawlers of explosive ordnance during the 12 months to last June. Four had been in a very unsafe condition. 'These figures are for New South Wales alone. Goodness knows how many are recovered around the Australian coastline', he said.

An example was the 500-pound aerial bomb (pictured) which a trawler picked up in its nets north-east of Sydney Heads in December 1978. The bomb was lifted aboard and taken to the Sydney Fish Markets wharf.

'The bomb was in an unstable condition. It was removed by vehicle and later exploded by the Army Demolition Squad', the police spokesman said. 'They later said that the bomb had been in such poor condition it was a wonder it had not gone off on the trawler'.

In the interests of 'preventing someone having his head blown off', the Water Police and the Navy's Hydrographic Section asked *Australian Fisheries* to publish the following section from the *Annual Summary of Australian Notices to Mariners*, 1979. It is Section 5 of Notice No 12, 'AREAS DANGEROUS DUE TO MINES — And General Information regarding Mines, Torpedoes, Shells, Bombs and Depth Charges':

(a) Mines, torpedoes, depth charges, bombs and other explosive missiles are sometimes picked up in trawls, often in waters comparatively distant from Australia. Explosive weapons may still be dangerous even if they have been in the water for many years, and the following guidance is given in dealing with them.

(b) A suspected explosive weapon should not be landed on deck if it has been observed while the trawl is still outboard. The trawl should be lowered and [illegible] towed clear of regular f[illegible]ng grounds before cutting away the net as necessary.

(c) In the event of the weapon not being detected until the contents of the trawl have been discharged on deck, the skipper of the fishing vessel must decide whether to rid his ship of the weapon by passing it over the side or to make for the nearest port, informing the Navy authority by RTF or RTG without delay. His decision will depend on the circumstances, but he should be guided by the following points:

- Great care should be taken to avoid bumping the weapon.
- If retained onboard it should be stowed on deck, away from heat and vibration, firmly chocked and lashed to prevent movement.
- It should be kept covered and damped down. (This is important because any explosive which may have become exposed to the atmosphere is liable to become very sensitive to shock if allowed to dry out).
- The weapon should be kept onboard for as short a time as possible.
- If within two or three hours steaming of the Australian coastline the safest measure will generally be to run towards the nearest port and lie a safe distance off shore to await the arrival of the Bomb Disposal Unit.

(d) Under no circumstances should attempts be made to clean the weapon

(e) A ship with an explosive weapon on board, or in her gear, should warn other ships in the vicinity giving her position and, if applicable, intended position of jettisoning.

Section 7 of Notice No 12 states: "Under no circumstances should an attempt be made to recover a mine and bring it to port and rewards formerly paid to mariners for such recovery have been discontinued."

The *Annual Summary of Australian Notices to Mariners* includes on pp 73-74 the following details of areas which are dangerou[illegible] to ships because of unexploded depth char[illegible]

