pain with palpable lymph nodes. She had also vomited and was extremely sweaty. I thought she had signs and symptoms of systemic envenomation so one ampoule of polyvalent anti-venom was given. This all occurred within 40 minutes of her being bitten. During the next 30 minutes all her signs and symptoms disappeared. All the investigations that were done were normal. She left hospital 48 hours later.

THE NATIONAL SAFETY COUNCIL OF AUSTRALIA, VICTORIAN DIVISION AND THE UNDERWATER TRAINING CENTRE

Ken Heynatz

The National Safety Council of Australia, Victorian Division, (NSCA) is the only organisation that I know of that offers both a retrieval service and hyperbaric treatment for patients. This is an overview of the operations of the NSCA, so that you may understand how we can offer this unique service. Those of you who have heard past presentations and read any recent writings, count this as an update, and please bear with us.

The National Safety Council of Australia, Victorian Division, is an independent, non-government, non-profit organisation, whose charge is to promote safety in all walks of life. To fulfil this charter, the NSCA, Victorian Division, provides vital services over a wide range of specialised areas at the highest possible professional standard at the lowest possible cost. The general membership of the Victorian Division, consists of public bodies, companies and private members. Some of these members are elected to the State Council, which is an honorary group of 31, who meet annually or as required. The State Council elects an executive committee, who, through the executive director and deputy director, pursue the goals of the Council with the various facilities at their disposal. The NSCA is a company limited by guarantee, with a turnover now exceeding $16 million, generated almost exclusively through the fees for the services provided. The Victorian Government grant for safety and the membership fees, account for less than 2 per cent of the annual income.

The company employs over 180 people to cover the diverse range of services to industry, government and the community. The consultancy services offered from our Melbourne Head Office cover occupational health and safety in many industries. The consultants are highly qualified in occupational medicine, business administration, mechanical and civil engineering, ergonomics and fire prevention, etc. The staff are also trainers and educators. To assist in this area, video technology has been incorporated into the training services as well as on-site cameras for training. We have developed a sophisticated audio-visual production and post production centre at Morwell.

On the more active side, the Council is engaged in provision of industrial emergency services in the power stations of the LaTrobe Valley. We maintain a 24 hour a day, 365 day a year presence, to help with first aid, fire protection, fire prevention and emergency services. To maintain a call-out ability for the many varied emergencies that we are confronted with, requires a large variety of support vehicles. These include rescue trucks, fire-fighting vehicles, personnel carriers for all sorts of terrains. We maintain and replenish various caches of stores and equipment throughout Victoria, which may be needed in times of emergency. Most of our ground support vehicles, support plants and equipment are fully maintained and serviced in our Morwell workshops.

The resources available within the Underwater Training (UTC) for use in training and emergencies, include a 52 foot Randal diving craft, currently being leased in conjunction with a sports diving organisation, for standby and rescue operations in Bass Strait, a 47 foot diving craft equipped with high pressure (HP) air banks, compressors, mixed gas banks, lifting arms, cages, and whatever is necessary for deep diving as well as numerous small craft, from a 24 foot aluminium jet boat down through semi-inflatable boats and zodiacs, the small “rubber duckies” that we use in diving operations as safety craft.

Training and diving includes the whole gambit of equipment. Air scuba used by the sports diver and the shallow commercial effort. Oxygen rebreathers used by our pararescue unit. Kirby Morgan band masks and helmets which are used for surface supply diving. We have mixed gas helmets and rebreathers for bell diving as well. We carry a complete range of tools, both manual and hydraulic, which are used operationally and in the training realm. Underwater cutting and welding equipment, non-destructive testing inspection, underwater video, are just a few of the other sidelines. All diving is carried out to Australian standards, using Royal Navy tables and USN tables as appropriate and, so far, without any incidents. We safely train for, and work up to deep diving. We maintain an operational diving team, capable of diving to most depths using Drager FGG3 mixed gas equipment and Kirby Morgan with surface air supplies. We have two deck decompression chambers and a bell simulator. Again, all our equipment, whether for working dives or for training is maintained at our centre at Morwell.

