# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editorial</td>
<td>3</td>
</tr>
<tr>
<td>President’s Message</td>
<td>4</td>
</tr>
<tr>
<td>Fourth Annual Conference</td>
<td>5</td>
</tr>
<tr>
<td>1995 AMMA Research Grants</td>
<td>6</td>
</tr>
<tr>
<td>1995 Council Elections</td>
<td>7</td>
</tr>
<tr>
<td>Call for Papers - Annual Conference</td>
<td>8</td>
</tr>
<tr>
<td>Original Articles</td>
<td></td>
</tr>
<tr>
<td>Interesting haematologic responses to microwave exposure</td>
<td>10</td>
</tr>
<tr>
<td>Review Articles</td>
<td></td>
</tr>
<tr>
<td>Physical conditioning and tolerance to +Gz</td>
<td>14</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>16</td>
</tr>
<tr>
<td>Short Articles</td>
<td></td>
</tr>
<tr>
<td>Time for change</td>
<td>19</td>
</tr>
<tr>
<td>Cardio-pulmonary resuscitation modules</td>
<td>20</td>
</tr>
<tr>
<td>Occasional Article</td>
<td></td>
</tr>
<tr>
<td>Light Blue in Darkest Africa, Operation Tamar: ASC UNAMIR II</td>
<td>23</td>
</tr>
<tr>
<td>Abstracts from the Literature</td>
<td>27</td>
</tr>
<tr>
<td>Book Review</td>
<td>35</td>
</tr>
<tr>
<td>News from the Library</td>
<td>36</td>
</tr>
<tr>
<td>News and Views</td>
<td></td>
</tr>
<tr>
<td>Financial Assistance to Special Interest Groups</td>
<td>37</td>
</tr>
<tr>
<td>What do YOU want from Your Association</td>
<td>37</td>
</tr>
<tr>
<td>Have you been to a Conference lately?</td>
<td>38</td>
</tr>
<tr>
<td>Conference &amp; Meeting Calendar</td>
<td>39</td>
</tr>
</tbody>
</table>
Australian Military Medicine Association

Statement of Objectives

The Australian Military Medicine Association is an independent, professional scientific organisation of health professionals with the objectives of:

- promoting the study of military medicine
- bringing together those with an interest in military medicine
- disseminating knowledge of military medicine
- publishing and distributing a journal in military medicine
- promoting research in military medicine

Membership of the Association is open to doctors, dentists, nurses, pharmacists, paramedics and anyone with a professional interest in any of the disciplines of military medicine.

The Association is totally independent of the Australian Defence Force.
From the Editor

“The use of travelling is to regulate imagination by reality, and, instead of thinking how things may be, to see them as they are.”

One of the delights (or occasionally otherwise) of military service is the opportunity to travel; perhaps more importantly, to travel in a more ‘down-to-earth’ way than the average tourist, seeing things as they really are rather than as the tour promoters would have us see them. Further, we often get to stay in the places we visit rather longer than the average tourist, and we often have to interact with many of the local service providers. It is always an education, often a challenge.

It was ever thus during my visit to the US recently. What does the US conjure in your mind - Hollywood, Disneyland, the Big Apple, Dynasty, Dallas, Wall Street, and so on. Is this the reality? What is middle America like?

Norfolk, Virginia, is a naval town. Slightly smaller than San Diego, it has several naval bases, shipyards and Naval Air Stations: well over 100,000 uniformed personnel Little Creek, where I was privileged to spend 3 months, is a ‘suburb’ of Norfolk, halfway between the city and the beach (Virginia Beach).

Little Creek Naval Amphibious Base is a huge concern, spread out over several square miles of the Chesapeake Bay foreshore - its own cinema, golf club, ten-pin bowling alley, supermarket, department store and, of course, MacDonald’s. And nothing else. Not that you would expect much else. Outside the naval base, there was not a lot more; little wonder that many of the ‘troops’ from HMAS Kanimbla spent much of their time in the local hostellies.

Medically, the base was served by the Admiral Joel T. Boone Naval Medical Clinic, an outpatient centre. This was only open from 0800 - 1600, Monday to Friday. Out of hours, the nearest clinic was some ten miles away, or one could go into the 1,000-bed Naval Hospital at Portsmouth, 15 miles distant.

Marvellous, I hear you say. What facilities? Oh, yes, but the challenge is to use them. How often, in our careers, have we had to listen to people complaining because a specialist, or some other health professional, has kept them waiting fifteen minutes? Small beer compared to Outpatients at the Boone Clinic or the Accident and Emergency Department at Portsmouth. The best I was able to achieve with a patient, after-hours and in uniform, was about two hours - and that was for an acute abdomen; of course, the man doing the operation was the last of about five doctors who appeared.

Of course, these facilities had all the latest technology, but did it make for better patient care? I give you an example. I took a sailor with an acute knee to see an orthopaedic surgeon, who agreed with me that he probably had a meniscal tear. The management plan? - a diagnostic MRI scan. Ah! Wait! This man has a past history of metallic foreign body in his eye - must do a CT scan of his orbits to exclude remaining fragments that might cause trouble in the MRI scanner. How long? One month for the two scans, then, who knows? Needless to say we flew our man home for a diagnostic/curative arthroscopy.

Do not misunderstand me. I do not mention these examples with a hyper-critical bent because I am all too aware that the US health care professions exist in a totally different milieu to us; rather, I draw the picture to emphasise several things.

First, there is an advantage in being small (or, should I say, there is a disadvantage in being too big). There is also a great advantage in having close control over health care services rather than relying on a system which is not able to focus on the operational priorities and the intangible costs of the processes of health care delivery. Those (and there are still a few) who might have us disappear in favour of reliance on the Medicare system should take note.

Second, technology has its uses, but should not be the be all and end all. The first priority must always be the patient and his speedy recovery. If technology assists this, use it. But beware if it is done for the sake of doing. Clinical medicine must still take an important place in our armamentarium - and its is absolutely critical in the field.

Finally, the ADF health care system may be small, but we can be well proud of it, and the quality, relevance and timeliness of its service provision. The grass is not greener on the other side.

I would like to thank Andy Robertson for his efforts in publishing the November issue of AMM. While stuck in Little Creek, I was too far distant, and too busy preparing a ship’s medical organisation from...
scratch, to be able to produce anything. Andy has
joined me as Assistant Editor, so, if you have any
ideas for this journal, feel free to consult him as well
as me.

Russ Schedlich

REFERENCES
1. Samuel Johnson: in Mrs Piozzi’s Anecdotes of the late Samuel Johnson.

CONTRIBUTIONS
For June issue by 19 May 1995 to
Secretary, AMMA, PO Box 373, MOONAH TAS 7009 or
The Editor, PO Box 730, PYMBLE NSW 2073

President’s Message

I am sure everyone will be devastated to learn that my
tenure as President will soon be over. The RAAF has
seen fit to despatch me to the USA for two years from
June, and presiding from across the Pacific did not
present as a viable option. Thus, I will be handing
over as an interim measure to Nader Abou-Seif, our
Vice-President, until the AGM in September. At that
stage, the results of elections will be implemented,
with a new President in place.

It is standard for an outgoing President to
make a ‘State of the Nation’ address (to borrow
heavily from the US). I find it particularly poignant
for I have a certain proprietary feeling towards
AMMA.

The idea of an Association devoted to military
medicine in Australia was not new when it was raised
among a few people attending the Underwater
Medicine course at HMAS Penguin School of
Underwater Medicine in July 1990. The difference
was that on that occasion, action was taken and our
Association is what resulted.

I look now at what has been established,
comparing it to the ‘vision’ over four years ago, and
see some considerable achievements, and some areas
where there is still some way to go. The Council is an
enthusiastic, hard working group, in whose hands I
unreservedly leave AMMA. Nader has been VP
throughout, and has been convenor of the 1st and 3rd
conferences. Marcus Skinner has been Secretary from
the start, and has the Association’s workings
functioning smoothly. Chris Maron was the first
Treasurer and remains part of the Council. We are
fortunate to have expanded our Council membership
to include are much broader cross section of the
military medicine community. The current Council
has women, a nurse, dentist, permanent and reserve
ADF members, and people from the three services. It
is only natural that nearly everyone who is a member
of AMMA is also affiliated with the ADF. However,
there is also scope for outside membership,
particularly from DSTO and academics.

The Council presently is a little constrained,
with two members being in the second contingent to
Rwanda: Robyn Green and Peter Warfe.
Nevertheless, financial management continues despite
Robyn’s absence, being managed from Hobart until
her return.

Financially we remain in a healthy state. It has
meant we have been able to keep the annual fee
unchanged, and commence some other activities I
was intend on starting back pre-AMMA. The research
grant program starts in 1995, modestly I admit, but
with scope for increasing in subsequent years. The
‘journal’ will continue to improve, as I trust you will
have noticed with this issue. Andy Robertson has
been co-opted to assist Russ Schedlich in editing, and
we envisage a larger, more varied and interesting publication. A program of peer review of papers will be instigated, with the intention of establishing, in the medium term, Australian Military Medicine as a respected, renowned journal in the field, as the natural place for publication in the field of military medicine in Australia.

The conference is the area with which I am most satisfied. In 1994 we had an outstanding conference, with better in store this year. I am not aware of a conference in military medicine, certainly in English, which is devoted to a scientific program and is put on by an independent association (ie one not part of or funded by the military). Meetings such as the International Military Medicine conference, AMSUS and Asia-Pacific Military Medicine are either not primarily scientific, have a restricted attendance and/or are not independent and are directly controlled by a Defence Force. Our conference could well fill a gap in providing a venue for an exchange of information in Military Medicine in an independent venue.

My disappointments I believe are slowly being overcome. We remain predominantly an Association of doctors. The conferences have included a wide range of professions, and this is something we are pursuing. A perception that we remain orientated to doctors is slowly being worn away. Once there is momentum in the membership of nurses, dentists, pharmacists, human factors specialists, administrators and more, there will be a recognition of what the Association can do for non-doctors. Secondly, regional groups have not really developed. This requires local input and enthusiastic individuals to develop programs to piggy back on AMMA membership and assistance. We await further interest. I have also had little or no interest from NZ to the several attempts to develop into an Australasian association.

By my return in 1997 I expect an even more vibrant, interesting, challenging and relevant association. It is with no little sadness that I farewell AMMA, for now.

James Roos

DISCLAIMER
The views expressed in this Journal are those of the authors and do not reflect in any way official Defence Force policy or the views of the Surgeon General, Australian Defence Force or any military authority.

Fourth Annual Conference
Sydney 1995

Beneath the gently swaying Norfolk Island pines of North Steyne, Manly, the Fourth Annual Scientific Conference of the Australian Military Medicine Association will take place from 1 to 3 September 1995.

As usual, the Conference will be full of a wealth of brilliant papers, will be enveloped in an atmosphere of bon vivant and is not to be missed - so don't.

Although keynote and guest speakers have yet to be finalised, likely attendees include Major-General ‘Digger’ James, Richard Southby (Freisen Professor of International Health and Health Policy, Professor of Health Care Sciences and Chairman, Department of Health Services Management and Policy, The George Washington University), Janet Southby, (Chief, Department of Nursing, Walter Reed Army Medical Centre), and Doug Ivan (Ophthalmology Division, Brooks AFB).

The Conference is being held at the Manly Pacific Park Royal. Just over the road is the beach, there is a great restaurant in-house (Gilbert’s), Manly Corso is just around the corner, golf is nearby, Sydney City is just 15 minutes by JetCat, and Luna Park has recently re-opened. Will there be any time for the papers?

As with all previous conferences, this one will be of an excellent standard, so make sure you write the dates in your diary NOW. Full details of the Conference will be in the next AMM.
1995 AMMA Research Grants

TOTAL AMOUNT AVAILABLE: $2000

CONDITIONS

☐ Distribution of the grants may be in one or more lots, as determined by AMMA council.

☐ Principal researcher to be member of AMMA.

☐ Research must be in the field of Military Medicine.

☐ There must be a commitment to publish in "Australian Military Medicine". There may be recourse to publish in another publication should the council determine that the research is of sufficient import.

☐ Grants are to be made preferentially to projects that otherwise may not proceed.

☐ Grants are not to be made to projects that have other sources of funding, other than the researchers themselves.

☐ All proposals are to submit:
   - Resource requirements and source of resources.
   - Resources requested and amount of requested grant.

☐ There are to be six monthly reports of progress to AMMA.

APPLICATIONS

☐ Applications may be received at any time, but grants will be issued once a year only. Applications for the years allocations close on 30 April.

☐ Successful applicants will be decided by council by 30 June and advised by 7 July.

☐ A sub-committee of Council, comprising one or more members, may be established to recommend to Council the distribution of grants and to administer and monitor the grants system.

☐ No correspondence will be entered into regarding the distribution of grants.

PROPOSALS

☐ Proposals that require ADMEC approval are to submit the completed ADMEC submission with the grant application.

☐ Proposals that do not require ADMEC approval are to provide:
   - Principal researcher’s publication history
   - Synopsis of proposed research (100-250 words)
   - Brief review of the subject (around 250 words)
   - Timeframe of research
   - Other researchers

Submissions are to be sent to AMMA Secretariat, PO Box 373, Moonah, Tasmania, 7009

Further details from Janel Scott, (08) 278.8575
1995 Council Elections

Please fill out the accompanying nomination form if you wish to nominate someone or be nominated to one of the AMMA Council positions. The position will be for 12 months, commencing from the next Annual General Meeting, 2 September 1995.

Please note that you must nominate for a designated position on Council. Should more than one person nominate for a position, a postal ballot will be held in June.

Unsuccessful nominees for positions may be co-opted onto Council if there are vacancies in other positions following the election.

Nominations close 5 May 1995.

Australian Military Medicine Association

Council Election 1995 - Nomination Form

I, ____________________________, being a full member of the Australian Military Medicine Association, nominate ____________________________ for the position of (tick ONE position only):

☐ President
☐ Vice President
☐ Secretary
☐ Treasurer
☐ Journal Editor
☐ Member (3 positions)

on the Association Council.