DANGEROUS AREAS DUE TO UNEXPLODED DEPTH CHARGES

No.	Locality	Chart	Position of Centre of Area: Latitude S. °	′	″	Longitude E. °	′	″	Radius of Area in Miles	Depth of Water in Fathoms	Other charts temporarily affected
1	Yampi Sound, W.A.	Aus. 40	16	06	57	123	36	51	0.5	16	Aus. 731-733
		BA. 1043	16	06	54	123	36	38	0.5	16	BA. 1206
2	Yampi Sound, W.A.	Aus. 40	16	05	35	123	35	20	0.5	6	Aus. 731-733
		BA. 1043	16	05	32	123	35	07	0.5	6	BA. 1206
3	East of Monte Bello Is., W.A.	Aus. 742	20	23	02	115	39	57*	0.5	25	Aus. 327-328
		BA. 1055	20	23	00	115	39	30	0.5	25	
4	N.W. of Anchor Island, W.A.	Aus. 744	21	29	00	114	39	42	0.5	34	
		Aus. 328	21	29	00	114	40	06*	0.5	34	
5	N.W. of Rottnest Island, W.A.	Aus. 334	31	45	12	115	13	12*	0.25	55	
		BA. 1033	31	45	00	115	14	36	0.25	55	
6	N.W. of Rottnest Island, W.A.	Aus. 334	31	47	30	115	14	18*	0.25	65	
		BA. 1033	31	47	24	115	15	54	0.25	65	
7	N. of Rottnest Island, W.A.	Aus. 112	31	58	19.5	115	32	01.5*	0.25	9	Aus. 114-334
8	Port Phillip, Vic	Aus. 158	38	13	58	144	49	39*	0.25	13	Aus. 143
9	Port Phillip, Vic.	Aus. 158	38	11	35	144	51	55*	0.5	13	Aus. 143
10	Port Phillip, Vic	Aus. 143	38	08	54	144	50	35*	0.25	13	
11	Bass Strait, Vic.	Aus. 801	39	05	44	146	45	05	0.5	30	BA. 1695A
		Aus. 357	39	05	36	146	45	05*			Aus. 350
12	Bass Strait, Vic.	Aus. 357	39	38	06	146	46	30*	0.5	39	BA. 1695A
13	Wreck Bay, N.S.W	Aus. 807	35	15	30	150	38	00	0.5	24	BA. 1020
14	Wreck Bay, N.S.W	Aus. 807	35	15	13	150	41	20	0.5	41	BA. 1020
15	Wreck Bay, N.S.W	Aus. 807	35	12	00	150	38	00	0.5	10	BA. 1020
16	Jervis Bay, . .S.W.	Aus. 193	35	06	41	150	48	07*	0.5	18	
		Aus. 807	35	06	42	150	48	12	0.5	18	BA. 1020
17	Shoalhaven Bight, N.S.W	Aus. 808	34	53	12	150	57	48	0.5	50	BA. 1020
18	Shoalhaven Bight, N.S.W	Aus. 808	34	52	00	150	58	00	0.5	48	BA. 1020
19	Shoalhaven Bight, N.S.W	Aus. 808	34	50	00	150	59	00	0.5	54	BA. 1020
20	Tom Thumb Islands, N.S.W	Aus. 195	34	27	37	150	55	48*	0.3	4	
		Aus. 808	34	27	37	150	55	44	0.3	4	BA. 1020-1025
21	N.E. of Bulli, N.S.W	Aus. 808	34	18	00	151	03	00	0.5	23	BA. 1025
22	E. of Wattamolla, N.S.W	Aus. 808	34	10	00	151	15	00	0.5	65	BA. 1025
23	Port Jackson, N.S.W	Aus. 201	33	50	27.5	151	16	17.5*	0.05	6	Aus. 200
24	Port Jackson, N.S.W	Aus. 201	33	50	35	151	16	19*	0.05	6	Aus. 200
25	Port Jackson, N.S.W	Aus. 201	33	50	58	151	16	15*	0.05	6	Aus. 200
26	Port Jackson, N.S.W	Aus. 201	33	51	02	151	16	13*	0.05	6	Aus. 200
27	E. of Broken Bay, N.S.W	Aus. 197	33	34	45	151	27	33*	0.5	31	
		Aus. 809	33	34	54	151	27	36	0.5	31	BA. 1025
28	S. of Newcastle, N.S.W	Aus. 207	32	59	10.5	151	48	47*	0.5	18	
		Aus. 809	32	59	10	151	49	00	0.5	18	BA 1027
29	N.W. Channel, Moreton Bay, Qld	Aus. 235	26	54	42	153	08	33	0.5	5	Aus. 365-814
		BA. 1029	26	55	08	153	09	50	0.5	5	
30	Moreton Bay, Qld	Aus. 236	27	14	24	153	15	40*	0.25	7	Aus. 814
		BA. 1029	27	14	22	153	17	00	0.25	7	
31	Cleveland Bay, Qld	Aus. 256	19	10	18	146	55	00*	1.0	5	Aus. 827
		BA. 348	19	10	12	146	55	08	1.0	5	BA. 2349
32	Fitzroy Island, Qld	Aus. 830	16	55	21	145	58	42*	0.5	12	
33	Cape Grafton, Qld	Aus. 830	16	51	18	145	54	12*	0.25	4	
34	N. of Cape Grafton, Qld	Aus. 830	16	47	18	145	55	18*	0.25	17	
35	N. of Cape Grafton, Qld	Aus. 830	16	41	54	145	51	36*	0.25	18	
36	Approaches to Darwin, N.T.	Aus. 27	12	21	48	130	46	29*	0.5	7½	Aus. 308-309
		Aus. 722	12	21	51	130	46	24	0.5	7½	
37	Milne Bay, P.N.G.	Aus. 629	10	21	03	150	21	20*	0.25	7	Aus. 381
38	Milne Bay, P.N.G.	Aus. 629	10	20	32	150	21	21*	0.25	7	Aus. 381
39	Milne Bay, P.N.G.	Aus. 629	10	20	14	150	21	40*	0.25	8	Aus. 381
40	Blanche Bay, New Britain	Aus. 680	4	14	48	152	12	30	0.2	Var.	BA. 3553
41	Gazelle Hr, Solomon Is.	BA. 3420	6	30	06	155	11	54	0.56	Var.	

(Caution — Anchoring, trawling, or fishing is dangerous in the above areas.)
Positions marked thus * are based on AGD 1966 Datum.

Hydrographic Service; R.A.N. Sydney. *(A.H. 17/28.)*

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