24% mortality rate. 9 of the 58 cases were from elective surgery on patients with peripheral vascular disease who received no antibiotic cover. 16 were caused by trauma, ie. agricultural and industrial accidents. Clostridium perfringiens is a Gram positive rod (however dead Cl. perf. stain Gram negative).

The patient's own immunity is important. If they cannot help themselves hyperbaric oxygen therapy cannot help them. Eg. a patient with Hodgkin's disease on immunosuppressants who had a WCC of 20,000 developed gas gangrene following grazing an elbow. Other cases of gas gangrene were shown including slides of a buttock pierced by a bull's horn, scrotal infections, necrotizing fascitis in diabetics, and a child who had had a hind quarter amputation before being referred to Prince Henry Hospital. This last patient probably would have kept his leg if he had been referred early in the disease.

Wednesday 27th June

Report by Dr Janene Mannerheim

In the morning some members visited the British Base Hospital in Vila and were invited to join a wardround. New Hebridean patients suffering from TB, tibial osteosarcoma, maxillary lymphomas (not Burkitt's) and bilateral corneal opacities were presented.

Following the AGM the new president, Dr John Knight, took us on a panoramic study of the hyperbaric chambers in the western Pacific. Slides of chambers at HMAS PENGUIN, and the Hyperbaric Unit at Prince Henry Hospital in Sydney were shown along with those of chambers at Prince Henry's Hospital, Melbourne, the Melbourne Metropolitan Water Board works at Braeside, and at the Fishermen's Co-operative at Mallacoota in Victoria. Outside Australia the slides showed chambers in Nauru and Truk. Finally two portable chambers were shown, one a Portable Inflatable Recompression Chamber or PIRC which was demonstrated at the UMS meeting at Miami in June 1979 and the other is produced by Dräger. In this the attendant sits up with his legs under the stretcher that the patient lies on. From the outside it looks like a large red boot. It can be attached to a Dräger chamber and the front of the foot removed and the patient lifted into the larger chamber. This transfer under pressure capability is useful but limited as it will only mate with a Dräger chamber.

Dr Jefferson Davis continued with the topic of hyperbaric oxygen therapy. It is possible for a hyperbaric chamber to pay for itself if it is used for the other conditions mentioned previously. The largest hyperbaric oxygen complex has six chambers and is in Moscow, USSR. Treatments are usually one per day per patient, every day, for thirty days, excluding Saturdays and Sundays. For instance patients with refractory non-healing treated with 100% oxygen at 2.4 ATA for 90 minutes. There are 5 minutes air breaks every 20 minutes during this time. Treatment is given five days a week. This exposure gives am arterial PO_2 of 1100 to 1300 mm Hg with additional oxygen carried in solution in the plasma. Optimum tissue PO_2 is 30 mm Hg. In these sorts of wounds the PO_2 is much lower. The rise in PO_2 results in fibroblastic proliferation, collagen formation and capillary buddings and the fistulae heal and epithelium grows over.

We were shown a series of slides of 23 cases of radionecrosis with non-healing. These patients were treated with hyperbaric oxygen, surgery and antibiotics. Most had pain relief within 10 days of starting hyperbaric oxygen and healing followed unless there was residual tumour.

In a series with osteomyelitis which was refractory to conventional treatment 53 were treated with hyperbaric oxygen. 12 months later only 6 of the 40 who were followed up had had a recurrence. This is an 85% success rate. The necessity of surgery, antibiotics and co-operation with the orthopaedic surgeon was stressed. Further slides of individuals whose chronic ulcerations and fistulae were healed by hyperbaric oxygen included radionecrosis of the vagina and buttocks, radiochondritis of the larynx, oro-cutaneous fistulae diabetic ulcers and gangrene, one requiring daily treatment for two years, a venous stasis ulcer present for 15 years, and amputation stumps.

If hyperbaric oxygen therapy is continued for too long the fibroblasts are killed. As a rule of thumb a wound that won't heal has tumour in it.

Following radiotherapy and prior to any surgery patients should receive hyperbaric oxygen therapy as it encourages good wound vascularization for further reconstruction.

The absolute contraindications for hyperbaric oxygen therapy are:

1. Pneumothorax
2. Pulmonary blebs
3. Pulmonary cysts
4. Systemic viral disease
5. Optic neuritis

The relative contraindications are:

1. Inability to equalise middle ear pressure. Those who cannot equalise may need polyethylene tubes inserted through the tympanic membrane.
2. Fever
3. Chronic pulmonary disease. These people require a very slow ascent to avoid pulmonary barotrauma.

Dr Ian Unsworth, who has the most experience of treating patients with hyperbaric oxygen in Australia continued the subject. He discussed its use in non-healing ulcers. He believes that it is necessary to apply oxygen topically to the ulcer as well as systemically to the patient. He covers the area with a plastic bag and seals it to the skin and runs oxygen through the bag. Ian mentioned the loss to the community, let alone to the individuals who suffer, from burns. More needs to be done in this field as some centres are reporting dramatic improvements with hyperbaric oxygen twice a day to burns. Not only does the burn tend to be less infected but they also heal much more quickly than with normal conventional burns therapy.

He also discussed the work that he and Dr Yeo have been doing with spinal trauma cases. The results are encouraging but not conclusive.

Thursday 28th June

Report by Dr Janene Mannerheim

Pulmonary Overpressure Accidents

Dr Jefferson Davis

The bursting pressure of the human lung is some 50 to 100 mm Hg which is equal to 3 to 5 feet of seawater.

Lung rupture results in:

Mediastinal Emphysema
Arterial Air Embolism
Pneumothorax

Precipitating factors are panic, breath holding, laryngospasm at depth, pulmonary disease, eg. blebs, obstructive lung disease, and abnormalities in lung compliance.