Signed ____________________________ (member proposing)

Date ___/___/___

Signed ____________________________ (member being proposed)

Date ___/___/___

Return to: Dr Marcus Skinner
Secretary, AMMA
PO Box 373
MOONAH TAS 7009

By 5th May 1995.
The 1995 Conference Committee is calling for the submission of abstracts on Military Health related topics. Such topics may include:

- Operational Health
- Disaster Health
- Military Dentistry
- Military Nursing
- Medical Logistics
- Human Factors
- Tropical Medicine
- Aviation Medicine
- Underwater Medicine
- Aeromedical Evacuation
- Battlefield Surgery
- Clinical Practice
- Occupational Health/Safety
- Medico-legal aspects
- Military Medical History
- Field Hygiene
- Medical Equipment
- Medical Fitness

All abstracts are to be submitted on the attached form.

An award of $500 will be made to the best original paper presented at the conference.

Membership of the Australian Military Medicine Association is not a prerequisite for either presenting or attending the conference.

Send your abstract to:

Surgeon Commander Andrew D.S. Gibson RAN
Medical Officer-in-Charge
Balmoral Naval Hospital
HMAS Penguin
MOSMAN NSW 2088
Tel: 02 960 0296
Fax: 02 969 9402
Closing Date for Abstracts: 12 May 1995.
ABSTRACT

Title

Abstract: (Max 250 words)

Presenter’s Contact Address:
Author(s): (Presenter first)

1.
2.
3.
Interesting haematologic responses to microwave exposure
Stephen Robson, Kevin Donovan

Abstract
A significant drop in white cell count following microwave exposure of 21 naval personnel occurred 36 hours after the exposure. Closer analysis of the results suggests that the effect was not from the microwave exposure but the result of diurnal variation in white cell counts. The importance of the timing of sampling, especially for serial blood counts, is illustrated.

Introduction
Microwaves are electromagnetic radiations with wavelengths between one millimetre and one metre, and are part of the radio frequency band. Because of their short wavelength, microwaves are non-ionising. The principal sources of microwave emissions are communications equipment (including radar), microwave ovens, cathode ray tubes, and electrotherapy devices.

The power output from microwave generators is quite variable, ranging from millions of watts for some radar equipment, to less than 100 watts in surgical diathermy. The outputs are either continuous wave, as in consumer goods, or pulsed waves, as in radar emissions.

A number of interactions are possible when a target is introduced into the microwave field. The emission may be reflected, it may be absorbed, or it may pass through the target. It is the absorbed fraction which is harmful. Different wavelengths of microwaves are absorbed to different degrees by living tissues. Short wavelengths, less than three centimetres, are entirely absorbed by the skin, whilst wavelengths between 10 and 20 centimetres penetrate the body deeply and dissipate their energy as heat. Living tissue is virtually transparent to wavelengths greater than 500 centimetres.

The biological effects of microwave exposure relate principally to changes in temperature, and these have been extensively studied in vitro and in animal experiments, and in some anecdotal evidence from human subjects. The overall scope of this research has been well reviewed, the most widely publicised effect on humans being cataractogenesis, although this remains uncertain. Other possibilities in humans have been extrapolated from animal models, and include effects on the testes, nervous system and some endocrine organs such as the adrenal gland. The possibility of effects on the immunological status of exposed individuals remains, although studies on human leucocytes in vitro have shown no striking changes.

The use of radar and other communications equipment in the military is well-established, and has long caused concern as to effects on service personnel. The Australian armed services take particular precautions to prevent excessive exposures to microwave emissions, adhering to the guidelines set down by the Standards Association of Australia. In spite of the precautions taken, accidental exposures occur. An unusual incident involving 21 personnel at a Royal Australian Navy establishment provided some quandaries in management and indirectly provided an interesting glimpse at some haematological effects of microwave exposure.

Description of incident
Navy personnel were carrying out routine maintenance on a Sea King helicopter, parked on the apron outside a hanger. The aircraft was connected to external power, and two hours after commencing the work somebody noticed the sound of the rotating radome, which presumably had been activated for the entire time. The radar apparatus was a MEL lightweight radar, with wavelength 32.4 millimetres, average power 15 Kilowatts, with a 360 degree sweep pattern. The radar in a Sea King is located on top of the aircraft and an occupational health assessment had shown minimal risk to personnel working on the ground whilst the radar is operating.

Shortly after the incident, the 21 exposed personnel presented to the hospital on base. Only one reported any symptoms: he described nausea and sleepiness, and had been working directly on the radome. The others had all been in and around the aircraft during the two hours, some walking along the spine. All were normal to examination, and none had any clinical evidence of current infection. All personnel had a blood specimen taken, and the sailor who reported the nausea was admitted overnight for observation. He settled well, and was asymptomatic by the morning.

The 21 reassembled at the hospital 40 hours after their initial blood test for a follow-up sample. None had developed any symptoms, but one sailor had an upper respiratory tract infection. At this time arrangements were made for ophthalmic examinations over the ensuing fortnight and a time was made for a check blood sample which was duly taken from all involved, except one who had posted to
a different establishment. On each of the blood samples a full blood examination was performed, with white cell count and differential.

Investigations
Upon discovery of the microwave exposure all personnel who had been working within the vicinity of the emitting aircraft presented at the hospital and all had been examined within two hours of the possible exposure. Initial management consisted of a general history of possible symptoms and general examination with specific examination of the ocular lens. Blood was taken for a full blood count and was repeated after two and 28 days. Ophthalmological checks were done after one and three months.

Results

History of Microwave Dosage
The medical history included a history from each subject as to where they were working, and for how long in each area. The times and distances were combined using time in minutes divided by the square of distance in metres. This figure was used to calculate a relative microwave strength exposure. If several areas were worked for various times then each was calculated and added for each subject.

Table 1 - Relative dose and white cell count (WCC)

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>RELATIVE DOSE</th>
<th>W.C.C. DAY 0</th>
<th>W.C.C. DAY 2</th>
<th>W.C.C. DAY 18</th>
<th>W.C.C. DROP (0 - 2)</th>
<th>W.C.C. DROP (2 - 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16.19</td>
<td>9.70</td>
<td>6.90</td>
<td>7.50</td>
<td>2.80</td>
<td>-0.60</td>
</tr>
<tr>
<td>2</td>
<td>22.63</td>
<td>8.00</td>
<td>5.20</td>
<td>5.70</td>
<td>2.80</td>
<td>-0.50</td>
</tr>
<tr>
<td>3</td>
<td>22.63</td>
<td>9.20</td>
<td>6.30</td>
<td>7.60</td>
<td>2.90</td>
<td>-1.80</td>
</tr>
<tr>
<td>4</td>
<td>22.63</td>
<td>8.60</td>
<td>5.00</td>
<td>6.10</td>
<td>3.00</td>
<td>-0.50</td>
</tr>
<tr>
<td>5</td>
<td>7.50</td>
<td>8.40</td>
<td>6.60</td>
<td>6.60</td>
<td>1.80</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>0.65</td>
<td>7.00</td>
<td>5.00</td>
<td>5.10</td>
<td>2.00</td>
<td>-0.10</td>
</tr>
<tr>
<td>7</td>
<td>7.50</td>
<td>10.50</td>
<td>9.20</td>
<td>10.80</td>
<td>1.30</td>
<td>-1.60</td>
</tr>
<tr>
<td>8</td>
<td>0.30</td>
<td>12.40</td>
<td>8.90</td>
<td>8.80</td>
<td>3.50</td>
<td>0.10</td>
</tr>
<tr>
<td>9</td>
<td>0.60</td>
<td>8.90</td>
<td>6.80</td>
<td>7.90</td>
<td>2.10</td>
<td>-1.10</td>
</tr>
<tr>
<td>10</td>
<td>0.30</td>
<td>5.50</td>
<td>6.80</td>
<td>6.70</td>
<td>1.30</td>
<td>0.10</td>
</tr>
<tr>
<td>11</td>
<td>0.41</td>
<td>7.80</td>
<td>5.70</td>
<td>n/a</td>
<td>0.90</td>
<td>-0.20</td>
</tr>
<tr>
<td>12</td>
<td>0.63</td>
<td>9.30</td>
<td>5.70</td>
<td>7.70</td>
<td>2.10</td>
<td>n/a</td>
</tr>
<tr>
<td>13</td>
<td>0.63</td>
<td>9.30</td>
<td>6.80</td>
<td>6.60</td>
<td>2.50</td>
<td>0.80</td>
</tr>
<tr>
<td>14</td>
<td>2.50</td>
<td>10.50</td>
<td>8.90</td>
<td>9.50</td>
<td>1.60</td>
<td>-0.60</td>
</tr>
<tr>
<td>15</td>
<td>5.00</td>
<td>8.90</td>
<td>6.70</td>
<td>7.00</td>
<td>2.20</td>
<td>-0.30</td>
</tr>
<tr>
<td>16</td>
<td>1.20</td>
<td>9.00</td>
<td>6.00</td>
<td>6.40</td>
<td>3.00</td>
<td>0.40</td>
</tr>
<tr>
<td>17</td>
<td>0.10</td>
<td>12.10</td>
<td>1.10</td>
<td>7.00</td>
<td>6.00</td>
<td>-0.90</td>
</tr>
<tr>
<td>18</td>
<td>0.20</td>
<td>6.20</td>
<td>5.80</td>
<td>8.80</td>
<td>0.90</td>
<td>-0.50</td>
</tr>
<tr>
<td>19</td>
<td>0.76</td>
<td>8.80</td>
<td>7.80</td>
<td>8.00</td>
<td>1.00</td>
<td>-0.20</td>
</tr>
<tr>
<td>20</td>
<td>0.10</td>
<td>8.90</td>
<td>7.60</td>
<td>7.50</td>
<td>1.30</td>
<td>0.10</td>
</tr>
<tr>
<td>21</td>
<td>0.15</td>
<td>8.60</td>
<td>7.30</td>
<td>7.00</td>
<td>1.30</td>
<td>0.30</td>
</tr>
<tr>
<td>NUMBER</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>20</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>TOTAL</td>
<td>112.56</td>
<td>187.60</td>
<td>141.20</td>
<td>144.70</td>
<td>46.40</td>
<td>-9.2000</td>
</tr>
<tr>
<td>MEAN</td>
<td>5.3600</td>
<td>8.9333</td>
<td>6.7233</td>
<td>7.2350</td>
<td>2.2095</td>
<td>0.4600</td>
</tr>
<tr>
<td>SUMSQ</td>
<td>1340.6590</td>
<td>53.567</td>
<td>14.174</td>
<td>35.1455</td>
<td>39.0581</td>
<td>8.5800</td>
</tr>
<tr>
<td>VAR</td>
<td>67.0330</td>
<td>2.6783</td>
<td>1.4849</td>
<td>1.8498</td>
<td>1.9529</td>
<td>0.4509</td>
</tr>
</tbody>
</table>
Analysis
There was a significant drop in WCC between Day 0 and Day 2 (t=4.9618, df=40, p<0.001). There was no significant change in WCCs between Day 2 and Day 18. Spearman rank correlation tests of the calculated microwave dosage and the initial WCC drop showed no evidence of a relationship between dosage and WCC drop (R40 = 0.229, t=1.0261, df = 19). The correlation co-efficients and probability levels are shown in Table 2.

**Table 2 - WCC correlation**

<table>
<thead>
<tr>
<th>Table Entry = Correlation, order, PRDB/CORR=0.0</th>
<th>Relative Dose</th>
<th>WCC Day 0</th>
<th>WCC Day 2</th>
<th>WCC Day 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Dose</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCC Day 0</td>
<td>-0.0010, 6</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.996 P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCC Day 2</td>
<td>-0.2269, 4</td>
<td>0.5542, 3</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.323 P</td>
<td>0.009 P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WCC Day 18</td>
<td>-0.1082, 5</td>
<td>0.6015, 2</td>
<td>0.8702, 1</td>
<td>1.0000</td>
</tr>
<tr>
<td></td>
<td>0.650 P</td>
<td>0.005 P</td>
<td>0.000 P</td>
<td></td>
</tr>
</tbody>
</table>

Comparison of the neutrophil, lymphocyte and monocyte percentages over the test period show no significant difference between the percentages from measurement to measurement. The drop from Day 0 to Day 2 therefore occurred in all leucocyte types and not in any particular group.

**Actual Dosages**
Radiation measurements were performed by trained technicians and the results are quoted in Table 3. The figures quoted are a worst case scenario.

**Table 3 - Peak power density (PD) vs distance**

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>PD Measures (mW/cm² pk)</th>
<th>PD Possible Worst Case Measures (mW/cm² pk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>11.4</td>
<td>750</td>
<td>1500</td>
</tr>
<tr>
<td>8.2</td>
<td>1625</td>
<td>3250</td>
</tr>
<tr>
<td>4.6</td>
<td>4000</td>
<td>8000</td>
</tr>
<tr>
<td>2.7</td>
<td>6250</td>
<td>12500</td>
</tr>
<tr>
<td>1.8</td>
<td>11250</td>
<td>22500</td>
</tr>
</tbody>
</table>

The only figures previously available for this radar were from a radiation survey 18 months prior to the event. This survey measured, at a distance of 2m above ground under the antenna (ie at a distance of about 3m from the antenna), 0.017 mW/cm². This measurement is, however, an averaged, not peak, level. Exposure limits for peak levels are about 1000 times those of mean levels for long term exposure. For example, AS 2772 (1985) defines the level not to be exceeded for 300 kHz to 300 GHz as a power flux density of 10 kW/m².
Discussion
Despite the significant drop in WCC 24 hours after microwave exposure recorded here, there seems to be no significant relationship between the radiation exposure and the fall in WCC. It is most likely that other factors other than the microwave exposure were responsible.

The most likely cause for the difference would seem to be diurnal variation, as the initial WCCs were collected in the late afternoon and subsequent follow up collections were done in the morning. Bertouch\(^7\) shows significantly higher white cell counts in the later afternoon, with lower counts occurring in the early morning. This difference would more than explain the apparent drop in WCC from Day 0 to Day 2 and also explain the lack of change between Day 2 and Day 16.