We have a 10 metre diving tank for initial dives. This is also used with our ditched helicopter simulator for underwater helicopter escape training. This course, where trainees are strapped into the simulator and rolled over underwater, is designed to give confidence and understanding to those people who fly over water in a helicopter and who, one day may be unfortunate enough to be involved in a ditching and have to find their way to the surface. We also run survival courses for those who find themselves under the surface, regardless of how or why they got there.

To assure them that all these activities are medically sound, we have a highly skilled and well organised medical section, with three doctors, a fully trained nurse, one part-time psychiatrist and one full-time physiologist who cater for in-house medical needs, all training requirements and all forms of emergencies including hyperbaric treatments.

With all this equipment comes our mobile decompression chamber. This unit is totally self-sufficient and has a transfer-under-pressure (TUP) capability with our Drager DuoCom chambers. It consists of a prime mover, compressors, air banks, filtration banks, power generators, living quarters, supervisor’s and operator’s position in addition to the chamber itself. Currently this unit is located on a semi-permanent basis at the Royal Adelaide Hospital, together with one of our company operators and maintainers.

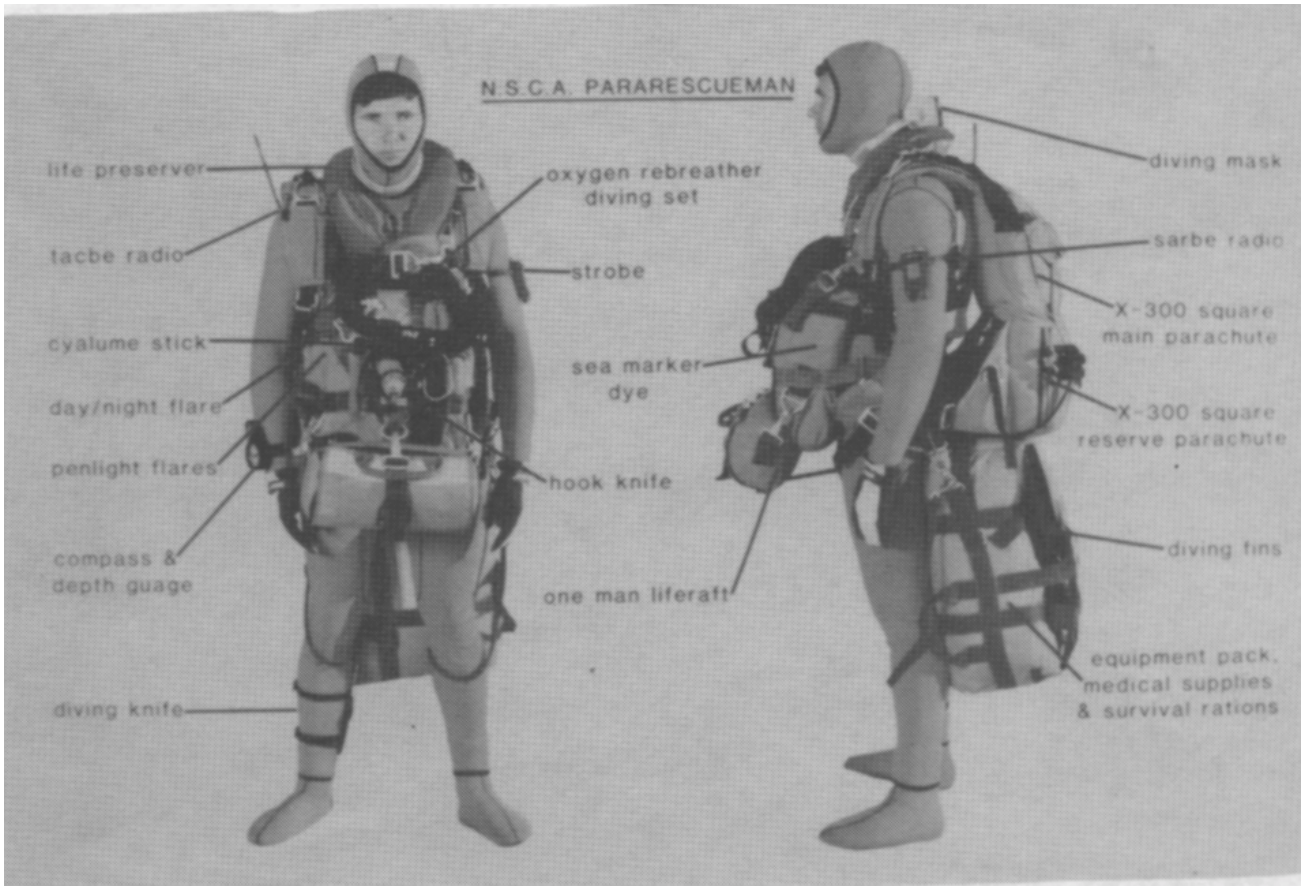
We have two Drager DuoComs in Morwell, one in Woollongong and one in Townsville. They allow for the transport of the patient and an attendant. For those who have not seen or used one before, and intend to in the fu-

