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REPORT FROM FIJI

Greetings from a warm and very humid Lautoka, Fiji. The following is a condensed version of a poster I presented to the Engineering in Physics and Medicine Conference held in Queenstown N.Z. in November 1995. The poster was entitled "Biomedical Engineering in Fiji." The purpose was to raise the profile of the Biomedical Engineering field in Fiji to the delegates of the conference.

As mentioned in my previous article Biomedical Engineering has been staffed by expatriate Australians employed partly by Aus Aid since 1989. There is an Engineer, Bob Daly, Department Head, Suva, myself, Senior Technician, Lautoka and seven local staff. One of these staff has just left for Melbourne to study for his Biomedical Engineering Degree. Upon completion he will return to Fiji to become Department Head. Another major development has been the planning for a new Biomedical workshop at Suva to replace the 5 year old 'temporary' one. The Lautoka Biomedical workshop/office was completed at Christmas 1994 (5 months after my arrival) it took a further 3 months to get a fax line! We were fortunate to have a room made available to us.

During the course of my employment I have been fortunate in being able to see first hand the experiences of the more isolated Health Care personnel. These people do it tough with little or no supervision. The quality of Health Care is very much determined by the individual in residence. Biomedical Engineering is responsible for the electromedical (and other patient related) equipment in these centres and all others up to Divisional Hospital level. Of these Hospitals, Suva Hospital has 500 Beds, Lautoka 250 and Labasa 150. Most specialties provided can be found at Suva.

Biomedical Engineering is fortunate in having a large budget, which seems to increase each year. This budget, \$1 million plus management of an additional \$0.8 million endows a large responsibility. The budget is for all new and replacement Electromedical Equipment, updating spare part stocks and some disposables and also test equipment and tools. There is, as always, more demand than resources. It is quite rewarding to see the difference that a new or replacement machine makes on site. One has to be careful, as always, that the staff have a good understanding of the equipment to ensure the long term viability of such a machine. I still have been frequently amazed at what is not known. A sizeable budget for the last 5 years has meant that most of the ancient equipment has been removed from service. At this stage the perception is that the electromedical equipment provided has exceeded the capabilities of the majority of the Medical, Nursing and Technical staff available to use it.

It would seem that the Medical Department is happy with these decisions because the funding level increases each year. Unfortunately the areas of responsibility also increase as the Medical Department devolves too much responsibility away from the locals who should be learning to make these decisions. The Fiji Government in the past has never allowed local staff at the level of our local Technicians to manage this amount of capital. It is unlikely to assume that such big budgets will continue after 'localisation' of Senior

positions takes place. Unless the capital is available and managed well the problems in the past leading to the need for external help in Biomedical Engineering will be repeated.

It is a very rewarding and interesting experience to work in Fiji. The work is such that in some areas the whole community is aware of the difference you make. I have learned a great deal more about Biomedical Engineering. It is necessary to have (or develop quickly) a broad knowledge of other related fields as this expertise is not always available. I find great personal satisfaction in observing people doing work that previously they didn't know how to or had little understanding of, knowing you contributed to it. Both Fijians and Fiji Indians are exceptionally generous in their thanks. The Fijians are consistent in their approach to you and do appreciate your efforts to do likewise. It goes without saying that the weather is good and the scenery isn't bad either.

In conclusion is a list of peculiarities that make work in Fiji (and , I suspect) most developing countries more unique.

Thank you for your interest
David Luhrs.

Peculiarities

FIJI TIME

The endemic attitude of a reasonable number of locals can be loosely blamed on this phenomenon. Most third world or developing countries suffer from a version of this. Standards are low as is initiative to improve it. If you show initiative you get the job! Therefore you have to work harder. A fairly undesirable situation easily solved if you keep your mouth shut. As a result change and most normal work takes a long time.

BRAIN DRAIN

As a result of the above any one who does show some initiative in spite of the 'problem' mentioned is likely to get quite frustrated and if the frustration is consistent will start looking for greener pastures . Since 1987 there has been quite an exodus of population and information back to Fiji about the places emigrated to, and people to sponsor immigration to these countries have rapidly increased.

HUMIDITY

The Fiji group of Islands are blessed with a humidity of not less than 50%. More often than not it is much higher than this. Average temperatures are 25-35C. Equipment kept outside rusts (if it is not flattened by a Tropical Cyclone!) and internal stored equipment is subject to mould.

ISOLATION

Most Health Centres are very hard to get to. Transport is scarce or non existent. Sometimes there is no transport route. Others centres are quite inaccessible. As an example almost all of Fiji's Ambulances are converted four wheel drives. Biomedical

Engineering's access to equipment in these centres is almost as bad as the people who live in these areas accessibility to Health Care.