It is recommended that blood samples collected for occupational health monitoring be collected at the same time of day to minimise the effects of diurnal variation.

REFERENCES
Introduction

Flying modern high performance fighter aircraft is an extremely demanding profession. It is also not without its dangers. One of these dangers is the magnitude of the accelerative stress which the fighter pilot must endure, particularly during dynamic phases of flight such as air combat manoeuvring. "Pulling G" is an occupational fact of life for today's fighter pilots. During the course of an air combat manoeuvring (ACM) sortie, the fighter pilot will often experience G loads of 6G or more, sometimes up to 7.5G in the case of the F/A-18 Hornet operated by the RAAF.

This G force is generally speaking applied along the Z-axis, i.e., in the head-to-foot plan. Positive accelerations in this axis produce a number of physiological effects which are well known to the fighter pilot. In the aerospace medicine community, much attention has been paid over the last few decades to the problem of increasing the pilot's tolerance to high +Gz levels. Various protective mechanisms have been developed, including the G-suit (which is currently "acing something of a design revolution") and the incorporation of positive pressure breathing systems in new-generation fighter aircraft (e.g. the Eurofighter 2003).

Attention has also been focused on improving pilot factors, as opposed to the abovementioned technology factors. The role of different physical conditioning regimes has been examined in a variety of studies. Essentially the debate in this area has focused on the relative merits of either aerobic or anaerobic conditioning as a means of improving the fighter pilot's ability to withstand high +Gz levels. This paper reviews the available information and experimental evidence, and provides a broad overview of tolerance to +Gz acceleration as it relates to the physical training status of the pilot.

The Physiology of +Gz

Before entering the aerobic vs anaerobic debate, it is pertinent to firstly and briefly examine the physiology of +Gz acceleration for those readers not familiar with the concept.

+Gz acceleration in the flight environment is generally created by radial acceleration (i.e. a banked turn or loop) with the pilot's head directed towards the centre of the circular flight path. The resultant centrifugal force produces the physiological effects which are essentially due to alterations in flow and distribution of body fluids.

During exposure to +Gz, vascular pressures above the heart decrease and those below the heart increase. Mean cerebral artery pressure falls and femoral artery pressure rises. The magnitude of these changes is a function of the magnitude of the G force, and the distance from the heart. As the capacitance vessels dilate, total peripheral resistance and cardiac output both fall. If the G level is sufficiently large, loss of consciousness may result. At lower levels, vision is impaired - grey-out (loss of peripheral vision), followed by black-out (complete loss of vision).

There is a reflex compensation mechanism which comes into play some 6 seconds after the +Gz is applied. Sympathetic compensations occur, resulting in increased heart rate, arteriolar vasoconstriction and increased venous return and therefore cardiac output. These compensatory mechanisms are well augmented by the use of protective equipment such as the anti-G suit, and the use of the anti-G straining manoeuvre (AGSM). The AGSM is a technique whereby forced expiration against a partially or completely closed glottis raises the threshold for G symptoms by up to 3G.

Obviously, if the G level is too high, the reflex compensations and accessory equipment are unable to combat the fluid translocation and centrifugation effects of the acceleration. Loss of consciousness will result with clearly dire consequences for the fighter pilot. Prevention of such G-induced loss of consciousness (known as G-LOC) has long been a focus of aerospace medicine researchers.

Aerobic vs anaerobic conditioning

Physical fitness is obviously a valuable commodity for the fighter pilot, particularly in the demanding world of air combat manoeuvring. Fighting the deleterious effects of +Gz by use of the AGSM is fatigueing in the extreme, particularly if performed properly. The important question is clearly not whether a fighter pilot should or should not exercise, but rather what
sort of training should be undertaken in order to improve tolerance to high +Gz.

Aerobic conditioning generally involves improving the body’s ability to use oxygen by improving the cardiovascular efficiency of the body. Aerobic capacity is generally a function of VO2 max (maximal oxygen consumption). Aerobically fit individuals tend to have high VO2 max values and lower heart rates. Examples of aerobic activities include running, especially long-distance endurance running, swimming and endurance cycling. Aerobic fitness tends to translate into the ability to sustain high workloads for long periods (endurance) or repetitive episodes of a given activity (as a shorter recovery period is required).

Anaerobic conditioning essentially involves strength training. Anaerobic activities include isometric exercises such as weight-lifting and resistance training activities that provide increases in muscle mass, strength and endurance. Anaerobic fitness generally translates into the ability to use less muscular force for a given activity, or to sustain that force for a longer period (increased time-until-exhaustion for a given muscle tension). Overall muscle power is also increased, so that greater force can be exerted against an object if required.

**Physical Training And +Gz Tolerance**

Epperson et al. examined the question of physical training and +Gz tolerance using volunteer centrifuge subjects. Twenty-four subjects were divided into three groups - a control group (no physical training), a running group and a weight-lifting group. The two exercise groups then underwent a 12-week conditioning program, involving either running or weight-training. Following this, centrifuge testing of subjects was undertaken using a simulated air combat manoeuvring (SACM) profile. This centrifugation profile consists of repetitive excursions to +Gz levels of 4.5 and 7.0 at 15 second intervals. Tolerance to +Gz was measured in terms of the time interval until fatigue was reported by the subject.

The results of their study were quite clear cut. The +Gz tolerance of the runner group and the control group were similar, with the runner group demonstrating no increase in +Gz tolerance. By contrast, the weight-training group demonstrated a statistically significant increase in +Gz tolerance. Furthermore, the weight-training group took longer to reach the fatigue end-point than the other two groups.

A similar study in Sweden demonstrated a 39% increase in tolerance to SACM in the centrifuge in subjects who had undergone a strength-training program for 11 weeks. In contrast, Cooper and Leverett undertook a centrifuge study that examined the impact of aerobic conditioning on +Gz tolerance. One group undertook a running program for three months and the other group did not exercise at all. Centrifuge testing failed to show any improvement in +Gz tolerance in the aerobically fit group. Neither an increase nor a decrease in tolerance was demonstrated.

A study involving amateur long-distance runners and their tolerance to +Gz found that although their aerobic capacities were high, they had low average +Gz tolerances when compared against a control group.

Houghton et al., in a study of G-induced loss of consciousness, found a direct correlation between the aerobic fitness of pilots and increased time of incapacitation occurring as a result of G-LOC.

Other studies have shown a variety of deleterious effects of aerobic conditioning occurring in individuals subject to +Gz. These effects have included an increased incidence of cardiac arrhythmias, including asystole and motion sickness.

A study by Stegemann et al. in Germany found that endurance training tends to reduce the effectiveness of the blood pressure control system, which they found would be disadvantageous under conditions of orthostatic challenge, i.e. acceleration.

**Discussion**

Is aerobic training more beneficial than anaerobic training in terms of conferring additional acceleration protection? It would appear not, judging by the evidence so far examined. Anaerobic training, involving gains in muscle strength and endurance, would seem to be of much more benefit to the fighter pilot than aerobic fitness.

Theoretically, this should be so. An air combat manoeuvring sortie is a dynamic, strength-related activity. The AGSM is a muscular endeavour. It stands to reason that an anaerobically fit pilot with well-developed muscle strength will be able to tolerate the AGSM for longer periods before becoming fatigued. This will allow him to avoid the danger of G-LOC for longer and to thus concentrate on the actual mission itself. Epperson’s study showed the benefits of strength training in this respect quite well.

Clearly, then, the pilot of a modern high performance fighter aircraft needs to be anaerobically strong in order to survive the dynamic environment of air combat. This type of flying is fatigue in the extreme. However, a moderate degree of aerobic fitness is also important to the fighter pilot, not in terms of +Gz tolerance but rather in terms of fatigue and mission tolerance. A level of aerobic fitness will help him withstand the generally fatiguing effects of flight for longer, and allow him to sustain a high inflight workload for longer periods. It also seems reasonable to suggest that a degree of aerobic fitness will provide the fighter pilot with the ability to recover quickly from repeated strenuous ACM sorties.
Too much aerobic fitness, however, can have negative implications for the fighter pilot. As we have seen, aerobic fitness has been related to cardiac dysrhythmias and motion sickness. These effects are thought to be due to the increased vagal tone which develops in endurance-trained individuals. Excessive aerobic fitness is also related to generally poor +Gz tolerance.

How much aerobic fitness is adequate, and how much is too much? Opinions vary, but in order to prevent excessive vagal tone and its attendant problems, current recommendations are that pilots routinely exposed to the high +Gz environment have a resting pulse rate no lower than 55 beats per minute.  

**Conclusion**

Anaerobic conditioning has been shown to improve the fighter pilot’s +Gz tolerance, whereas aerobic conditioning has not. Indeed, excessive aerobic training may actually reduce such tolerance to acceleration. There is still a place for aerobic training, however. While anaerobic conditioning is important for +Gz tolerance, air combat missions are demanding and fatiguing. A degree of aerobic fitness will minimise these effects. A general level of fitness is still important.

The fighter pilot thus needs to be both aerobically and anaerobically fit to carry out his mission effectively. How much of either type of conditioning is optimal remains a continuing focus of research. The ideal physical training regime that caters for all aspects of the fighter pilot’s demanding environment has not yet been developed.

Should such a program be developed, it will no doubt give the fighter pilot even more of an edge in an air combat engagement. In the high +Gz environment of the future, the outcome of such an engagement may well depend on the relative fitness of the pilots.

**REFERENCES**


---

**Yellow Fever**

*Sue Sharpe*

Yellow fever is a debilitating and sometimes fatal viral disease. Only seen in South America and Africa, recent outbreaks have been described in Nigeria. This paper will review Yellow Fever, an important infectious disease and possible biological warfare agent.

**Aetiology**

The aetiological agent of yellow fever is a small, enveloped, RNA virus of the Flaviviridae family. It has a diameter of between 17 nm and 28 nm and is able to pass through most filters. The virus is resistant to freezing, but is inactivated by heating for 10 minutes at 78 degrees C or by exposure to common disinfectants. The virus is transmitted via a mosquito vector, principally Aedes species, although Haemagogus spp. and Sabethes spp. have been implicated in South American outbreaks of yellow fever.
Epidemiology
Yellow fever is currently found only in South America and Africa and occurs in two epidemiological forms.

The sylvan (or jungle) cycle occurs between monkeys and the mosquito *Aedes africanus* and is confined to forest environments. Another mosquito, *A. simpsoni*, may feed on viraemic monkeys and transmit the virus to humans entering the forest.

This cycle is observed in forest-savanna areas of tropical Africa and forested regions of South America. Parts of Central America and Trinidad are sometimes involved.

Approximately 100-300 cases are reported from South America every year. Epidemics occur in Africa every few years and commonly affect tens of thousands of people. The disease can be controlled by vaccination of at-risk human populations.

The urban cycle occurs away from the forest, and is transmitted by *A. aegypti* which breed in domestic water containers. Man-to-man spread is possible, and massive epidemics may result.

Urban Yellow Fever has recently been reported in Brazil, Bolivia, Panama, Ecuador, Venezuela, Colombia and West Africa. This form of the disease can be controlled by eradicating the mosquito and by vaccinating susceptible people.

Pathology
After introduction into the host's blood stream, the virus is carried to lymph nodes where primary multiplication takes place. Dissemination to viscera (particularly the liver, kidneys, spleen, heart, bone marrow and lymph nodes) may occur, followed by secondary virus multiplication in these organs. Cell damage and death ensues, causing degenerative lesions. Hepatic involvement is common: parenchymal acidophilic fatty degeneration and midzonal necrosis are frequently noted. Inflammatory reactions may occur but are considered unusual.

The severity of symptoms varies with the strain of Yellow Fever virus involved.

Clinical Manifestations
Yellow Fever can be subclinical to fatal. It is of short duration - the patient will either have died or recovered within two weeks of onset of symptoms. An incubation period of 3-6 days is followed by a sudden onset of fever, rigors, headache, backache, muscle pain, prostration, nausea and vomiting. After a further 3-4 days, a temporary reduction of fever may occur, but more severe symptoms may then develop.

In the severe illness symptoms may include: a slowing and weakening of pulse, albuminuria, anuria, leukopenia (especially around the fifth day), severe gastrointestinal symptoms, and haemorrhagic complications such as epistaxis, buccal bleeding, haematemesis and melaena. Jaundice is a common symptom of severe Yellow Fever and indicates a poor prognosis (it is associated with a mortality rate of between 10% and 50%). Milder cases, where jaundice is not present, probably have a mortality rate of around 5%.

Laboratory Diagnosis
Diagnosis can be made by detection of the virus in blood or liver biopsy tissue using ELISA or fluorescent antibody staining; inoculation into suckling mice, mosquitoes, or cell culture, particularly C6/36 *Aedes albopictus*, Vero, or BHK (baby hamster kidney) cell lines; (although direct isolation may be costly and time-consuming); or by identification of the viral genome using DNA hybridisation technology.

SeroLOGY is the usual method of diagnosis. Identification is achieved by demonstrating specific IgM in early sera and a rise in titre in paired acute and convalescent sera. However, serologic cross-reaction may occur with other flaviviruses. The most commonly used assays are haemagglutination inhibition, neutralisation, and (less commonly) complement fixation.

Differential Diagnosis
Yellow fever may be confused with Lassa fever, Rift Valley fever, Congo-Crimson haemorrhagic fever, Ebola and Marburg Fever. Jaundice is only common in Yellow Fever and Rift Valley Fever. Milder illnesses have Dengue-like symptoms.

Treatment
No specific treatment is available. Supportive treatment (bed rest, fluid replacement) is necessary even in mild cases.

Susceptibility Of Population
There is no discrimination between males and females or different age groups, although adults have more likelihood of previous exposure (and subsequent immunity). Adult males are most often exposed in sylvan Yellow Fever, principally because of occupational factors (ie: they are more likely to enter the forest).

Recovery from Yellow Fever (even sub-clinical infections) provides the patient with solid immunity. Second attacks are unknown. Passive transfer of antibodies from an immune mother to her infant may persist for up to 6 months.