ture, the attendant slides in first and sits in an upright position and the patient lies on a stretcher and ends up between his knees. They are also in use by commercial firms worldwide. The West German Navy, the Canadian Navy, and I believe, the Israelis have some as well as the Swiss Air Rescue. In Carl Edmonds' own words, "If there is nothing else available, and the DuoCom is available, what would you use?" While these units are great for transport, they really are not suitable for carrying out treatments. So they must be capable of being mated with a deck decompression chamber for a transfer under pressure into a larger chamber to be used effectively. To this end, we have provided a TUP flange to the Royal Australian Navy at HMAS Penguin for use at their hyperbaric facility and also one to the Australian Institute of Marine Science (AIMS) in Townsville, for use with their chamber. We have now received another modified DuoCom that allows greater access by the attendant to the patient by increasing the width of the vertical component.

Naturally, our own decompression chambers are fitted with TUP facilities and can accept our DuoComs. The two chambers are rated as 8 and 12 bar respectively, for 10 trainees or one or two patients or one or two saturation divers. Transfer under pressure is effected through the AKZ chamber in the front. We are in the middle of an upgrading program with our chambers, which has recently seen the installation of new low pressure air supply systems, complete with catalytic conversion, air purifiers, air cooling and heating, oxygen analysers, and carbon dioxide monitors. The chambers are wired for video and sound monitoring and recording. Soon they will be fitted with multi-parameter monitors, for both treatment and research, and an improved suction system for emergency treatment. There is a new high pressure air and mixed gas supply system being constructed and upgraded. An overnight patient-observation room has been established. To back up our systems and allow programmed down time for maintenance, we are currently negotiating with Drager for a six man chamber as well.

Having served in several of the other hyperbaric units in Australia, I think we can be justly proud of the facilities in the NSCA

The UTC runs a number of courses. On the diving side, there is orientation to commercial diving down to 20 metres, restricted air diving to 30 metres, basic air diving to 50 metres, bell diving to 100 metres. Miscellaneous courses include non-destructive testing, helicopter underwater escape training and survival courses, assistant life support technicians. Of more interest to this gathering are the medical courses which are, Emergency Medical Technician Part I, a medical course aimed at the sports diver instructor, or dive leader; and Emergency Medical Technician Part II, aimed at the commercial diver.



This picture of a pararescueman was kindly provided by the National Safety Council of Australia, Victorian Division.