Today's Fijians are the first generation with access to more complex technology. In Electromedical Equipment they have had it thrust upon them at a faster than normal rate. A significant number of the staff are unaware of how the equipment works (certainly most would be unaware of all the features available to them) and this means the user often is not aware of the equipment starting to go wrong. Most problems are not discovered in their early stages.

OBITUARY TO DAVID JOHN DEWHURST

In early March David Dewhurst sadly passed away. David was a pioneer in biomedical engineering in Australia and almost all working in the field would have had contact with or been influenced in some way by David. David was instrumental in setting up the SMBE here in SA and was a life member.

The following obituary was written by Richard Kirsner , Lindsay Dally and other colleagues at the Department of Physiology, University of Melbourne.

David John Dewhurst, AM, BA(Hons), Msc, Phd, FIEAust. Gifted teacher and pioneer in medical instrumentation. Formerly Reader in Biophysics and Biomedical Engineering, University of Melbourne Born: 8th January 1919, Died: 4th March 1996 aged 77.

David completed an Honours BA in classics in 1939, intending to follow his father as an Anglican priest, but after war service in the AIF Corps of Signals, he took a B.Sc. in physiology and electronics, and in 1949 was appointed Lecturer in Physiology at the University of Melbourne. His Biophysics Unit soon became a renowned centre of medical instrumentation. There was little money but he and his technical staff became skilled in using army disposals components to build innovative instruments for Physiology's research and teaching. He gained his PhD in 1959 and in 1964 was appointed Reader in Biophysics.

He was a born teacher. For many years, he ran a course in medical electronics for biological researchers which had a major influence on medical technology and research in Melbourne. In 1966 David acquired a PDP-8, the first mini-computer in Melbourne, and used it to pass on computer skills to students, colleagues, and the wider biomedical community with a course on computer methods in biological research.

In 1959, he became involved in activities of the then small International Federation for Medical & Biological Engineering. He subsequently became a member of its Administrative Council and in 1971, under his Presidency, Melbourne hosted the 9th International Conference on Medical & Biological Engineering. In 1979, he was made an

Honorary Life Member of the IFMBE - a rare honour. From 1977 to 1988 he wrote a column for the IFMBE newsletter called "On the Real Axis". The articles ranged widely - observations on the practice of biomedical engineering, its human relationships, ethics, with asides on topics ranging from wombats to steam engines to the Plague. In 1991 a selection of these very popular articles was published as a book.

The SMBE (Vic) started in 1959 while David was in England. On his return in 1960, he became very involved in its activities and became its second President. He spoke at many of its meetings over the years and played a major part in setting up the Australian Federation for Medical and Biological Engineering. He also played a major role in the formation of the SMBE (NSW) and the SMBE (SA). His interest in improving the organisation and status of biomedical engineering in Australia was a major factor in the formation of the IBME (Aust).

In addition to his work in medical computing he was involved in many facets of biomedical engineering from the design of the first cochlear ear implant - the bionic ear - to the development of Australian Standards for medical equipment to the introduction of magnetic resonance imaging into Australia. His disabled son inspired his strong commitment to the needs of disabled people and led to FRED, an interactive teaching device that has given many severely disabled people a degree of independence and the conviction that they can achieve something. In 1990, he was made a Member of the Order of Australia for "services to biomedical engineering for people with disabilities".

He never really retired. After leaving the University, he continued his consulting work and was actively involved in the Portarlington community and the local Anglican church. He leaves a wife, Majorie, and children Penny and Tim.

RWANDA: HOPE AND HEALING FOR A NATION IN POST-TRAUMATIC SHOCK

Timothy G. Larson World Medical Mission is the medical arm of Samaritan's Purse, an international Christian relief organisation headquartered in Boone, NC, and headed by Franklin Graham, the son of Dr. Billy Graham. As a provider of professional medical and technical assistance to hospitals in the developing world, and of emergency medical teams for disaster areas and war zones, World Medical Mission has spent the past year rebuilding the health care delivery system of Rwanda. World Medical Mission staffer Timothy G. Larsen tells here of their efforts to reestablish medical services throughout the war-torn nation. The biomedical personnel who have been directly involved in the technical aspects of this project are Carl Ahlbom, Patricia Barnett, BSRT, MS, Wesley Benfield, AAS, Todd Castle, AAS, Richard Wood, BA, and William, PE, under the direction of Donald C. Mullen, MD, Mdiv, President of World Medical Mission. For more information about service opportunities, please call Rick Wood at (708) 262-0175.

Nearly one million people were killed in Rwanda in the spring of 1994 in the civil war between the Hutu and Tutsi tribes. The Hutu majority government's secret police selectively targeted and eliminated the best and brightest of the Tutsi tribe, and in the conflagration that followed, Samaritan's Purse was one of the few relief organisations to operate medical facilities behind the Tutsi lines. When the war ended the Tutsis' Rwanda Patriotic Front controlled the country and asked Samaritan's Purse and its medical arm, World Medical Mission, to reopen the Central Hospital of Kigali. This complex of ranch-style buildings sprawling over a hillside in the capital had been the site of thousands of killings.