Prevention
An effective vaccine is available and has been used successfully to control the spread of Yellow Fever. The vaccine is an attenuated virus derived from the 17DE strain, which has been passaged over 200 times through chick and mouse cell cultures. Immunity afforded by the vaccine appears to be long-lasting.
Studies have indicated that neutralising antibodies may be present at high titres for as long as 35 years after initial challenge, although boosters are suggested every 10 years.

The WHO indicates that a single dose of vaccine is effective 10 days after administration. The vaccine is recommended for native populations and international travellers to at-risk areas. The vaccine is not suitable for people with egg protein hypersensitivity, acute illness, depressed immunological states, generalised malignancies, for pregnant women or for children under 12 months. Mild adverse reactions include fever, general malaise and joint pain (occurring between the fifth and eighth day following vaccination). Patients should be kept under observation for 30 minutes after vaccination, and adrenaline should always be available. Ideally, other live virus vaccines, not given on the same day, should be administered at least a month apart.

Avoidance of mosquito bite, by wearing suitable clothes and insect repellents, is advisable.

**Potential As A Biological Warfare Agent**

Yellow Fever virus is only transmissible where the suitable mosquito vector is present. To be an effective biological weapon, a large number of chronically infected mosquitoes would need to be released. A select, isolated attack is therefore the most likely scenario.

The mortality is not usually high, although symptoms can be quite debilitating. Illness usually does not last more than two weeks, and chronic or recurrent attacks are unknown.

Identification may take several days, but since treatment is only supportive, this delay does not affect the management of the disease.

An effective vaccine is available and completely safe for most people. The risk of infection can be further reduced by wearing suitable clothes and insect repellents. The virus can be destroyed by simple chemical disinfectants, or by heating at 78 degrees C for 10 minutes.

**Future Directions**

Research into the immunological and pathological aspects of Yellow Fever are continuing, and the 17D vaccine has recently been improved (removal of contaminating avian viruses originally introduced through passage through chick embryos). Supportive therapies could also be improved.

Continuation of preventative measures in Africa and South America, encompassing vaccination and eradication of mosquito vectors will help keep natural infections in check.

**REFERENCES**

3. Chichester; John Wiley and Sons, Chapter 11, 438-441.
Short Articles

Time for change
Jan Rice, RN. RM

Just How Old Is Dressing Technique?
Dried goats dung, honey boiled in vinegar, heads of soldier ants and boiled puppies... the list sounds as if it came from Macbeth's witches on the blasted heath. Yet these are but a tiny part of the saga of wound treatment through the ages. Prehistoric man's first attempts at managing wounds focused on first aid treatment. The aim was to staunch the bleeding and cover the wound.

460-379 BC Hippocrates showed foresight as he discussed healing by first intention, the need to quickly promote haemostasis in bleeding wounds and the benefit of not allowing wounds to dry out. This was probably the first record of the moist wound healing principle.

1493-1541 AD Paracelsus believed that "surgeons should not interfere with nature's balsam which is produced and deposited on the surface of open wounds and ulcers." This anti-microbial value of wound exudate was proved true by Hohn and his colleagues in 1977.

1793 John Hunter differentiated between primary and secondary healing. He discussed the phenomena of granulation, wound contraction and epithelialisation in wound healing. Understanding these stages is essential for assessing and managing wounds today.

1962 George Winter described the concept of moist wound healing. "The demonstration that a simple change in the physical conditions at the wound surface can have such a marked effect on the rate of epithelialisation, has an important bearing on experimental methods in wound healing".

100 years after Joseph Lister described the use of a colloidal transparent film dressing in 1870, OPSITE was introduced into the field of wound care.

1973 Stomadhesive wafers were introduced as ostomy care products. These products and principles were derived from mouth ulcer treatments and were later developed into a range of dressings called hydrocolloids.

1980 Calcium alginate dressings were introduced as technology improved. These "seaweed dressings" were tried in 1948. The cost, however, was prohibitive until technology developed.

Traditional Wound Management said that:
- Wounds should be kept clean and dry so that a scab forms over the wound.
- Wounds should be exposed to air and sunlight as much as possible. Where tissue loss is present the wound should be packed to prevent surface closure before the cavity is filled.
- Wounds should be covered with a dry dressing.

The disadvantages of this are:
- The scab (dehydrated exudate) is a physical barrier to healing. The delay is because epidermal cells cannot move easily under the scab. There may also be poor cosmetic results as well as scarring.
- Exposure to air reduces surface temperature of the wound and further delays healing.
- The quality of healing is impaired.
- The dressing may adhere to the wound and cause trauma at time of removal.

Moist Wound Healing
The advantages of moist wound healing are that it:
- Simplifies debridement
- Facilitates wound healing
- Protects granulation
- Encourages epithelialisation
- Allows growth factors optimal healing activity

Therefore The Purpose And Function Of A Wound Dressing Is To:
- Maintain humidity levels
- Remove excess exudate
- Allow gaseous exchange
- Maintain thermal insulation
- Be impermeable to micro-organisms
- Provide freedom from toxic and particle wound contamination
- Reduce trauma during dressing change

Having an understanding of the history of wound healing and the epidemiology of wound healing, the next hurdle to overcome is that of dressing choice. There has been an explosion of options for the treatment of acute and chronic wounds. Most health care professionals who are responsible for the
procurement, selection and use can hardly keep pace with the new brands, categories and techniques for wound care that are so rapidly becoming the norm. There are basically five categories: Films, Foams, Gels, Hydrocolloids, and Exudate Absorbers.

Once accurate assessment of the wound has taken place and an aim is determined, the choice of dressing is then made upon the aim. This is not as easy as made out to be, and collaboration with other health professionals is essential. Wound management is the buzz phrase of the nineties. Research has provided evidence that the old ways are not enhancing wound healing and in these days of quality care, optimal care and cost effectiveness, clinicians must acknowledge the research data and move with the times.

ABOUT THE AUTHOR
Major Jan Rice is a General Reserve Nursing Officer posted as S02 (Career Advisor), Defence Centre, Melbourne.

Reprinted by kind permission of the Editor, "Grey and Scarlet".

References


Cardio-pulmonary resuscitation modules

Pat Rose RN, BEd

Respiratory and cardiac arrests are emergencies for which everyone should be able to initiate treatment. Taking that into consideration, the next step is to attempt to find the most efficient means of not only teaching CPR, but of ensuring retention of the necessary knowledge and skills, to ensure correct utilisation when necessary.

Documented evidence of deterioration in CPR skills and knowledge is sadly lacking for the Australian arena, but research studies abound from America and the United Kingdom. Most of the studies reviewed followed the same format, looking at retention of skills and knowledge in Basic Life Support (BLS) in various groups: the general public, student nurses, registered nurses, medical students and doctors. Skills were tested immediately prior to a BLS refresher course, immediately afterwards and at various times up to four years post course.

All research studies identified that the retention of skills declined post course, so that within a year, BLS skills had reverted to pre course levels. Those individuals who underwent annual retraining showed that their skills had deteriorated less than groups who did not have annual retraining. It is interesting to note that, despite retraining, deterioration in skills had occurred. All research studies identified a significant decline in skills over time, as well as the fact that most individuals overestimate their CPR skills and knowledge. The "norm" for recertification of CPR skills is one year.

Given the various studies\textsuperscript{3-4}, annual updating of training is insufficient. Review and re-enforcement are needed more frequently with emphasis on, and consideration of, the most poorly retained psychomotor skills. Compulsory retraining programmes are necessary, especially as individuals are unable to judge accurately their own skills.

A pilot study was conducted at 3 Forward General Hospital, an army reserve medical unit, consisting of ten volunteer personnel each with different knowledge and skill levels in CPR. Each volunteer had undertaken previous assessment and retraining between six months and three years prior to the pilot study. Testing was conducted utilising the CPR module assessments designed. The sample group was tested prior to reading or interpreting any of the information provided in the modules. This initial assessment included both a theoretical and a practical assessment. The results of this study seem to correlate with previous in-depth studies about the deterioration of CPR skills. Most of the personnel felt sufficiently motivated to read the modules immediately, and were retested successfully once they had completed the modules.

A popular idea about learning holds that learning is a process of accumulating facts and information. Learning, however, is an active process involving information processing and recall. The aim of CPR instruction is to achieve long term memory, storage and utilisation of information.
There have been several studies comparing different methodologies for CPR instruction and their outcomes on retention of learners' skill and knowledge. Frieson, tested the effect of lecture demonstration versus self-paced instruction on the retention of CPR skills by baccalaureate nursing students. Only eight weeks after the course, skills had decreased, regardless of the instruction format. The findings are supported by Nelson and Coleman, who also compared formal didactic courses and modular instruction. Given these results it would seem not to matter how the individual is taught, only that frequent retraining be implemented in order to increase retention.

Didactic techniques are restrictive; they need set time frames which can be constraining and an instructor during this time. Students are unable to pace their own learning needs based on their previous knowledge base and experience.

Modular instruction is self-paced so that the student with prior knowledge may finish more quickly. This allows the slower student to work at their own pace, decreasing their frustration or feelings of guilt at holding others back. Modular instruction also offers flexible time schedules and aids elimination of variable or poor instruction. The instructors' main role is testing, organizing the course, explaining the equipment and being available to answer questions.

Given this information, and the nature of the Army Reserve particularly, a modular CPR instruction course for army personnel should be variable as continuity of attendance on a didactic course would be virtually impossible. Training man days have been restricted so this format allows personnel to study when they have the time, whether within the unit or at home. For the instructor running the course, it allows them more time so that they may continue with their own training and professional development. The most important aspect is the freedom of time this method of instruction gives to personnel.

The Australian Resuscitation Council was initially established in 1976, providing a basic framework of uniformity and standardisation of resuscitation techniques on which the cardiopulmonary resuscitation modules are based. Five learning packages have been developed aimed at population specific training. Each package is aimed at the individual learning needs of one of five subgroups of army personnel. These sub-groups were identified based on the previous and expected knowledge base and psychomotor skills of the personnel.

Module One for personnel with basic first aid skills.

Module Two for personnel who have completed the army medical assistance course and module one.

Module Three for nursing officers who have completed modules one and two.

Module Four for advanced nursing officers who have completed modules one to three. (In this case advanced means those nursing officers with critical care skills).

Module Five for medical officers who have completed modules one to four.

The objectives for each module are detailed, and represent the minimum skills that are expected from each individual when performing within their role. The packages are designed to give a theoretical framework, fostering an informed view point about resuscitation in the student. The information builds on previous knowledge and training, but demands also a basic level of achievement. The practice of psychomotor skills needs to be encouraged at all levels and at frequent intervals throughout the year - not just for testing.

Within 3 Forward General Hospital, we have the advantage of manikins and supplies being available. Also, there are the trainers necessary for instruction and practice. But, as stated earlier, the disadvantage is in the restriction of time for training. Practice offers feedback and refinement of skills and knowledge.

The initial period of implementation requires a lot of effort and time investment. Included as part of the implementation plan are lectures to explain the modules to personnel and review basic CPR. Information is available from the librarian along with the packages and videos. It is imperative that the instructors are knowledgeable regarding the design, content and assessment methods of the modules. The ongoing maintenance and currency of the packages must be reviewed. The storing of the information on computer disc will facilitate the updating of the packages. Like any curriculum, knowledge is not a stagnant pool but rather a river with the flow of streams combining, making it ever stronger until it reaches the sea of knowledge.

In the future the Army Reserve may be able to utilise computer technology or video-discs as a means of training personnel. Providing a more realistic simulated station would also help to prepare the individual for the actual stress and tension present during a resuscitation attempt.

It is recognised that the differing levels and their respective objectives reflect the author's individual opinion. These levels and objectives should preferably be designed collectively by all those
involved in teaching cardio-pulmonary resuscitation to Army personnel. However, the author views this study as a pilot package for discussion and possible modification.

ABOUT THE AUTHOR
Captain Patricia Rose, General Reserve Nursing Officer, is currently posted to Adelaide University Regiment

Reprinted by the kind permission of the the Editor, Gray and Scarlett.

REFERENCES

HYPERBARIC TECHNICIANS & NURSES ASSOCIATION
THIRD ANNUAL SCIENTIFIC MEETING
Conference: 3rd Annual Scientific Meeting on Diving and Hyperbaric Medicine
Date: 28th to 23rd September, 1995
Venue: Carlton Radisson Hotel, Melbourne, Victoria, Australia

This is an international scientific conference which is being hosted by the Australian Hyperbaric Technicians & Nurses Association. The Association was formed in 1990 and despite being a newcomer on the hyperbaric scene has a membership of 145. The conference will cover hyperbaric medicine on the Friday and diving related issues on the Saturday. Keynote speakers will be Dr. Richard Moon and Dr. Cueilhencro Sanchez. Dr. Moon, from the Duke University Research Facility, is the current President of the Undersea Hyperbaric Medicine Society and has published extensively on diving and carbon monoxide gas poisoning. Dr. Sanchez is the Director of National Hyperbaric Services in Mexico.

Conference Arrangements:
Kevin Fabris or John Houston Telephone: (03) 276 2323 Facsimile: (03) 276 3780
Closing date for abstracts (maximum 250 words) is 12th May, 1995
Light Blue in Darkest Africa. Operation Tamar: ASC UNAMIR II
Col. Robert Atkinson

Rwanda - Who had ever heard of this place? When it appeared on television - where was that? Occasionally a map appeared and there seemed to be an arrow pointing to the central portion of the African continent. So there was some UN Troops there? Once. Well there was a little bit of press and there was something on the news if you watched the news. Most people watch the news, but don’t really watch the news. If you are in the Military you look at the news and think, I wonder whether that would effect us? Probably not, because it’s a long way away from us and what’s Africa got to do with Australia anyway?

Next, there were visions on television of people cutting people with machetes in the streets, then rumours of massacres and a little bit of press with a photograph of a soccer team with not many legs amongst them left. Then there was finally information regarding the RPA (Rwandan Patriotic Front) who were moving in from Uganda and they seemed to be winning as they fought the RGF (Rwandan Government Forces). Suddenly the French were getting involved and they don’t seem to do anything without a good reason and there was a safe zone in the south-west of the country.