THE NATIONAL SAFETY COUNCIL OF AUSTRALIA'S AVIATION FACILITIES

Ian Millar

The National Safety Council of Australia (NSCA) Aviation Facilities include the areas of most dramatic growth within NSCA over the last few years, and are important in the diving context, as they are a useful resource for diver evacuation, in co-ordination with the treating facility. They also represent considerable manpower, material and expertise to back up the Hyperbaric facilities.

The Aviation Emergency Services started with a Hughes 500 helicopter serving as the first Latrobe Valley District Ambulance Service helicopter ambulance. This small but versatile aircraft was soon requested by other agencies for both fire-fighting and rescue applications.

The principle of cost-effective aviation emergency services supply on a multi-user, non-profit basis by NSCA became firmly established. Since then the fleet has grown considerably to meet requirements, particularly those of the Department of Aviation and Transport (DoA) as part of the upgrading of Australia's offshore search and rescue capability, and those of the Victorian Department of Conservation, Forests and Lands for airborne scanning and firefighting.

At present, three main bases are established, in Townsville, Wollongong and the Latrobe Valley. All have both fixed and rotating wing aircraft, available for search and rescue, air ambulance, fire-fighting or other public safety roles at the request of the appropriate official agency.

The Helicopters in use at present are the size of the familiar military "Iroquois", with as a guide only, a maximum passenger load of 13, or a 1.5 tonne cargo lift. This is however, reduced in many of the aircraft by long-range fuel tanks, etc. Bell 412 and 212 (four and two bladed rotors) helicopters are twin engined, instrument flying helicopters, set up primarily for offshore work, although suitable for ambulance work and capable of carrying the Drager DuoCom portable decompression chamber. They are fitted with radar, emergency radio beacon direction finders, forward looking infra-red units and powerful searchlights for night work, a 270 kg capacity winch and advanced navigation and radio communications equipment. These serve as the primary search and rescue (SAR) helicopters at all bases.

In addition, single engined Bell 205 helicopters are used primarily for mountain country bushfire fighting. Fitted with a 1400 litre belly tank, these machines can self fill via a hydraulic snorkel pump within 60 seconds whilst hovering over any water source greater than 15cm deep. This load is then released over the fire. NSCA has also been pioneering "heletak" operations, in which a team is abseiled into the forest from a helicopter to cut a firebreak, control a spot fire or lightning strike, or cut a helipad in the bush, allowing other helicopters to ferry larger numbers of firefighters in to otherwise inaccessible areas. These techniques were well tested and proven in last summer's Bright bushfires, when up to seven NSCA helicopters and eighty personnel were involved in the massive firefighting effort there.

This picture of a Drager Duocom being loaded into a King-Air was kindly provided by the National Safety Council of Australia, Victorian Division.

The NSCA fixed-wing fleet is led by, at present, four Beech Super King-Airs. These versatile aircraft are large enough to carry the DuoCom, a full search load, or a comfortable patient (diver!) evacuation configuration, yet can land on relatively small airfields. They are twin turbo-prop pressurised aircraft, cruising at about 250 knots, with a range of up to 1800 miles. For the search and rescue role these are specially modified with in-flight opening door, bubble search windows, smoke flare tubes and other equipment. When offshore survivors are found beyond the range of helicopters, a sea rescue kit can be dropped. This is a string of life rafts and supply containers, connected by lines, dropped to form a horse-shoe around those in the water. A NSCA team working on behalf of the Department of Aviation, is currently training a number of aircraft operators up and down the East Coast of Australia in the use of this equipment, as well as search techniques, so that the General Aviation aircraft often needed to assist in major searches may be better fitted for their task.

These techniques are however, dependent upon survivors being able to use these bundles from the sky, which may not be possible if injury, hypothermia and weakness have taken their toll. Pararescue has been developed over the last eighteen months as a result. This involves highly trained and extremely fit young men parachuting into the water with equipment which includes wet-suit, liferaft, lifejacket, harness, diving apparatus, radios, flares and a large equipment pack containing medical and survival equipment. All of this is suspended under an oversize "square" parachute, which glides forward as it sinks, attaining controllable , horizontal speeds of 25 knots and more, allowing accurate landings in the water in winds in excess of forty knots.