Early April 1994

Graphic news videos of the Rwanda civil war shocked the world in April 1994, as we witnessed hundreds of bodies floating down a river in Rwanda to Lake Victoria in East Africa. This dark episode took nearly a million lives in six weeks. The weapon of choice for execution was the machete. Today, the cities and towns do not show the devastation of shelling and bombing that one expects to see after a war. Most buildings remain unscathed, leaving the spoils of war intact for the perpetrators. Thus, the scars that remain are largely those that are invisibly but permanently, etched in the hearts and minds of the survivors. Rwanda is a nation suffering from post-traumatic shock.

Late April 1994

During this short but deadly war the Central Hospital of Kigali was a focal point in the killing. Buildings that had been dedicated to healing only days earlier quickly became centres of death when machete-wielding death squads killed or chased away the doctors and nurses. The killers dragged patients out of their beds and slashed their throats over toilets. Tutsis and politically moderate Hutus captured elsewhere were brought to this central location to be systematically butchered. So much blood flowed in the hospital that the plumbing became clogged with congealed blood. Body parts were scattered everywhere. These unspeakable horrors greeted the Samaritan's Purse team that arrived in late July to reopen the hospital.

Late July 1994 The First Samaritan's Purse team entered Kigali only days after the war officially ended. Sporadic fighting continued, however, and security remained a major concern. At night the team heard gunfire; by day, team members faced tasks for which their formal training had not prepared them.

First, a base had to be developed near the hospital to accommodate the team, and the Rwanda Patriotic Front allowed Samaritan's Purse to use a large villa that stood behind a high wall with iron gates. This beautiful property had been the scene of a mass murder. A couple of days before the team arrived, more than 20 bodies had been buried in a common grave in the backyard, but there were still body parts in the house and in the yard. The lingering odour of death was so great that many team members chose to sleep in tents in the yard until a special odour-eliminating paint could be applied in the affected areas of the house. When the grim task of removing and burning remains was completed, the team moved on to the hospital to continue this work on a much larger scale.

Early August 1994

The task of cleaning up the hospital was one that no one in Kigali wanted. The Rwanda Patriotic Front could not offer anyone enough money to do it, and none of the other relief organisations offered to help with this part of the work. Only when Dr. Gene Rudd led the Samaritan's Purse team into the first building and began scooping the congealed blood out of the toilet bowls did anyone else step forward to help. The only alternative to cleaning up the hospital would have been to abandon it and start over. But the hospital infrastructure could not have been replaced in time to serve the critical needs of a wounded and suffering population. Time was critical, and it took an extraordinary willingness on the part of a few American volunteers to do what otherwise would have been unthinkable.

Once the Herculean task of making the hospital habitable again was completed, the technical work began. While much of the medical equipment survived, most of the power distribution system in the hospital had been damaged by the fighting. In their haste to restore electrical service after the war, some inexperienced workers had incorrectly connected a high-voltage line to the operating room(OR) building. This caused a large power surge that blew out the OR lights, the electrosurgical units, and the patient monitoring equipment in all four surgical suites. The resulting lack of power and OR equipment made surgery quite difficult, and many procedures were done under what amounted to battlefield conditions.

Though the war was over, land mines continued to cause critical injuries, and two or three victims were brought into the hospital each day to have the remains of their limbs surgically repaired.

The plan was to bring the 600-bed hospital back to full operation one ward at a time, giving priority to the most acute diseases. Cholera is often the greatest killer in the aftermath of war, so the team opened a special cholera ward first. Clean drinking water is the most important element in eliminating cholera, and Samaritan's Purse logistics personnel arranged for the transportation of water from purification units that the U.S. Army had set up near Kigali International Airport.

Another area needing immediate attention was the maternity ward. While thousands of women and their unborn children were murdered in the war, a significant number survived and needed medical attention. The team leader, Dr Gene Rudd, an ob-gyn specialist from Marion NC, soon found himself delivering several babies every day in the reopened maternity ward. A week later, the team opened the paediatrics ward.

Late August 1994

By the second half of August, the Central Hospital of Kigali was beginning to function again as a normal medical facility. Many administrative and support staff members had returned, and the institution began to take on its former character. The team obtained a generator capable of powering the entire hospital, and they repaired the damage to the electrical distribution system. Power was finally restored to the OR, and surgeons were able to perform a full array of surgical procedures.