Next, there were visions on television of Belgian paratroopers carrying 10 dead in coffins with blue berets on the coffins. And finally, as the war seemed to die down there were images of massive movements of people pouring into Refugee Camps, stories of massacres of 500,000 people. This was newsworthy. The cameras focused in on all forms of human suffering and hard behind the scenes, the UN was attempting to put together a force to take over from UNAMIR I (United Nationals Assistance Mission in Rwanda) and there seemed to be no big players although the United States did put in a contingent of air controllers and the British put in a field ambulance and the Canadians likewise. And the Africans seemed slow but that was not true. There were Ghanaians there all along and they got caught in the cross-fire fighting through Kigali, the capital of Rwanda, caught in circumstances where their orders did not allow them to shoot back. Where they stood by and watched people killed and when the mortar bombs came and they weren’t selective, if you were there, you were it, and they did.

Same old story, blue berets, basically the forward element of the biggest fighting force this earth could ever produce but has never produced. And they sat there, caught in the cross-fire.

Well things started to move a little and more nations started to produce troops and lo and behold the Australian Army managed to convince the United Nations that they needed a hospital in Rwanda. Next, they convinced the Australian Government that we should be doing this and finally, the Medical Corps convinced the Army that they should command it and thus was produced the Australian Support Contingent, for UNAMIR II, which commanded all the United Nations medical resources in the country, including the establishment of a hospital facility in Kigali.

I received a telephone call late one afternoon asking could I organise some medical teams for Rwanda and had I ever heard of this place? I had heard of it and I had watched the news and I had considered that it was a possibility that we could be involved and I was very supportive. Within three days I had 25 people from South Australia prepared to go. This was reported back to Land Command which gave them the impetus to say “yes, we can provide a hospital with surgeons, anaesthetists and intensive care staff”.

Adelaide is quite a unique place and when it comes to producing Military Medical people.

This was a key factor in enabling the Land Command to mount the mission. The lead time was in the order of weeks and the Australian Government was in the process of making a decision based on the risks, balanced against the outcome.

My life became a mad whirl trying to organise varying forms of equipment through a fairly cumbersome military bureaucracy.

After all, we had not placed a significant Medical Military Mission overseas for 24 years, since the Vietnam days.

It did not help things that I was involved heavily as Commanding Officer with 3 Forward General Hospital at Keswick in organising Aboriginal Eye Surgery in Alice Springs as well as mounting a Forward Surgical Team and it’s equipment to Exercise Swift Eagle on Cape York. Everything happened at once. Still the Army way is that of a team and the team rose to the occasion and finally with locums in place and personal equipment organised, I was able to leave on the 12th August, in
company with LTCOL Stuart Inglis, Anaesthetist and LTCOL Toby Thomas Intensive Care Specialist. In fact, we promoted him on television at the airport, from Major to LTCOL. A good start!

Oh, by the way, we also were issued with trunks and this may not mean very much to the average person but a trunk to anybody going on a Military Mission equals luxury, as you can pack many things into a trunk! So in went the umbrella and the camping chair and just about every text book on trauma surgery that I could find.

Townsville was certainly a different temperature to Adelaide at this time of year and the next day was the first 5km run. On the Sunday we had a day off already so we went to Magnetic Island which was quite interesting but did present me with a problem because the Bankcard bills came in three weeks later back to Adelaide and my wife, Pauline said "Magnetic Island! It’s in Queensland, I thought he was in central Africa!". It needed an explanation.

The following week involved passing all our physical tests as well as revising the weapons including the Aust-Steyr and the 9mm pistol. Stuart proved to be deadly with the Aust-Steyr and Toby with the pistol. I have the fond philosophy that live ammunition and Medical Officers do not mix and thus was much more wary of both of them. LTCOL John Teh was with us at this stage and he was the General Surgeon having done 18 years in the Regular Army as well as serving in the Gulf War. An asset to any medical team, a very good surgeon and a great human being. We had our legal lectures on rules of engagement, mine awareness and even stress management, so the Army is improving, in case you hadn’t noticed.

Finally, on Saturday 20th August we packed up and flew out of a C5 (Galaxy) which was a huge aircraft where all the vehicles and trucks just drove on board and we sat up on top in relative luxury, almost up to the standard of the average airline. We flew to Perth then to Diego Garcia in the Indian Ocean, overnighting there, and then on directly to Kigali.

We sat in the airport under the hot African sun and then travelled by ambulance to the Central Hospital, Kigali (CHK). The streets were deserted in the city at this stage with barely a soul around and the part of the hospital that had been designated UN was essentially the previous private wing which had been built in 1968. This was fairly well trashed with many holes in the roof, the windows out and rubble everywhere in spite of the fine efforts by the advanced party who had cleaned up a large amount. Every door had been kicked in or broken and the rumour was that the patients had been locked in and the militia had come and killed them all. No confirmation but consistent with the previous circumstances. There was no running water, there was no electricity and we organised our beds with mosquito nets (soaked in pyrethrin of course) and during the night there was a thunderstorm with plenty of lightning, with the roof leaking on most of us. In the dark before dawn we heard the chanting of Africans and the stamping of feet in unison and having seen the film "Zulu" I thought I knew what was coming next, the massed charge.

It was however, new recruits from the RPA Barracks across the road doing their morning jog and singing ("The Rwandan Boys Choir"). Still when you arrive at a new place, it does seem a little disconcerting.

The following night we had an earthquake and after all I thought it was near the Rift Valley where life began and maybe we were going back to being primeval soup.

Things got better, but there were a few disconcerting activities. For example, there was gun fire near the morgue and fuel was stolen from the incinerator. RPA soldiers pointed weapons at our Infantry who went to "instant", and just to translate that means their weapons were cocked, loaded, with safety catches off. The next step is firing.

The pattern of the days began to form and after we gained our blue berets, we got on with the job. In fact, on day one there were injuries and we spent most of our days in the Rwandan part of the hospital operating on patients who had gun shot wounds, mine injuries and varying other forms of injuries. There was a large number of patients who had previous injuries from the war and they required further surgery. In all John Teh and I did 168 cases, most of which were major cases and we basically helped each other as well as performing surgery with other people.

We worked with a non-government organisation called “Emergency” which was a Swiss-Italian based surgical group providing surgery for the civilian victims of war. They had previously been with the International Committee of the Red Cross but moved onto their own organisation as they felt the Red Cross was too bureaucratic and too political. Their philosophy was to use 10% of their money on administration and the rest to go to the field and they will be starting this group in Australia and it may be that they will be able to cooperate with Care Australia, providing another facet of relief in the midst of a human crisis.

Our equipment was a little tardy in arriving, however the hospital that we had moved into was fully equipped when it hadn’t been devastated and most of this equipment was lying around in varying states of disrepair so with a little bit of activity and ingenuity, equipment was refurbished. We were lucky, once the ventilators had been cleaned and fixed by the nurses in Intensive Care, then there was an accident and we needed them. One patient (a gun shot wound to the lung) was on a ventilator for some 14 days. Our X-ray facility was performing in the order
of 180 cases a week and using up our films and developer at an alarming rate. Our mission in fact was to provide medical support (Level 3 which includes surgery) for the United Nations personnel as well as the volunteers in the non-government organisations. We were also to provide for senior Rwandan personnel.

In fact, this area of the hospital was not busy particularly and most of our surgery occurred in the Rwandan wards where the need was greatest. The basic operation was debridement of one leg which had been half blown off and then debridement of the other leg removing the first. They had been blasted in. Delayed primary closure on the basis of war surgery was routine.

If anybody deserved a medal it was the Australian soldier who ran the laundry that we brought with us. This is quite a large concern and he started off working on this huge mountain of contaminated blood and pus-stained blankets and sheets. Florence Nightingale took a mortality rate of 40 deaths per hundred soldiers in the Crimea down to five per hundred by basic discipline and hygiene and I am sure that CPL Lloyd, who ran the laundry, played a major role. It was a fairly unsung job and nobody wanted to go down to the basement because it stank so much.

I remember this well because my room was two floors above this mountain and the smell gradually got less as the weeks went by. In the Rwandan wards one could almost feel hope rising as the smell disappeared, the blankets became clean, the nurses became happier and the eyes peering out from the blankets seemed to show hope. In fact I met a tremendous number of extremely nice human beings and I still can’t understand how it all happened. I guess people from immigrant democracies really don’t know how to hate and maybe there is a lesson in that. At one stage, the Rwandan Government elected to try and charge $20.00 per fortnight for a Visa for everybody including UN as a means of raising funds. They didn’t seem to realise they were hurting the people they were helping most and in conversation in the Rwandan Theatre we were discussing this heatedly when a voice from a corner said “Sir, I am most worried” and the next patient whose head was poking out of the blanket spoke perfect English and he said he was a student from Burundi, which was the neighbouring country, and circumstances were such that he could not pay this money.

I said seeing his problem was a gun shot wound to the thigh with an external fixateur and segmental bone loss and a gaping wound, I did tell him that he shouldn’t worry too much about the fee as it was the least of his problems. Africa is full of surprises and a kaleidoscope of sensory input for your nose, your ears as well as colours for your eyes. We were woken in the morning by the “Woop Woop” bird and a hawk nested in our defunct air conditioner.

We started a post-graduate medical programme and became friends with Ghanaians, Sinhalese, Ethiopians and Tunisian doctors as well as the usual British and Canadians. The blue beret provided a universal bond and all other colours faded behind that blue and Australians fitted in extremely well because we were there to help and were not prejudiced against anybody, with minimal colonial baggage to carry. I guess that’s why they chose us.

I recall just before dusk observing two of our Infantry patrolling through the darkening ward areas of the Rwandan part of the hospital and they sat on a bench with their weapons and ammunition and started eating and a small girl came limping, with a crutch, and a white dress, out of one of the wards and limped, limped slowly 50 metres up to them and stood in front of them. You could imagine the picture. They looked at each other and handed over what they were eating whereupon she solemnly shook both their hands and turned and limped slowly back to the other children in the ward. The two soldiers looked at each other, winked and then swaggered out in fine Infantry style to complete their rounds. A strange contrast. I always wondered how the Australian soldiers seemed to attract piles of children, large numbers of which were on crutches with incomplete legs and arms. I felt pretty pleased to be part of that team.

The work went on but we did go to other areas such as Butari in the south and Kibungo in the south-east to perform surgery under fairly difficult circumstances. We did not do major cases here and it became fairly obvious that to maximise the use of our expertise did require the facilities of a hospital. A jet pilot is no use without his jet and in some ways, without the technology that I was used to. I felt like this on occasions, although we were able to perform major surgery with limited facilities.

I went to great lengths to point out that one of the unique things in Rwanda were the mountain Gorillas. In my guidebook it was described as a unique African wildlife experience. Finally we sent a reconnaissance party and two of the surgical team went, as we could not all go at once.

The road was rough, unbelievably rough, climbed the mountain and the air was thin and it almost killed me, particularly as I was carrying cameras. We saw the Gorillas and they were within touching distance and they were fantastic. They were huge, as they thrashed the bush around, the advice was to go in the Gorilla non-threatening position, crouching. At this stage I filmed grass. The Gorillas were in good condition with good fur, bright eyes and met us as equals. It was a unique experience and next time I go to the Zoo I think I am going to let them loose. They are vegetarians and they do not kill each other like chimpanzees and homo-not-so-sapiens. The
next week the other half of the team of four arrived. Then we handed over our cases, flying home via Nairobi.

There were two medical highlights worth recalling and one was 'Bosco the Skull' who was a small boy aged approximately nine, who fell into a fire and had burnt down to the bone in a large area over his skull. When we first discovered him he was basically a sea of pus covered in flies, probably ready to get septicaemia and die.

We cleaned him up and removed the outer diploe of his skull with an osteotome, down to the cancellous bone which grew a large amount of granulation and we steadily skin grafted this. His last operation was the morning we left and he seemed to be satisfactory.

Our soldiers did suggest that we get some steel-wool, painted in black and screw it in to give him hair which seemed like a good idea at the time.

The other medical highlight was the use of the Military version of an external fixateur developed in Adelaide.

The fixateur had been developed by Tony Pohl and his team at the Royal Adelaide Hospital and at my request they developed a military version of this a few years ago. We managed to get this through the Army logistics system (and I am still not certain how) and the first ones arrived the week before my departure.

As luck would have it, and we had been lucky there was no doubt, it was required two days later, so I was able to place the first one of these on a tibia.

In essence, I have come away with a unique experience. Having performed a large amount of surgery and developed tremendous respect for my colleagues and their ability to live and survive under difficult circumstances and be innovative, with tremendous expertise without the back up of the normal public Teaching Hospital system. I have come away having seen Kigali go from a ghost town to a busy city with, of course, the road accident rate increasing dramatically as a result. The city had been trashed and the good thing was that the traffic lights were all lying at funny angles or just plain shot out, but it didn't seem to make a lot of difference. Certainly the traffic lights in Adelaide were my first irritation on return to civilisation.

I came away with the view that the United Nations can be effective and that the blue beret was a great bond between people. The Australian Army in fact received special dispensation to wear the slouch hat with a blue puggaree around it and for the hot climate, I would see that as being extremely wise.

If the world is to be a better place we do need an effective United Nations and maybe with the UNAMIR II we have learnt the hard way, and with 7,500 Infantry in the country now it may be this will provide the framework for the Rwandans to build their nation again, with the eyes of the world upon them through the faces under the blue berets.
Abstracts From The Literature

Prepared by Andy Robertson


A review was conducted of papers describing the use of N-methyl-2-pyridinedaldoxime (PAM), toxogonin or HI-6 as antidotes to the nerve agents tabun, sarin, soman and VX. The review included use of the oxime alone, oxime plus atropine and oxime plus atropine plus diazepam, given therapeutically, i.e. after nerve agent, in all cases. Experiments with any of these compounds given prophylactically were not considered. The review also included protocols of pyridostigmine prophylaxis and oxime-atropine therapy (with or without diazepam) It was difficult to draw conclusions as to the best oxime to use, because of lack of data in many cases. The identity of the oxime did not appear to be important when pyridostigmine prophylaxis was combined with atropine-oxime-diazepam therapy: in these cases, very good protection was observed in guinea pigs against all four nerve agents. The choice of oxime based on the data presently available may well depend on factors other than protection against lethality, such as cost and availability of the oxime and human toxicity of the oxime. This last factor was also reviewed, and the results showed that toxogonin is likely to cause more side-effects than PAM or HI-6. The efficacy of the oximes against the emerging threat agent GF was also reviewed.