The diving apparatus is necessary as a surface swimming breathing source in rough conditions, or if caught under a parachute. A closed circuit oxygen rebreather is used at present, this being the lightest chest mounted unit suitable for parachuting. A chest mounted, long duration air set is being developed, but at present, any diving operations planned would use air dropped, conventional scuba gear if possible. A wide range of backgrounds is represented in the present team, including doctors, professional divers, mechanics, shipwright and many others, all of whom can be deployed anywhere within the range of Australia's suitable civil and military aircraft.

One of the King-Airs is fitted with multi-spectral scanning equipment that is the tool of the other rapidly growing section, Remote Sensing. Both visible and infra red pictures of the landscape are digitally recorded in the aircraft. A quick print of this can be made and dropped to ground crews for analysis. In the case of fire mapping this enables an accurate picture to be obtained at night or through dense smoke, giving fire controllers better information to plan deployment of resources than previously available.

The digital recordings can also be manipulated by the Morwell computer to provide accurate scale maps with very wide applications, as details are shown that are not apparent from aerial photographs. Vegetation types, crop diseases, resources surveys, pollution spread, water temperature and fire damage are some of these. Recent upgrading of the remote sensing computer has also given NSCA the capacity for fairly large scale data recording and analysis, and discussions are well underway with Dr D Walker, the Navy and other groups concerning the potential use of this computer to extend and enhance the functions of Project Stickybeak, allowing for instance, direct data entry by diving accident treating facilities, and easier statistical analysis, whilst of course retaining the necessary confidentiality by appropriate security systems.

NSCA has a policy of maintaining and supporting all of its own operations, and thus aircraft and electronic engineers are on staff with all necessary equipment for most repairs, modification and maintenance work. A twenty-four hour operations room has the necessary staff on call via pagers, with telex, radio, facsimile and multiple telephone links to provide co-ordination of all services. The emergency direct telephone number of this Latrobe Valley Operations Room is (051) 74 9922, which can be called direct by Victorian divers requesting assistance, but otherwise will only lead to a turn-out of equipment and personnel if called by the appropriate authority for that problem (eg. Police, Ambulance, DoA, RAN etc.).

These resources are being widely and increasingly used, and continue to be upgraded and to expand as invitations to augment already existing services arise. In association with the NSCA hyperbaric facilities, they offer an important part of Australians developing diver evacuation and treatment network.

GADGETS AND GOOFY IDEAS

Carl Edmonds

Washerwoman's Skin

One of the things that I encountered in Sydney a little while ago, was a great idea from a young resident at the Sydney Hospital. He got involved in an underwater endurance record.

People who go into those futile gestures often have no concept of the physiology they disrupt. The diver came out of his underwater endurance after about 36 hours and his main symptom, apart from the odd hallucination, was extreme pain in his hands and feet. They were waterlogged (Figure 1). Everyone recognises this "washerwoman syndrome", we have all had it to a greater or lesser degree. But this was to such a degree that it was very painful. The pain was the pain of arthritis as well as in the skin, and he could hardly move his hands because of the pain associated with this movement.

The young resident rationalised that "because you've soaked up a lot of fresh water into your tissues, we will now bathe your hands in hypertonic saline". This he proceeded to do and got excellent results after 10 minutes. The hands cleared up nicely and the pain went away!

I had never heard of this treatment before. It makes sense doesn't it?

Jackpot

The next smart idea I wish to present is referred to as "the Jackpot" (Figure 2). It is very small it stands about 10 cm, and is a mini wet compression chamber, made for me by a couple of entrepreneurs in Kempsey so that we could test decompression meters. Well, it was too small for the meters but it is just the thing to test depth gauges.