Early September 1994

By the first of September, 200 of the hospital's beds were available, and there was a growing need for additional equipment and furnishings. With the assistance of the congressional delegations from North Carolina and South Carolina, the U.S. Air Force unit at Charleston Air Force Base provided Samaritan's Purse with a C-5 transport to airlift approximately 35 tons of medical equipment and supplies to Kigali. Samaritan's Purse sent a significant amount of equipment that the organisation's biomedical technicians had reconditioned at their facility in Boone. King Pharmaceutical in Bristol, TN, also donated five tons of medicine and intravenous (IV) fluids. The military logistical support made it possible to complete the refurbishment of the hospital and share excess materials with other relief groups working in the Kigali area.

Having consolidated its operations in Kigali, Samaritan's Purse moved the orphanage near the border in Rutare to the capital. The government provided the site of the former agricultural college, and the team set up a clinic on-site to care for the medical needs of the 400 children there. Samaritan's Purse was also responsible for one of the first schools reopening in the city, serving over 700 children from the orphanage and the surrounding community.

Mid-September 1994

As additional medical and surgical wards were reopened, the need for IV fluid became critical. The hospital had a perfusion plant that produced IV solutions by reverse osmosis, but it had been damaged in the fighting. World Medical Mission biomedical technician Rick Wood teamed up with representatives from the Belgian manufacturers of the plant operational. With no other production unit in the country, IV fluid had to be flown in at considerable cost until the system could be restored to normal functioning.

Early October 1994

By the first of October, 300 of the hospital's 600 beds had been reopened. Three months had passed since the end of the war, and the Samaritan's Purse team expected to see the medical professionals return to their positions at the hospital. However, only about one-third of the Rwandan medical staff returned, an insufficient number to meet the need. Professional staffing became a critical problem. The original group of American volunteers was near to completing its time commitment, and it was difficult to replace these people on such unexpectedly short notice. The recruitment and placement team at the Samaritan's Purse home office, led by Becky Williams, RN, BSN, worked many late hours to find doctors and allied health care professionals to fill the urgent need in Rwanda.

It soon became apparent that a disproportionately large number of professional and well-educated people had been targeted in the genocide. In less than two months, nearly an entire generation of health care professionals had been eliminated from Rwandan society and many of those who had escaped the slaughter had left their homeland.

Late October 1994

After almost four months of work, the hospital was operating near capacity, mostly with

expatriate physicians and with the financial support of Samaritan's Purse. Over 100 Rwandan nurses and aides finally returned to handle patient care, and the American volunteers were able to take on a training and support role.

The Air Force airlifted a second C-5 load of medical equipment and supplies from Charleston, South Carolina, to Kigali, delivering the balance of the materials needed to complete the reopening of the hospital.

Winter-Spring 1994-1995

Over the next six months, additional equipment was installed and the new government gradually assumed responsibility for hospital administration with full control by the end of May. Pat Barnett, Samaritan's Purse's certified radiographic technologist and x-ray service technician (the only person we know of to combine both specialties), came to supervise the installation of an x-ray system. Along with Rick Wood, she also installed a unit at the Kibagora Hospital on the Zairian border. Biomedical equipment continued to require service and repair by Samaritan's Purse personnel, because there were no Rwandan technicians available. Samaritan's Purse continued to recruit and send volunteers from the United States and Canada.

Summer 1995

To help Rwanda to rebuild its medical education infrastructure and thus replenish the ranks of health care professionals, Samaritan's Purse developed and submitted grant proposals to a number of private foundations and government agencies. In the meantime, the first class of medical assistants was selected for September enrolment in the core nursing curriculum to be taught by Samaritan's Purse staff.

In the span of a year, World Medical Mission's professional and technical personnel have watched a society come back from the brink of self destruction. They have been instrumental in reestablishing the health care delivery system of this nation by providing resources for physical and spiritual healing.

Timothy G. Larsen joined Samaritan's Purse and World Medical Mission in 1993 as the director material and technical services. He holds an MA from Vanderbilt University, an MBA from Pepperdine University, and a certificate in health services administration from the University of Southern California School of Public Administration. During the Rwandan crisis, he served as assistant to the president of World Medical Mission and as a management consultant for hospitals in the developing world.

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NEW MEMBERS

The Council welcomes Lubomir Lliev , Biomedical Engineering , TQEH and David O'Connell , Biomedical Engineering , W&CH; to the Society.

CONFERENCE CALENDAR

May 26-30 1996 The 2nd Medical Engineering Week of the World, Taipei, Taiwan
June 9-13 1996 10th Nordic-Baltic Conference on Biomedical Engineering, Tampere, Finland
October 21-24 1996 EPSMH'96 Engineering and Physical Science in Medicine and Health, Canberra
Sept 8th 1997 Annual Biomedical Engineering Conference, Adelaide, SA
Sept 14-19 1997 World Congress on Medical Physics and Biomedical Engineering, Nice, France

Information on the above are available from the editor or president