Comment: This is a useful review of an often confused and confusing therapeutic area. The move to HI-6 is occurring in many countries and, given the data presented here, this would be a reasonable course of action for the ADF to consider.


The National Academy of Sciences' Institute of Medicine conducted an independent scientific investigation to evaluate the strength of evidence for human health effects among veterans exposed to herbicides used in Vietnam and to suggest future research recommendations. Neurologic domains where multiple studies had been performed in military, occupational, or environmental situations were (1) cognitive and neuropsychiatric effects, (2) motor/coordination dysfunction and other central nervous system disorders, and (3) peripheral neuropathy. In all categories, no strong evidence established an association between herbicides used in Vietnam and clinical neurologic disorders. Methodologic weaknesses, long durations between exposure and assessments, and poor exposure measures limited many studies. The committee concluded that the available evidence was insufficient to determine an association between neurologic disorders and exposure to herbicides used in Vietnam. Neurotoxicologic studies available did not suggest strong biological plausibility for neurologic
alterations related to herbicide exposure. Furthermore, given the large uncertainties in the epidemiologic studies reviewed and inadequate control for important confounders, the committee could not quantify a degree of risk for neurologic disorders from herbicide exposure likely to be experienced by Vietnam veterans. Although not part of the neurologic report, the risk of brain tumors was considered in the cancer analysis, and the committee concluded that there is limited/suggestive evidence of no association between exposure to herbicides and brain tumors.

**Abstract:** In the light of the National Academy of Science’s paper noting the association between herbicides and certain cancers, this interesting review further clarifies the effects of herbicides used during the Vietnam war. The association between environmental factors and Gulf War Syndrome will be even more difficult to clarify.


A retrospective case-control study into the risk factors for injury during basic military training was conducted at Recruit Training Unit, Royal Australian Air Force Base Edinburgh, South Australia. Cases were recruits suffering a musculo-skeletal injury during the course, severe enough to result in backcoursing (being delayed and joining a later course) - usually requiring the loss of five days training. Controls were 629 recruits selected randomly from recruits who were not cases from the same period of 1 Jan 1985 to 31 Dec 1990.

238 cases were identified (2.7% of the recruit population), of which 122 were overuse type injuries and 115 acute type injuries. Most injuries occurred in the first two weeks of training.

Bivariate and logistic regression analysis of possible risk factors for injury was conducted, both for all cases and for the subgroup of cases with overuse injuries. Statistically significant associations were identified for female sex, body mass index >26.9, winter training, a history of lower limb injury and the presence of a lower limb deformity. All these associations were stronger for overuse injury, and in addition, pre-enlistment physical activity was also significantly associated with overuse injury. No significant association was found for height, weight, age, smoking or sex makeup of courses. Most striking was a large rise in female overuse injury incidence over the period of study, from 0.2% in 1985 to 8.8% in 1990. Reasons for this increase may include 'social pathogenesis'.

**Comment:** It is heartening to see topical and useful research emanating from the ADF. Lower limb injuries continue to be a vexed problem in all three services. This paper identifies key factors involved, many of which may be modified to reduce the injury rate. A prospective intervention study would be a useful future project.


This paper describes the case of an industrial radiographer who was seriously overexposed to gamma radiation. The exact circumstances of his exposure were not established but it was concluded that he was repeatedly irradiated probably to a total average whole body dose of at least 10 Gy over several years. Also, a much larger dose to a hand required its partial amputation. He developed myelodysplasia, which progressed to acute myeloid leukaemia from which he died.

Karyotypic examination of the leukaemic blasts showed changes very similar to those associated with secondary leukaemia that may develop after radio or chemotherapy. The paper describes his medical case history, the investigation of his workplace, and the attempts to estimate his radiation dose by chromosomal analysis of blood lymphocytes and electron spin resonance of dental enamel and bone.

**Comment:** This is a very interesting paper on the possible effects of large protracted doses of ionising radiation. Research on the chronic effects of radiation are continuing.


**Objective**
To clarify the effects of ionizing radiation and to dispel fear associated with the use of radioactivity in medical diagnosis and therapy.

**Design**
Studies of populations in geographic areas of increased cosmic radiation and high natural background radiation, radiation-exposed workers, patients with medical exposure to radioactivity, and accidental exposure are reviewed.
Results
No reproducible evidence shows harmful effects associated with increases in background radiation of 3 to 10 times the usual levels. American military personnel who participated in nuclear testing had no increase in leukemia or other cancers. Among 22,000 patients with hyperthyroidism treated with 131I (mean dose, 10 rem), no increased incidence of leukemia was found in comparison with 14,000 similar patients who received other treatment. A 20-year follow-up of 35,000 patients who underwent 131I uptake tests for evaluation of thyroid function revealed that those studied for other than a suspected tumor had only 60% of the thyroid cancers expected in a control group. Although early studies showed that high exposures to miners to radon and its daughters resulted in a substantial increase in lung cancer, no evidence exists for an increase in lung cancer among nonsmokers exposed to increased radon levels in the home.

Conclusion
Perhaps the association of radiation with the atomic bomb has created a climate of fear about the possible dangers of radiation at any level; however, no evidence indicates that current radiation exposures associated with medical usage are harmful.

Comment: This study and the following study by Darby et al. demonstrate that low grade radiation exposures (medical tests, etc.) are not associated with increased risks of cancer. The question of the risk from 1 to 2 Gray exposures remains unresolved.


Objectives
To study the long term effects of participation in the United Kingdom's atmospheric nuclear weapon tests and experimental programmes and to test hypotheses generated by an earlier report, including the possibility that participation in tests caused small hazards of leukæmia and multiple myeloma.

Design
Follow up study of mortality and cancer incidence.

Subjects
21,358 servicemen and civilians from the United Kingdom who participated in the tests and a control group of 22,333 non-participants.

Main Outcome Measures
Numbers of deaths; standardised mortality ratios; relative risks of mortality from all causes and 27 types of cancer.

Results
During seven further years of follow up the numbers of deaths observed in participants were fewer than expected from national rates for all causes, all neoplasms, leukaemia, and multiple myeloma (standardised mortality ratios 0.86, 0.85, 0.57, and 0.46); death rates were lower than in controls (relative risks 0.99, 0.96, 0.57, and 0.57; 90% confidence intervals all included 1.00). In the period more than 10 years after the initial participation in tests the relative risk of death in participants compared with controls was not near unity for all causes (relative risk 0.99 (0.95 to 1.04) and all neoplasms (0.95 (0.87 to 1.04)); it was raised for bladder cancer (2.69 (1.42 to 5.20)) and for cancers of the mouth, tongue, and pharynx (0.45 (0.22 to 0.93)) and for lung cancer (0.85 (0.73 to 0.99)). For leukaemia mortality was equal to that expected from national rates but greater than in controls for both the whole follow up period (1.75 (1.01 to 3.06)) and the period 2-25 years after the tests (3.38 (1.45 to 8.25)).

Conclusion
Participation in nuclear weapon tests had no detectable effect on expectation of life or on subsequent risk of developing cancer or other fatal diseases. The excess of leukaemia in participants compared with controls seems to be principally due to a chance deficit in the controls, but the possibility that participation in the tests may have caused a small risk of leukaemia in the early years afterwards cannot be ruled out.


Major air shows are potentially extremely hazardous events. They may attract large crowds numbering in the hundreds of thousands, and the communities in which they are held are usually not equipped to provide emergency services for so many individuals. It is not unusual for several hundred spectators to develop symptoms of medical illness substantial enough to require some elements of medical intervention. Added to this is the potential for and very real hazard of a major airplane crash or vehicular crash. Effective planning for such events is a complex process requiring coordination among various agencies. The Royal Air Force Mildenhall Medical Emergency Support Plan is an example of an approach used successfully to provide support for one
of the largest military air shows in the world. We present a comprehensive approach to providing urgent services for up to 700 potential casualties including on-scene definitive stabilization for those most seriously injured.

Comment: A useful addition to the military medical planning literature.


As part of an ongoing evaluation of US Army immunization policies, two serologic surveys were conducted at an army basic training centre. Antibody status to measles, mumps, and rubella were determined by an ELISA in 969 soldiers in 1989 and 992 soldiers in 1990. Measles seronegativity rates, directly adjusted to the 15- to 24-year-old US population in 1980, decreased from 21.3% in 1989 to 12.5% in 1990 (P < 0.001). Decreases also were observed in mumps (16.2% to 14.7%) and rubella seronegativity rates (18.4% to 14.3%) from 1989 to 1990 but were not statistically significant. In subgroup analyses, significant decreases in measles seronegativity were observed in younger, white, male, and female cohorts. There is evidence that susceptibility among young adults had declined, although it remains unclear if this is due to increased immunization or exposure to natural disease.

Comment: This would be a useful study to repeat under Australian conditions.


Background
The US Navy visits ports on all continents and many islands of the world, many of which are reported to have a high endemicity of human immunodeficiency virus (HIV) infection. The objective of this study was to determine whether visits to foreign ports by actively duty navy personnel were associated with increased risk of HIV infection.

Methods
The Naval Health Research Center in San Diego, Calif, maintains records of all HIV enzyme-linked immunosorbent assay and Western Blot tests given in the navy. This information, along with career histories and ship movement data, was used in a nested case-control design to examine the relationship between visits to the 100 foreign ports most frequently visited by the navy and risk of HIV seroconversion. All visits to a port and total time in each port during the study period were examined. A total of 813 seroconverters were matched to 6993 seronegative active-duty controls by age, race, sex, occupational group, home port, and year of test.

Results
Estimated relative risks of seroconversion associated with visits to foreign ports showed no statistically significant excess risk of HIV infection for navy personnel after visits to any foreign port.

Conclusions
These results do not imply that an individual’s risk of acquisition of HIV would be less in a foreign port if the individual engaged in high-risk activity there. Rather, they imply that despite the mobility of the US Navy and the large variation in HIV seroprevalence rates throughout the world, navy personnel generally do not appear to be acquiring HIV infections abroad.

Comment: Anecdotally this is the same in the RAN. A prospective study of the RAN’s rate of HIV seroconversion would provide support or otherwise for this theory.


A retrospective non-randomized study, comparing primary repair with colostomy, was made on a series of 102 patients with penetrating intraperitoneal colon injuries, in a war surgery programme in Cambodia. The overall case fatality rate (CFR) was 25.5%, whereas in the primary repair group CFR was 20%, compared to 30.8% in the colostomy group. The difference was not statistically significant (P = 0.30). Adjustment for possible confounding factors in the two groups did not alter the results. Considering the numerous advantages to the patient of a primary closure in the precarious situations where war surgery is often performed, this technique merits consideration.

Comment: A useful technique which warrants further research.

Diarrhoeal disease has always been a major medical problem during military operations. Lost personnel time has been significant, with over 50% of deployed forces being affected and unable to do their jobs for several days. During 'Operation Desert Shield' in Saudi Arabia in 1990, the US military took extensive precautions to prevent diarrhoeal disease. Surveys from 1% of the 200,000 US military personnel in Saudi Arabia indicated that 97% experienced diarrhoea, 22% sought medical care, and 19% were not able to perform their duties while affected. Medical evaluation of 452 individuals with diarrhoea determined a bacterial aetiology in 50% and a clear relationship with consumption of local fruits and raw vegetables. Prophylactic antibiotic administration was not a reasonable proposal and treatment was effective only when susceptibility patterns of local enteric agents were considered. Research efforts must continue for diagnostic tests to indicate which individuals with diarrhoeal disease would benefit from early antibiotic therapy and for development of vaccines effective against the common agents of diarrhoeal disease.

Comment: While further research into detection and prophylaxis is laudable, the importance of basic field hygiene needs to be stressed. Don't eat the food and don't drink the water!


The use of antibiotic impregnated beads has been shown to be a valuable adjunct in the prevention of infection in open fractures. The bead pouch technique employs these beads within the wound, producing high local levels of antibiotic in a moist environment. This effectively inhibits bacterial colonisation and wound infection whilst preventing desiccation of structures such as bone and tendons. This technique can be used to manage wounds until soft tissue cover is obtained, whether by delayed primary suture or by plastic surgical means. The potential use in acute military surgery includes the management of wounds associated with fractures, damage to tendons or neuro-vascular injury. In such cases delay in soft tissue cover may be clinically necessary or dictated by casualty evacuation to rearward surgical facilities. The bead pouch technique offers a means of managing the wound between initial wound surgery and soft tissue cover.

Comment: This looks like a useful technique. I would appreciate comment on its utility by our orthopaedic surgical colleagues.

Prepared by James Ross


Comment: Very useful update on developments in ejection seat technology: helicopters, supersonic and 'smart' ejection seats. A 'smart' seat will have an inbuilt flight computer to determine an optimum escape solution and a thrust vectoring control system. Inverted ejection due to the ground will be less hazardous, and the escape envelope greatly expanded.


Since May 1993, volunteers of the International Medical Corps have worked in Bosnia, helping to stave off the collapse of a medical system desperately damaged and overburdened by civil war.

Comment: The work of IMC has been substantially in training the desperately understaffed, under resourced, under equipped and under experienced Bosnians. Western methods of triage and Advanced trauma life support (give limitations in equipment) are being taught, and managed while they wait for peace.
United States military medical planning must reevaluate the practices of combat casualty resuscitation, transportation, and triage to secondary echelon care. Analysis of the experiences of other medical commands, such as that of the Israeli Defence Force, offers insight into improvements in equipment and training that are achievable with minimal cost. Training programs must involve formal instruction in Advanced Trauma Life Support for the combat corpsman, and ongoing experience in trauma surgery for personnel who are placed in the role of military surgeons. Today in military medicine there exists a major deficiency of expertise in trauma care, arising through near total lack of involvement in active trauma surgery on the part of military medicine training facilities. Civilian trauma centers offer an abundance of opportunity for military-like casualty management, and successful efforts to our command have integrated active duty personnel into this experience.

Comment: The problems are more acute in Australia with the relative lack of war-like trauma available.

Snoddy R O, Henderson J M. Predictors of Basic Infantry Training Success Mil Med 1994 159(9) 616-621

Because of shrinking resources, the United States military will be forced to carry out its mission in the future with maximum efficiency. Medical problems reduce the efficiency of the training of soldiers. Our project documents the medical problems that occurred in infantry basic trainees and tests easily obtainable information for its ability to predict the impact of medical problems on each trainee. The study involved 649 trainees undergoing a 13-week cycle of basic and advanced infantry training in one of three companies at the United States Army Infantry Training Center, Fort Benning, Georgia. The most common reason for sick call attendance among this group of trainees was upper respiratory infection. While medical illnesses were frequently seen, they did not cause a great deal of lost training time. Training injuries such as foot and lower leg overuse syndromes and patellofemoral knee pain were the primary causes of time lost. The average trainee made 1.58 = 1.61 visits to sick call during the cycle, with a total of 4.53 = 8.49 days of training time limited by profile. However, many trainees made no sick call visits and the majority of trainees lost no time due to medical problems. The strongest predictors of medical impact on training were a history of cigarette smoking and the initial performance of the trainee on the three events of the Army Physical Fitness Test. Based on the results of this study, we recommend that the military consider cigarette smoking as a negative factor in the selection of recruits and consider that recruits be required to meet some standard of fitness prior to induction.

Comment: The need for a pre-enlistment physical fitness test has been demonstrated by a number of papers. It is inertia more than anything else that stops it being implemented. Smoking as a negative for recruitment is more problematic. Does the immediate cessation of smoking change the outcome? What about false declaration: should people undergo a CO test at the time of application.

Brown F W. Military Paddling Permanent White Water: Managing Within the Paradigm Shifts in Military Medicine Mil Med 1994 159(9) 622-626

The challenges of managing military medicine over the last three decades have been complicated by rapidly changing priorities and redirections. Inspired by Kuhn’s theory of “paradigm shifts”, we can identify five distinct paradigms and four paradigm shifts that have dominated military medicine over the last 25 years. These shifts began in the early 1970s when military medicine was forced to make a transition from a focus on combat casualty care to the problems of becoming an all-volunteer force. These paradigm shifts continue in the form of the current challenges of simultaneously embracing new cost-conscious forms of health care delivery while downsizing the force. Each of the shifts has been characterised by a lack of anticipation and the onset of crisis. The present challenges faced by military medical leadership are not necessarily unprecedented; prescience in regard to inevitable future shifts could reduce turmoil and enhance adaptation.

Comment: Arguments for and against Kuhn’s Paradigm shift theory of scientific thought and progress are not particularly relevant to the sentiments in the article. However, Kuhn’s idea is that an old paradigm is dispensed with in favour of new. In this article, new ‘paradigms’ are added to, and often compliment, the old, complicating Military medicine. What has to be accepted is that management in any field has been complicated by, changes in external and internal factors just as much. We are not alone in facing permanent white water but must ensure always that patient care is the focus of the management.

Summary
Military surgeons in a future conflict may face the problems of wounds contaminated with chemical warfare (CW) agents. No useful guidelines for this eventuality exist - not any assessment of the specific CW risk to such casualties or to the surgical teams operating on them.

The principal hazard to surgeons is direct contact with contaminated clothing in the wound. Practices are recommended to reduce this threat significantly. Thorough wound excision augmented by lavage with a specific proprietary hypochlorite solution will provide effective wound decontamination without producing unacceptable tissue damage.

The vapour hazard at surgery is very low - respirators are unnecessary but goggles or glasses should be worn to prevent conjunctival splashes of potentially contaminated body fluids.

Comment: The last sentence of the abstract says it all. Risks from vapour from CW agents is low because of the low vapour pressure.


Summary
The objective of this study was to report on a breakthrough of Plasmodium falciparum infection following a military exercise in central Kenya and the treatment regimens used. A series of case reports are presented from the three UK hospitals involved.

Among 150 British soldiers who had been on exercises for five weeks in central Kenya, taking proguanil/chloroquine anti-malarial prophylaxis, seven developed symptomatic falciparum malaria. Initial symptoms, which started between 2 and 10 days before their return to England, included faintness, sweating, shivering, diarrhoea, headache and myalgia. Diagnosis was delayed from between 5 and 13 days after the first symptom. One patient was severely ill with 50% parasitaemia; he required intensive care, exchange blood transfusion and haemofiltration for acute renal failure. Compliance with chemoprophylaxis was not measured and anti-mosquito measures were not generally practised. However, British Army policy was amended in June 1993 so that mefloquine will be used in future rather than proguanil/chloroquine.

It was concluded therefore that even in an educated and motivated population simple preventive measures are not observed. Chemoprophylactic compliance could be improved by changing to a simpler regime. Falciparum malaria is a medical emergency that requires urgent admission for confirmation of diagnosis, supportive and curative treatment. Its presence should be suspected in any ill traveller.

Comment: No mention made of Doxycycline as a prophylactic anti-Malarial drug. British Army changed from Proguanil/Chloroquine to Mefloquine. They could well do with a further review of policy.

Saric V et al. NATO War Medicine Doctrine Revisited in Bosnia and Herzegovina J R Army Med Corps 1994 140: 132-134

Summary
NATO war medical doctrine was applied in the war in Croatia, Bosnia and Herzegovina. However, due to rather specific marital and organisational circumstances, the doctrine had to be modified, sometimes substantially. A medical team from the war hospital in Livno, Bosnia and Herzegovina describes their work with respect to the four-echelon NATO doctrine. The team covered a relatively large and active battlefield, and treated 597 patients with 314 major surgical interventions. Due to the lack of surgeons and medical personnel in general, the second echelon concentrated on fast transportation, and the third echelon fulfilled the function of the fourth echelon, completing the surgical treatment except for 12 patient with head and spine injuries.

Comment: No doctrine is worthwhile if it is not flexible. The NATO organisation was found to be 'suitable for the treatment of war casualties in Bosnia and Herzegovina ... as a basic model which can be further developed in accordance with local conditions and potentials in a defence war'. A strong endorsement.

Vassallo D J. The International Red Cross and Red Crescent Movement and Lessons from its Experience of War Surgery J R Army Med Corps 1994 140: 146-154

Summary
This article describes the evolution, motivation and structure of the International Red Cross and Red Crescent Movement, and its contribution to international humanitarian law. It explains the respective roles of its three components: the National Societies, the International Federation of Red Cross.
and Red Crescent Societies, and the International Committee of the Red Cross (ICRC). It highlights the ICRC’s experience of war surgery and emphasises the relevance of this for the military medical services, especially for the training of military surgeons and anaesthetists.

**Comment:** A useful history. Highly recommended.


A study was undertaken to document the incidence of overuse injuries sustained during basic military training. The injuries in military recruits (N = 1,261) undergoing basic training were documented prospectively over a 9-week period. Injury incidence was expressed as percentage of all recruits injured, weekly incidence (injuries/1,000 recruits/week), and injuries/1,000 training hours. The incidence of six common specific overuse injuries was also recorded. The overall incidence of injuries over the 9-week period was 31.9% (acut, 13.6%; overuse, 86.4%), or 1.8/1,000 training hours. The highest incidence of injuries was recorded in weeks 1 to 3 and week 9 of training, which were weeks characterised by marching (>77% of the training time). The highest incidence (injuries/1,000 training hours) of specific overuse injuries were tibial bone stress reaction (0.33), patellofemoral pain (0.22), and the iliotibial band friction syndrome (0.08). The incidence of stress fractures over the 9-week period was 1.2% (0.07/1,000 training hours). Injuries to the knee, lower leg, and ankle accounted for more than 80% of all injuries. A total of 36% of training days were lost during this period, mainly due to bone stress injuries. In order to reduce injuries during basic military training, attention must be directed towards (1) modifying the type of training and (2) prevention of bone stress injuries.

**Comment:** Another paper of particular interest to me. Results are generally complimentary to similar studies on recruit training injuries, except for a penchant for iliotibial band friction syndrome. A hobby horse of mine is the inability to get a consistency in the technology and definition of ‘skin splits’. Here they are called ‘tibial bone stress reaction’. We now know the problem: now we need intervention studies. Where are they?


Reports of radiofrequency electric shock and burn are rare. Such burns associated with radio frequency radiation may occur in two ways. Firstly, from exposure to radio-frequency radiation fields which induce current flow and heat in the body, as happened to hands entering a faulty microwave oven, or cases of child abuse in a microwave oven. Such burns tend to be layered at tissue interfaces and are delayed in appearing. Secondly, burns may occur after direct contact with an energised conductor when current is conducted through the body, as when a hand was caught in an electric welder or in surgical diathermy. Here, we report the conduction of a massive radiofrequency current flow through the whole body.

**Comment:** Useful reminder of the potential effects of acute radiofrequency radiation exposure by humans. An unusual event but the military is a field where such exposures are most likely.


**Comment:** See comments on NATO doctrine in Bosnia: doctrine needs to be flexible: provide key principles and leave the application and interpretation to the operational commander. This article follows that concept. (Note: this article was co-written by the assistant editor of this journal).


A survey of the literature reveals little data regarding modern aviation and combat-related stress, fatigue, or psychiatric disabilities. hat little is known about combat fatigue in aircrew is largely inferred from literature written about ground personnel. Understanding the unique aviation environment is necessary in order to develop effective combat fatigue prevention programs. This paper reviews and summarises the literature regarding aeromedical aspects of combat stress reactions. Combat stress, fatigue, and psychiatric disabilities are common battlefield conditions, but are largely preventable. If not prevented or treated appropriately, combat stress reactions will frequently lead to more serious psychiatric disabilities, causing the evacuation of the combatant away from his or her unit with no expectation of return to duty. Appropriate intervention using the basic principles of proximity, immediacy, and expectancy are crucial in reducing these
casualties and returning aviation personnel to combat duty.

Comment: A useful attempt to define combat stress in aircrew, but likely mistaken in the attempt to directly associate the problems in ground crew to those in aircrew. A few problems of definition: ‘the military physician should not restrict primary prevention efforts to individuals who experience symptoms…’ By definition, 1° prevention involves people without symptoms. Once there are symptoms, it is 2° or 3° prevention!

---

Book Review

Submitted by Jeffrey V. Rosenfeld


This book is much more than the autobiography of Admiral James Crowe who was appointed Joint Chief of Staff in the United States of America (USA) in 1985. The reader enters the arcane world of the top echelons of the US military, and is presented with an insiders account of how military leaders are selected. Interestingly, only 30 out of 1400 Captains reach the rank of Admiral in the USA. Admiral Crowe’s impeccable career is described in detail. His rapid rise to the top was somewhat unconventional in that he did not spend a lot of time at sea. His career took a side turn when he did a PhD in political science at Princeton. He later became Commander in Chief of the Pacific Forces (CINCPAC). Admiral Crowe believes that the most important priorities of military leadership are flexibility of thought and innovation.

The book gives the reader a candid behind the scenes look at the workings of the Pentagon, and the Joint Chiefs of Staff committee, and their relationship with the President and the Congress of the USA. Admiral Crowe paradoxically shows that although the Joint Chiefs are all powerful militarily, they are also apparently impotent in their influence on a peacetime US Congress and President. This is illustrated with discussion on the determination of the defence budget and the intense lobbying and struggling which must go on to maximise the budget, the political control of the defence budget, and the critical threshold of Gross National Product beyond which the defence forces would be dangerously compromised. Many parallels can probably be drawn with the Australian situation.

Some of the many and varied topics covered are the optimal size of the US armed forces in peacetime, how military force can be productively employed in peacetime, how Ferdinand Marcos was ousted from power in the Philippines, Middle East diplomacy, the importance of maintaining a military presence in Bahrain, problems with Qaddafi of Libya and the Achille Lauro terrorist attack. Nuclear issues such as the frighteningly realistic nuclear wargame TEWTS in the Pentagon, the complexities in the formulation of the START anti-nuclear proliferation treaty, and the reaction to New Zealand’s anti-nuclear stance, are discussed openly.

We are given a behind the scene glimpse and thus a different perspective on recent events on the world stage vis a vis the standard media analysis reported at the time. There is surprisingly little overt criticism of President Reagan, but one strong message to come through was that when the President’s military advice emanated from outside Pentagon control, major problems developed such as the Contra Scandal, IranGate and Starwars initiative.

For those who are interested in an interesting military biography, or a unique military perspective on important world events over the last two decades, or a lesson in how to reach ever higher levels of leadership and responsibility, this book is highly recommended.
From the Librarian

The AMMA's library remains in pristine condition, relatively unused, but looking great on my bookshelves. I do have to congratulate one intrepid researcher, however, who did borrow several books for some work.

There is a wealth of material in the Library, ranging from original tomes such as the 1911 RAMC Training Manual (1914 edition - we're still simple!), to modern historical offerings like the recently published O'Keefe book on wars in South-East Asia since 1948, and other activities with a medical bent (such as the books on medical expeditions to wilderness areas). RAAF and Navy are not forgotten either.

The full list of books is reprinted in this edition of the Journal. It's your asset - use it.

New Book
The following new book has been received by the library:


<table>
<thead>
<tr>
<th>US Army</th>
<th>Medical Consequences of Nuclear War</th>
<th>Australian Army</th>
<th>Soldering On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Army</td>
<td>Jungle Warfare</td>
<td>-</td>
<td>As You Were - 1947</td>
</tr>
<tr>
<td>-</td>
<td>As You Were - 1948</td>
<td>-</td>
<td>HMAS M33</td>
</tr>
<tr>
<td>Rupert Goodman</td>
<td>Hospital Ships</td>
<td>Rupert Goodman</td>
<td>Our War Nurses</td>
</tr>
<tr>
<td>E.E. Dunlop</td>
<td>The War Diaries of Wosty Dunlop</td>
<td>Alan S. Walker</td>
<td>The Island Campaign</td>
</tr>
<tr>
<td>Alan S. Walker</td>
<td>Medical Services of the RAN and RAAF</td>
<td>Alan S. Walker</td>
<td>Clinical Problems of War</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>Medical Treatment of Gas Casualties</td>
<td>A.A. Harrison</td>
<td>The Grey Battalion</td>
</tr>
<tr>
<td>-</td>
<td>RAMC Training - 1935</td>
<td>Gordon Seagraves</td>
<td>Memorandum on Medical Diseases in Tropical and Sub-Tropical Areas - 1941</td>
</tr>
<tr>
<td>-</td>
<td>Elementary Hygiene</td>
<td>Gordon Seagraves</td>
<td>Grey and Scarlet</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Dixon</td>
<td>Burma Surgeon</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Burma Surgeon Returns</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>On the Psychology of Military Incompetence</td>
</tr>
<tr>
<td>-</td>
<td>A Hospital At War</td>
<td>-</td>
<td>The Origins of the RAAMC</td>
</tr>
<tr>
<td>Joan Crouch</td>
<td>A Special Kind of Service</td>
<td>-</td>
<td>Behind the Wire</td>
</tr>
<tr>
<td>John Pearce</td>
<td>Pioneer Medicine in Australia</td>
<td>Dr. Barnett Clark</td>
<td>Nightingales is the Mud</td>
</tr>
<tr>
<td>Mezcal</td>
<td>Miracles of Military Medicine</td>
<td>Barker</td>
<td>The Man With the Donkey</td>
</tr>
<tr>
<td>J Henry Durant</td>
<td>A Memory of Solferino</td>
<td>Irving Benson</td>
<td>Handbook of the Royal Navy Sickberth Staff</td>
</tr>
<tr>
<td>Breton</td>
<td>The Great War and the RAMC</td>
<td>-</td>
<td>Medical Soldiers</td>
</tr>
<tr>
<td>Alison Starr</td>
<td>-</td>
<td>-</td>
<td>Recollections of a Regimental Medical Officer</td>
</tr>
<tr>
<td>W. Deane Butcher</td>
<td>Neville Howse VC</td>
<td>Connelly</td>
<td>Civilian Health in Wartime</td>
</tr>
<tr>
<td>-</td>
<td>Fighter Squadron Doctor</td>
<td>Steward</td>
<td>Twentieth Century Book of the Dead</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Journey to the Fourth World. The Hovingen Doctor Expedition to Nepal</td>
</tr>
<tr>
<td>Hamilton</td>
<td>Soldier Surgeon in Malaysia</td>
<td>Dinninade</td>
<td>-</td>
</tr>
<tr>
<td>Caldwell</td>
<td>Military Hygiene</td>
<td>Gil Elliot</td>
<td>-</td>
</tr>
<tr>
<td>Pearson CD</td>
<td>Beyond the Lagoon. Hoversdoctors to Papua New Guinea</td>
<td>Cole M</td>
<td>-</td>
</tr>
<tr>
<td>Dixon P</td>
<td>Amazon Task Force</td>
<td>O'Keefe B</td>
<td>-</td>
</tr>
</tbody>
</table>

Books in the collection are held by the Journal Editor, Surgeon Commander Russ Schelllich RAN. Loans of books for up to 12 weeks at a time can be arranged by contacting him as follows:-

PO Box 730, Telephone (Home) 02 4889949
Pymble NSW 2073 (Work) 02 5634563
Facsimile 02 5634519
News & Views

Financial Assistance to Special Interest Groups

AMMA members are reminded that financial assistance is available to Regional, Craft and Special Interest Groups of the Association to support activities they undertake.

Group Treasurers, or members who are running Groups can obtain more information from the Acting Treasurer: Dr Marcus Skinner, PO Box 373, MOONAH TAS 7009

What do YOU want from Your Association

The Australian Military Medicine Association has been in existence for some years now, and has continued to grow since those early days. We now number around 300 members, and are gradually attracting people from the broader range of health service professions, rather than just doctors. We hold increasingly successful conferences, and have a ‘journal’ which is improving. We have introduced research grants, and there is at least one strong regional group.

At a meeting held in Adelaide last month, Council reviewed the Association’s progress, and, while expressing some satisfaction with both the tangibles and intangibles of its success, posed the questions “what can we do better?” and “what do our members want of us?” We as a group, and as individuals, beaver away on our own course, but would be the first to acknowledge that we are not the “fountains of all knowledge” when it comes to how best to use the Association for its members.

Council reviewed the Association’s Statement of Objectives (see the front of this journal) and tried to discover what it could do to better meet these. There were some ‘germinations’ of ideas, which will be developed in the future.

But, what do you want from the Association? Council is here to serve you. You are the customer. With the true quality improvement philosophy, what can we do to improve your Association.

Tell us. Contact a Council member NOW.

<table>
<thead>
<tr>
<th>NAME</th>
<th>POSITION</th>
<th>WORK PHONE</th>
<th>WORK FAX</th>
<th>HOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Ross</td>
<td>President</td>
<td>(06) 266.3807</td>
<td>(06) 266.4982</td>
<td>(06) 281.4081</td>
</tr>
<tr>
<td>Nader Abou-Seif</td>
<td>Vice President</td>
<td>(03) 749.6777</td>
<td>(03) 748.7517</td>
<td>(03) 808.2897</td>
</tr>
<tr>
<td>Marcus Skinner</td>
<td>Secretary</td>
<td>(002) 38.8308</td>
<td>(002) 31.2043</td>
<td>(002) 34.7763</td>
</tr>
<tr>
<td>Robyn Green</td>
<td>Treasurer</td>
<td></td>
<td></td>
<td>(018) 128668</td>
</tr>
<tr>
<td>Russell Schedlich</td>
<td>Journal Editor</td>
<td>(02) 563.4506</td>
<td>(02) 563.4519</td>
<td>(02) 488.9949</td>
</tr>
<tr>
<td>Chris Maron</td>
<td>Member</td>
<td>(09) 550.0561</td>
<td>(09) 550.0600</td>
<td>(09) 592.5281</td>
</tr>
<tr>
<td>Peter Warfe</td>
<td>Member</td>
<td>(06) 266.3913</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Janet Scott</td>
<td>Member</td>
<td>(08) 272.7399</td>
<td>(08) 373.3748</td>
<td>(08) 278.8575</td>
</tr>
</tbody>
</table>
Have you been to a Conference lately?

Not having a great travel budget, the Editor relies on the efforts of many others to supply copy for this publication. ‘Many others’ includes you, the reader.

Have you been to any conferences lately where military medicine was an integral part of the Conference matter, mentioned in passing, or just simply relevant to the Conference (or vice versa)? If so, please consider writing a short review of the conference. We’re not after detailed scientific synopses, but just general interest stuff that might encourage members to attend a similar conference in future years.

And if the Editor finds out you have been to a Conference (and, dare I suggest it, not volunteered to write). Beware. After raiding your travel funds, I will wring a review out of you!

Historic Stamp Cover

A strictly limited number of historic stamp covers produced for the AMMA’s Third Annual Conference are still available. These covers feature the 1991 Australia Day set of the Australian National Flag, White Ensign, RAAF Ensign and the Red Ensign. Only 100 of these were produced, they are individually numbered, and sell for the bargain basement price of $10. These will definitely be a collector’s item, particularly after the Republic and new flag!! For details, contact Nader Abou-Seif on 03 7496777.

MERCHANDISE

Items of merchandise featuring the AMMA logo are still available, particularly ties and T-Shirts. You should definitely get these before the next Conference - all the best dressed delegates will be wearing them.

For details contact Nader Abou-Seif on 03 7496777
## Conference & Meeting Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Conference</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-04 March 1994</td>
<td>ANZAOMS Biennial Conference</td>
<td>Sydney</td>
</tr>
<tr>
<td>06-11 March 1995</td>
<td>Wilderness Medical Society</td>
<td>Keystone, Colorado</td>
</tr>
<tr>
<td>07-09 March 1995</td>
<td>Ninth International Simulant Workshop</td>
<td>Aberdeen, Maryland</td>
</tr>
<tr>
<td>18-22 March 1995</td>
<td>Australian Dental Congress</td>
<td>Hobart</td>
</tr>
<tr>
<td>20-23 March 1995</td>
<td>Managing Occupational and Environmental Health Hazards</td>
<td>Helsinki, Finland</td>
</tr>
<tr>
<td>27-31 March 1995</td>
<td>12th World Congress of Physical Medicine and Rehabilitation</td>
<td>Sydney</td>
</tr>
<tr>
<td>18-21 April 1995</td>
<td>Moving in on Pain Conference</td>
<td>Adelaide</td>
</tr>
<tr>
<td>May 1995</td>
<td>SPUMS</td>
<td>Fiji</td>
</tr>
<tr>
<td>07-11 May 1995</td>
<td>Aerospace Medicine Association</td>
<td>Anaheim, California</td>
</tr>
<tr>
<td>17-19 May 1995</td>
<td>Fourth National Nursing Forum</td>
<td>Launceston</td>
</tr>
<tr>
<td>01-04 June 1995</td>
<td>International Academy of Peridontology</td>
<td>Monaco</td>
</tr>
<tr>
<td>01-04 June 1995</td>
<td>International Academy of Peridontology</td>
<td>Monaco</td>
</tr>
<tr>
<td>20-23 June 1995</td>
<td>First Biennial International Nursing Conference</td>
<td>Reykjavik, Iceland</td>
</tr>
<tr>
<td>22-26 June 1995</td>
<td>RACP and Faculties</td>
<td>Gold Coast</td>
</tr>
<tr>
<td>31 July-1 August 1995</td>
<td>The Future of Nursing</td>
<td>Canberra</td>
</tr>
<tr>
<td>06-12 August 1995</td>
<td>2nd World Congress on Wilderness Medical</td>
<td>Aspen, Colorado</td>
</tr>
<tr>
<td>01-03 September 1995</td>
<td>AMMA Conference</td>
<td>Sydney</td>
</tr>
<tr>
<td>07-10 September 1995</td>
<td>AMSANZ</td>
<td>Adelaide</td>
</tr>
<tr>
<td>20-22 September 1995</td>
<td>Asia-Pacific Conference on Occupational Health and Safety</td>
<td>Brisbane</td>
</tr>
<tr>
<td>22-26 October 1995</td>
<td>International Congress of Aviation Space Medicine</td>
<td>London</td>
</tr>
<tr>
<td>19-23 January 1996</td>
<td>Asian Pacific Dental Congress</td>
<td>Bombay, India</td>
</tr>
<tr>
<td>10-13 June 1996</td>
<td>7th International Congress of Infectious Disease</td>
<td>Hong Kong</td>
</tr>
</tbody>
</table>

## New Members

The AMMA would like to welcome the following new members:

- **Dr Michael Tyquin**
  - North Melbourne, Victoria
  - Hawthorn, Victoria
- **Dr Thomas F. Spring**
  - Washington DC, USA
  - Washington DC, USA
- **Professor Richard Southby**
- **Col. Janet Southby**
- **Dr Suresh Badami**
  - Berkeley Vale, NSW
  - Wayville, South Australia
- **FLT LT Matthew Ma**
  - Penrith, NSW
  - Lane Cove, NSW
- **Dr Patrick Rundle**
  - Norwood, South Australia
  - North Balwyn, Victoria
- **Susan Winter**
  - San Antonio, Texas, USA
  - Oakey, Queensland
- **SBLT James Rohrsheim**
- **Dr Geoffrey Jenks**
- **LTCOL Paul Alexander**
- **Dr John Newlands**
NOTIFICATION

ALL MEMBERSHIPS FELL DUE FOR RENEWAL IN DECEMBER 1994.

To retain current membership, please complete the form below and return it with a cheque for $30.00 to:

Dr M.W. Skinner
Secretary
AMMA
PO Box 373
MOONAH TAS 7009

ARE YOU STILL FINANCIAL?

RENEWAL OF MEMBERSHIP

Rank/Title: __________________ Name: ______________________________

Address: __________________________________________________________

State: _______________ Postcode: ____________ Phone No: __________

Please find enclosed a cheque for $30.00 being payment of membership fees up to and including 31 December 1995.

NOTIFICATION OF CHANGE OF ADDRESS

Rank/Title: ______________ Name: ______________________________

New Address: ______________________________________________________

State: __________________ Postcode: ____________ Phone No: __________

Previous Address: ________________________________________________

State: __________________ Postcode: ____________ Phone No: __________

Page 40
AUSTRALIAN MILITARY MEDICINE ASSOCIATION

Application for Membership

I wish to become a full/student/associate member of the Australian Military Medicine Association. I submit the following details so that accurate membership records and academic status of the organisation be maintained.

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Title/Rank)</td>
</tr>
<tr>
<td>Surname</td>
</tr>
<tr>
<td>Given Names</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ /</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Business Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburb</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Postcode</td>
</tr>
<tr>
<td>Country</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Business Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Telephone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postal Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburb</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Postcode</td>
</tr>
<tr>
<td>Country</td>
</tr>
</tbody>
</table>

Primary Qualifications

<table>
<thead>
<tr>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
</tbody>
</table>

Qualifications to be obtained and year anticipated for completion (student membership only).

Other Qualifications

How long have you been interested in Military Medicine?
What is your experience in Military Medicine (list publications if any)?

Currently serving in a Defence Force? Yes/No (please circle as appropriate)
If yes, which country?
If yes, Permanent / Reserve / Navy / Army / Air Force

Signed: ______________________  Date: ____ / ____ / ____

Please return this form with a cheque in Australian dollars made out to AMMA for:

| $80 full Members ($50 joining/$30 annual) |
| $30 Student/Associate ($20 joining/ $10 annual) |

To: Dr M. Skinner, Secretary, AMMA, PO Box 373, Moonah, TAS 7009 Australia